

B V RAJU COLLEGE

**VISHNUPUR
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FACULTY RESEARCH PUBLICATIONS

ACADAMIC YEAR 2022-23

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NUMERICAL SOLUTION OF FREDHOLM INTEGRAL EQUATIONS ARISING IN APPLICATIONS OF SCIENCE AND ENGINEERING

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Abstract:

We present the numerical solution of the Fredholm Integral Equations by using the analytic method (Adomian Decomposition Method). To illustrate the accuracy and efficiency of the proposed method (ADM), some numerical examples have been performed. A Fredholm integral equations is solved by ADM which gives us the approximate solution of the problem that tends to the exact solution of the problem.

Keywords:

Adomian Decomposition Method, Integral Equations, Fredholm Integral Equations, Numerical Example.

Adomian Decomposition Method

The Adomian Decomposition method (ADM) is very powerful method which considers the approximate solution of a nonlinear equation as an infinite series which actually converges to the exact solution in this paper, ADM is proposed to solve some first order, second order and third order differential equations and integral equations. The Adomian Decomposition method (ADM) was firstly introduced by George Adomain in 1981. This method has been applied to solve differential equations and integral equations of linear and nonlinear problem in Mathematics, Physics, Biology and Chemistry up to know a large number of research paper have been published to show the feasibility of the decomposition method.



STUDY OF SOME FREDHOLM INTEGRAL EQUATIONS ARISING IN APPLICATIONS OF SCIENCE AND ENGINEERING

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Abstract:

We present the numerical solution of the Fredholm Integral Equations by using the analytic method (Adomian Decomposition Method). To illustrate the exactness and efficiency of the proposed method (ADM), some numerical examples have been performed. A Fredholm integral equations is solved by ADM which gives us the approximate solution of the problem that tends to the exact solution of the problem.

Keywords:

Adomian Decomposition Method, Equations, Fredholm Integral Equations

Adomian Decomposition Method

The Adomian Decomposition method (ADM) is very powerful method which considers the approximate solution of a nonlinear equation as an infinite series which actually converges to the exact solution in this paper, ADM is proposed to solve some first order, second order and third order differential equations and integral equations. The Adomian Decomposition method (ADM) was firstly introduced by George Adomain in 1981. This method has been applied to solve differential equations and integral equations of linear and nonlinear problem in Mathematics, Physics, Biology and Chemistry up to know a large number of research paper have been published to show the feasibility of the decomposition method.

Proposed method for solving the Fredholm integral equation.

The type of integral equation in which the limits of the integration are constant, in which a and b are constant are called the Fredholm Integral equations, and is given as

$$\phi(x) = f(x) + \lambda \int_a^b K(x,t)\phi(t)dt \quad (1)$$

Where the function and the kernel are given in the advance, and λ is a parameter. In this part, the process of the Adomian decomposition method is used. The Adomian decomposition method involving the decomposing of the unknown function $\phi(x)$ of any equation into a addition of an infinite number of constituents defined by the decomposition series

$$\phi(x) = \sum_{n=0}^{\infty} \phi_n(x) \quad (1.1)$$

Or equivalently $\phi(x) = \phi_0(x) + \phi_1(x) + \phi_2(x) + \dots$

When the constituents $\phi_n(x), \geq 0$ will be resolved. The Adomian decomposition method investigate itself with discover the components $\phi_0(x), \phi_1(x), \phi_3(x), \dots$

To organize the recurrence relation, we substitute (1.1) into the Fredholm integral equation (1) to get

$$\sum_{n=0}^{\infty} \phi_n(x) = f(x) + \lambda \int_a^b K(x,t) \sum_{n=0}^{\infty} \phi_n(t) dt \quad (1.2)$$

Or equivalently

$$\phi_0(x) + \phi_1(x) + \phi_2(x) + \dots = f(x) + \int_a^b K(x,t) [\phi_0(t) + \phi_1(t) + \phi_3(t) + \dots] dt$$

The zeroth component $\phi_0(x)$ is spotted by all terms that are not comprises under the integral sign. This signifies that the components $\phi(x), \geq 0$ of the unknown function $\phi(x)$ are totally resolved by the recurrence relation

$$\phi_0(x) = f(x), \phi_{n+1}(x) = \int_a^b K(x,t) \phi_n(t) dt, n \geq 0$$

Or equivally

$$\begin{aligned} \phi_0(x) &= f(x) \\ \phi_1(x) &= \int_a^b K(x,t) \phi_0(t) dt \\ \phi_2(x) &= \int_a^b K(x,t) \phi_1(t) dt \\ \phi_3(x) &= \int_a^b K(x,t) \phi_2(t) dt \\ \phi_4(x) &= \int_a^b K(x,t) \phi_3(t) dt \end{aligned}$$

And so on the other constituents

Thus the constituents $\phi_0(x), \phi_1(x), \phi_3(x), \dots$ are resolved totally.

Thus the solution of the Fredholm integral equation (1) is easily acquired in a series form by utilize the series as assumption in (1.1).

Applications Fredholm integral equations:

Example1. Consider the linear Fredholm integral equation given as

$$\phi(x) = \sin x - \frac{x}{4} + \frac{1}{4} \int_0^{\pi/2} xt \phi(t) dt \quad (1.3)$$

$$\text{Let } \phi(x) = \sum_{n=0}^{\infty} \phi_n(x)$$

Then by applying the Adomian decomposition method, equation (1.3) becomes

$$\sum_{n=0}^{\infty} \phi_n(x) = \sin x - \frac{x}{4} + \frac{1}{4} \int_0^{\pi/2} xt \sum_{n=0}^{\infty} \phi_n(t) dt \quad (1.4)$$

To determine the components of $\phi(x)$, we use the recurrence relation

$$\phi_0(x) = \sin x - \frac{x}{4}$$

$$\phi_{n+1}(x) = \frac{1}{4} \int_0^{\pi/2} xt \sum_{n=0}^{\infty} \phi_n(t) dt$$

This implies

$$\Phi_0(x) = \sin x - \frac{x}{4} \quad (1.6)$$

$$\Phi_1(x) = \frac{1}{4} \int_0^{\pi/2} xt[\Phi_0(t)]dt$$

$$\Phi_1(x) = \frac{1}{4} \int_0^{\pi/2} xt[\sin t - t]dt$$

$$\Phi_1(x) = \frac{x}{4} \int_0^{\pi/2} [t \cos t - t^2]dt$$

$$\Phi_1(x) = \frac{x}{4} \left[1 - \frac{\pi^3}{24}\right]$$

$$\Phi_2(x) = \frac{1}{4} \int_0^{\pi/2} xt[\Phi_1(t)]dt$$

$$\Phi_2(x) = \frac{1}{4} \int_0^{\pi/2} xt \left[\frac{t}{4} \left[1 - \frac{\pi^3}{24}\right] \right] dt$$

$$\Phi_2(x) = \frac{x}{4} \cdot \frac{1}{4} \left(1 - \frac{\pi^3}{24}\right) \int_0^{\pi/2} t^2 dt$$

$$\Phi_2(x) = \frac{x}{4} \left(\frac{\pi^3}{24} - \frac{\pi^5}{576} \right)$$

And so on

Now by using equation (1.1) we obtain

$$\Phi(x) = \sin x - \frac{x}{4} + \frac{x}{4} - \frac{x\pi^3}{96} + \frac{x\pi^3}{96} - \frac{x\pi^5}{2304} + \dots$$

thus the solution will be $\Phi(x) = \sin x$

which converges to exact solution by the method of successive approximations $\Phi(x) = \sin x$

Example2.

Consider the Fredholm Integral equation given as

$$\Phi(x) = \frac{5x}{6} + \frac{1}{2} \int_0^1 xt\Phi(t)dt \quad (1.7)$$

$$\text{Let } \Phi(x) = \sum_{n=0}^{\infty} \Phi_n(x)$$

Then by applying the Adomian decomposition method, equation (1.7) becomes

$$\sum_{n=0}^{\infty} \Phi_n(x) = \frac{5x}{6} + \frac{1}{2} \int_0^1 xt \sum_{n=0}^{\infty} \Phi_n(t)dt \quad (1.8)$$

To determine the components of $\Phi(x)$, we use the recurrence relation

$$\Phi_0(x) = \frac{5x}{6}$$

$$\Phi_{n+1}(x) = \frac{1}{2} \int_0^1 xt \sum_{n=0}^{\infty} \Phi_n(t)dt$$

This implies

$$\phi_0(x) = \frac{5x}{6} \quad (1.9)$$

$$\phi_1(x) = \frac{1}{2} \int_0^1 xt[\phi_0(t)]dt$$

$$\phi_1(x) = \frac{1}{2} \int_0^1 xt \left[\frac{5t}{6} \right] dt$$

$$\phi_1(x) = \frac{5x}{12} \int_0^1 [t^2]dt$$

$$\phi_1(x) = \frac{5x}{12} \left[\frac{1}{3} \right]$$

$$\phi_1(x) = \frac{5x}{36}$$

$$\phi_2(x) = \frac{1}{2} \int_0^1 xt[\phi_1(t)]dt$$

$$\phi_2(x) = \frac{1}{2} \int_0^1 xt \left[\frac{5t}{36} \right] dt$$

$$\phi_2(x) = \frac{5x}{72} \int_0^1 [t^2]dt$$

$$\phi_2(x) = \frac{5x}{72} \left[\frac{1}{3} \right]$$

$$\phi_2(x) = \frac{5x}{216}$$

And so on

Now by using equation (1.1) we obtain

$$\phi(x) = \frac{5x}{6} + \frac{5x}{36} + \frac{5x}{216} + \dots$$

Which converges to exact solution by the method of successive approximations $\phi(x) = x$

Example 3: Consider the Fredholm Integral equation given as

$$\phi(x) = x + 2 \int_0^1 xt\phi(t)dt \quad (2.0)$$

$$\text{Let } \phi(x) = \sum_{n=0}^{\infty} \phi_n(x)$$

Then by applying the Adomian decomposition method, equation (2.0) becomes

$$\sum_{n=0}^{\infty} \phi_n(x) = x + 2 \int_0^1 xt \sum_{n=0}^{\infty} \phi_n(t)dt \quad (2.1)$$

To determine the components of $u(x)$, we use the recurrence relation

$$\phi_0(x) = x$$

$$\phi_{n+1}(x) = 2 \int_0^1 xt \sum_{n=0}^{\infty} \phi_n(t)dt$$

This implies

$$\phi_0(x) = x \quad (2.2)$$

$$\phi_1(x) = 2 \int_0^1 xt[\phi_0(t)]dt$$

$$\phi_1(x) = 2 \int_0^1 xt[t]dt$$

$$\phi_1(x) = 2x \int_0^1 [t^2]dt$$

$$\phi_1(x) = 2x \left[\frac{1}{3} \right]$$

$$\phi_1(x) = \frac{2x}{3}$$

$$\phi_2(x) = 2 \int_0^1 xt[\phi_1(t)]dt$$

$$\phi_2(x) = 2 \int_0^1 xt \left[\frac{2t}{3} \right] dt$$

$$\phi_2(x) = \frac{4x}{3} \int_0^1 [t^2]dt$$

$$\phi_2(x) = \frac{4x}{3} \left[\frac{1}{3} \right]$$

$$\phi_2(x) = \frac{4x}{9}$$

And so on

Now by using equation (1.1) we obtain

$$\phi(x) = x + \frac{2x}{3} + \frac{4x}{9} + \dots$$

Which converges to exact solution by the method of successive approximations $\phi(x) = 3x$

Conclusion:

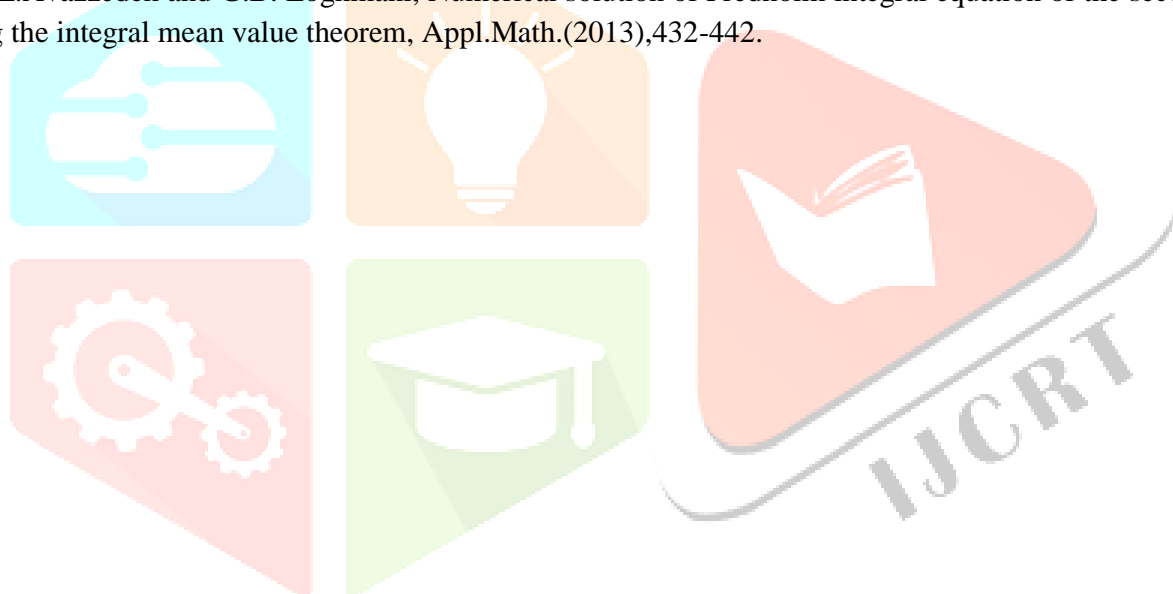
The goal of this paper is to use the Adomian decomposition method for solving the Fredholm integral equations. It is can be visibly seen that the decomposition method for the Fredholm integral equation is equivalent to successive approximation method. Even though, the Adomian decomposition method is a very strong and useful appliance for solving the integral equations

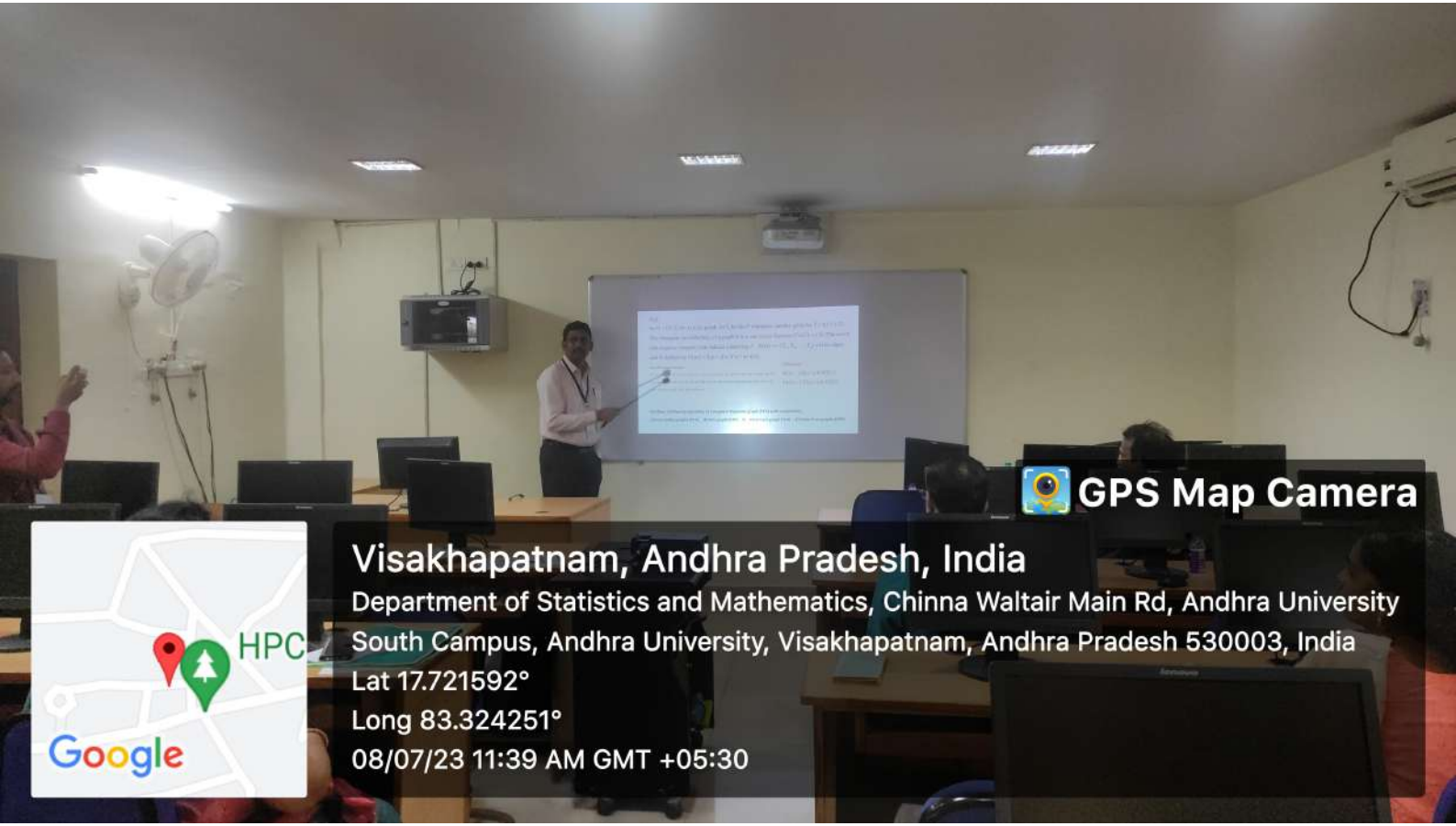
.Following points have been identified while solving the numerical examples:

1. Linear Fredholm integral equation can be solved by this method.
2. It is clear that using the Adomian decomposition method when there is increasing in the 'n' order then there is the decreasing in the error.

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 **GPS Map Camera**

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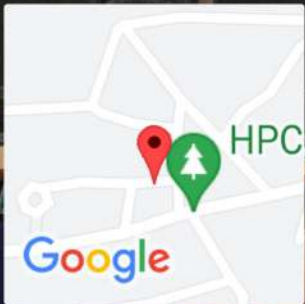
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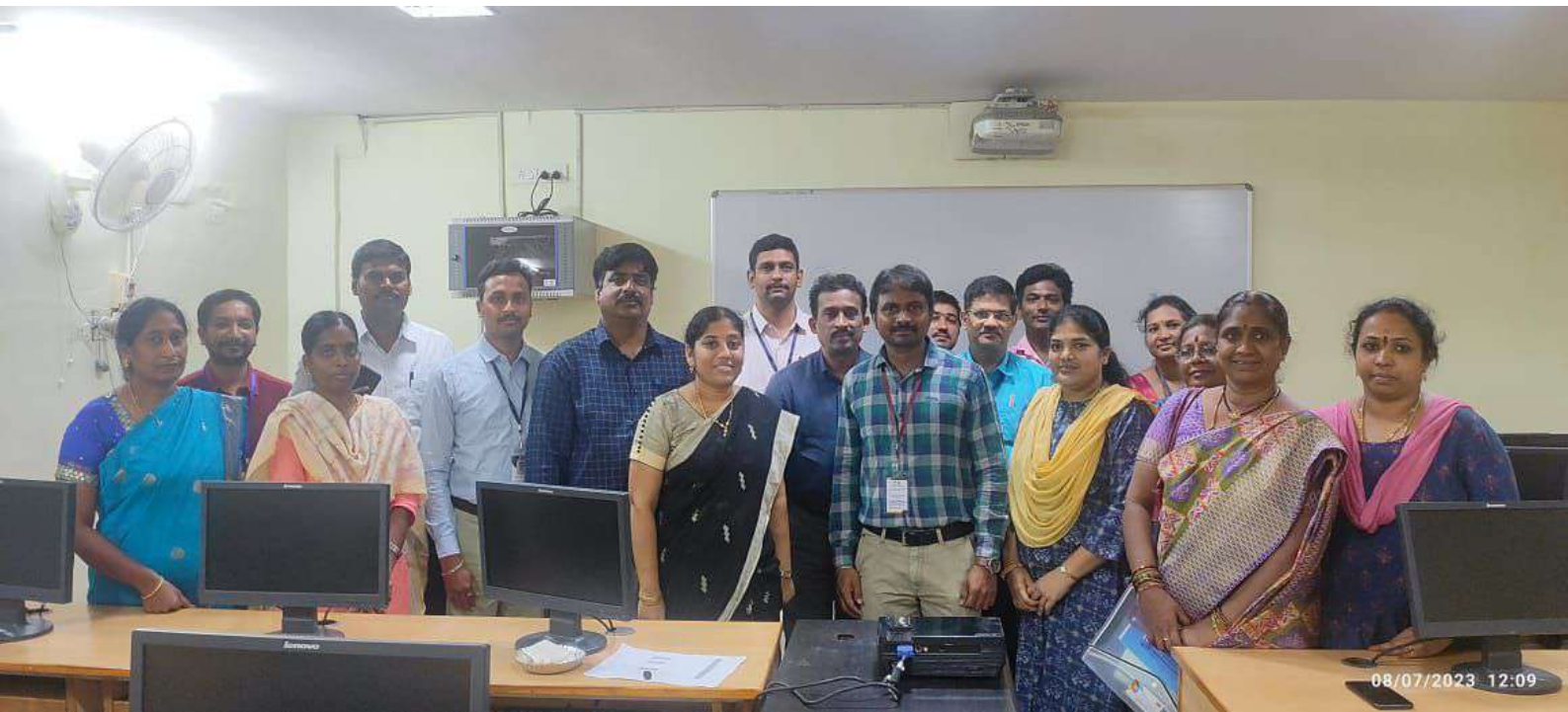


Def. Let $G = (V, E)$ be a (p, q) -graph, let k be the p -regular number given by $2p = 2k + 1$.
The k -regular cover \tilde{G} of G is a new (p, q) -graph $\tilde{G} = (\tilde{V}, \tilde{E})$ where \tilde{V} is the set of
two regular vertices \tilde{v}_1, \tilde{v}_2 and \tilde{E} is the set of edges $\tilde{E} = \{(\tilde{v}_1, \tilde{v}_2), (\tilde{v}_2, \tilde{v}_1)\}$ of the
graph \tilde{G} defined by $\tilde{E} = \{(\tilde{v}_1, \tilde{v}_2), (\tilde{v}_2, \tilde{v}_1)\} \times E$.

Example:
Let $G = (V, E)$ be a $(2, 2)$ -graph, let $k = 1$. Then $\tilde{G} = (\tilde{V}, \tilde{E})$ is a $(2, 2)$ -graph with
 $\tilde{V} = \{(\tilde{v}_1, \tilde{v}_2), (\tilde{v}_2, \tilde{v}_1)\}$ and $\tilde{E} = \{(\tilde{v}_1, \tilde{v}_2), (\tilde{v}_2, \tilde{v}_1)\} \times E$.

Def. Let $G = (V, E)$ be a (p, q) -graph. A k -regular cover \tilde{G} of G is a (p, q) -graph
with $\tilde{V} = \{(\tilde{v}_1, \tilde{v}_2), (\tilde{v}_2, \tilde{v}_1)\}$ and $\tilde{E} = \{(\tilde{v}_1, \tilde{v}_2), (\tilde{v}_2, \tilde{v}_1)\} \times E$.

Def. Let $G = (V, E)$ be a (p, q) -graph. A k -regular cover \tilde{G} of G is a (p, q) -graph
with $\tilde{V} = \{(\tilde{v}_1, \tilde{v}_2), (\tilde{v}_2, \tilde{v}_1)\}$ and $\tilde{E} = \{(\tilde{v}_1, \tilde{v}_2), (\tilde{v}_2, \tilde{v}_1)\} \times E$.



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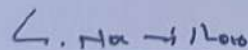
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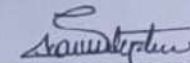
This certificate is given to

Satyanarayana Chilukuri

has presented a paper entitled "A Study on Some Labeling Techniques of Graphs" in the 1st National Conference on "Design Thinking: Trans-Disciplinary Challenges & Opportunities". The paper has been published in the conference proceedings titled "NCDT-2023" [ISBN: 978-93-5915-756-6]



Session Chair



Convenor & General Chair

08/07/2023 12:12

A STUDY ON SOME LABELLING TECHNIQUES OF GRAPHS

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Abstract— A Graph Labelling is an assignment of integers to the vertices or edges, or both subject to certain conditions. These graph labelings find their utility in various applications like coding theory, x-ray crystallography, radar, astronomy, circuit design, communication network addressing, database management. The present study on graph labellings can be utilized for computer applications.

Keywords— wheel, triangular sum, caterpillar, star, olive trees, palm trees.

I. INTRODUCTION

Graph labellings, where the vertices and edges are assigned, real values or subsets of a set subject to certain conditions have often been motivated by their utility to various applied fields and their intrinsic mathematical interest. There is a quite lot of interest on several kinds of labellings of graphs see [3]. Throughout this paper the word ‘graph’ will mean a finite undirected graph without loops and multiple edges. For the terminology and notation not used here, we refer to Harary [4].

We adopt the following notation throughout this paper

$$f(G) = \{ f(u) / u \in V(G) \}$$

$$f^+(G) = \{ f^+(e) / e \in E(G) \}$$

let $G = (V, E)$ be a (p, q) - graph let T_i be the i^{th} triangular number given by $T_i = i(i+1) / 2$ see [2]. The triangular sum labelling of a graph G is a one to one function $f: V(G) \rightarrow \mathbb{N}$ (The set of non-negative integers) that induces a labelling $f^+ : E(G) \rightarrow \{T_1, T_2, \dots, T_q\}$ of the edges and G defined by $f^+(uv) = f(u) + f(v) \forall e = uv \in G$. The graph which admits such a labelling is called triangular sub graph

Theorem2: The Wheel $W_n = C_n + K$, is not a triangular sum graph for any $n \geq 3$.

Proof: Suppose W_n triangular sum

Case(i): Let the Central vertex be assigned the value 0. Since the central vertex is adjacent to all the remaining vertices, we should assign triangular numbers to all the remaining vertices. By using the property $1+T_i \neq T_j \forall i \neq j$ at least these two edges of the cycle which receive the value 1 to one of their end points will have non-triangular numbers, which is a contradiction.

Case(ii) : Assign the value ‘0’ to a remaining vertex. Since there are three vertices adjacent to this remaining vertex, they all must be assigned triangular numbers such that one of them must be labelled.

By using the property $1+T_i \neq T_j$ for all i, j . at least one edge which receive the value 1 to one of its endpoints will have non-triangular number, a contradiction.

Therefore, the wheel w_n is not a triangular sum graph for any $n \geq 3$.

Theorem3: The complete bipartite graph $K_{a,b}$ is triangular sum iff $a=1$ or $b=1$.

Proof: If $a=1$ or $b=1$ then $K_{a,b}$ is nothing but a star graph which clearly triangular sum.

Conversely if $K_{a,b}$ is triangular sum then a or b must be one. Let the vertex set V is partitioned into

$V_1 = \{ u_1, u_2, \dots u_a \}$ and $V_2 = \{ v_1, v_2, \dots v_b \}$ where both $a, b \geq 2$.

Let $f(u_1) = 0$. Then we must assign triangular numbers to all v_i 's as u_1 is adjacent to all v_i 's. There may arise two different cases.

Case(i): suppose we assign consecutive triangular numbers to all v_i 's by defining

$$f(v_i) = T_i, \quad 1 \leq i \leq b, \quad T_i = i(i+1) / 2.$$

Then there are two possibilities either u_i 's, $i \geq 2$ can be assigned triangular numbers or non- triangular numbers. In the former case suppose we assign a triangular number T_i , $i \geq b+1$ to a vertex of V_1 say u_2 then by using the condition $1+T_i \neq T_j$ for all $i, j \rightarrow (1)$, we arrive at a contradiction that one is assigned to a vertex v_2 all the resulting p-edge values as non-triangular numbers. In the later case, if a non - triangular number say A is assigned to u_2 then we have the sum of the vertex values of the form $A + T_i$,

$$\text{Let us assume that } A + T_i = T_j, \quad 1 \leq i \leq b, b + i \leq j \leq ab \rightarrow (2)$$

$$\Rightarrow T_j - T_i = A \rightarrow (3)$$

It is enough we show that the RHS of (3) contains at least one triangular number,

$$\text{by using the property } T_{\frac{n(n+3)}{2}+1} - T_{\frac{n(n+3)}{2}} = T_{n+1} \quad \text{for all } A \geq 1 \rightarrow (4)$$

it can be easily verified that R.H.S of (3) contains at least one triangular number – a contradiction.

Case(ii): suppose we assign non-consecutive triangular numbers to all v_i ' by defining $f(v_i) = T_i$ for $1 \leq i \leq ab-1$ such that one of the v_i 's received here. Also there arises two possibilities either u_i 's can be assigned triangular numbers or non-triangular numbers. Suppose we assign triangular number to a vertex of V_1 say u_2 then by using the condition (1) we arrive at a contradiction. On the other hand, if we assign a non-triangular number to A to u_2 then we have the sum of the vertex values of the form $A + T_i$

$$\text{Let us assume that } A + T_i = T_j \rightarrow (5)$$

$$\Rightarrow |T_j - T_i| = A, \quad \text{for } 1 \leq i \leq ab-1, j = \{ 1, 2, \dots ab \} - \{ i \} \rightarrow (6)$$

It is enough if we show that R.H.S of (6) contains at least one triangular number using (4) it can be easily verified that the RHS of (6), a contradiction. Hence our assumption that RHS of (5) contains all triangular numbers is wrong. Since we arrive at a contradiction in both the cases, we can conclude that $K_{a,b}$ is triangular sum then either a or b must be one. Hence proved.

Theorem 4: Caterpillars are triangular sum graphs

Proof: Denote the vertices of path P_m as $v_1, v_2, \dots v_m$ and the n_j feet from each vertex v_j as $j= 1, 2, \dots, m$, as $v_{j,1}, v_{j,2}, \dots v_{j,n_j}$

The resulting graph is a caterpillar $S(n_1, n_2, \dots, n_m)$. it contains $n_1 + n_2 + \dots n_m + m-1$ edges say r edges.

Define a function $f: V(S(n_1, n_2, \dots, n_m)) \rightarrow \mathbb{N}$ by

$$f(v_1) = 0$$

$$f(v_j) = T_{j-1} - f(v_{j-1}) \quad j= 2, 3, \dots, m$$

$$f(v_{j,i}) = T_{m+1-i} - f(u_i) \quad 1 \leq i \leq n_i$$

$$f(v_{j,i}) = T_{m+n_1+n_2+\dots+n_{j-1}+(i+1)} - f(v_j) \quad 2 \leq j \leq m, \quad 1 \leq i \leq n_j$$

clearly the vertex labels are distinct and the resulting edge labels are of the form $\{T_1, T_2, \dots, T_n\}$

thus, caterpillars are triangular sum graphs.

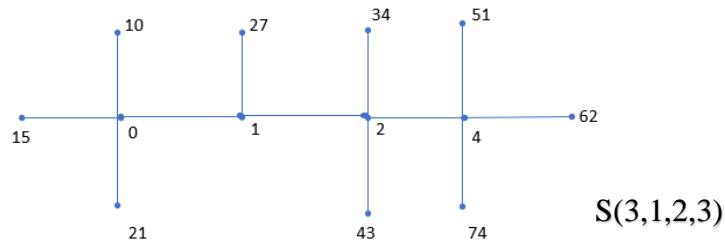


Fig 1: triangular sum labelling of a caterpillar

Theorem 5: The star $S(k, m)$ is a triangular sum graph

Proof: The star $S(k, m)$ is one point union of k -copies of path of length m . it contains km edges. Denote the vertices of level 1 as $u_{1,1}, u_{2,1}, \dots, u_{k,1}$, level 2 as $u_{1,2}, u_{2,2}, \dots, u_{k,2}$ etc., level m as $u_{1,m}, u_{2,m}, \dots, u_{k,m}$ and the centre as w define the map $f: V(s(k,m)) \rightarrow N$ by

$$f(w) = 0$$

$$f(u_{i,1}) = T_i, \quad 1 \leq i \leq k, \quad (i=1,2,\dots,k)$$

$$f(u_{i,j}) = T_{(j-1)k+i} - f(u_{i,j-1}) \quad 1 \leq i \leq k, \quad 2 \leq j \leq m$$

then one can say that f is an injective and $f^* = \{T_1, T_2, \dots, T_{km}\}$

Hence $S(k,m)$ is a triangular sum graph

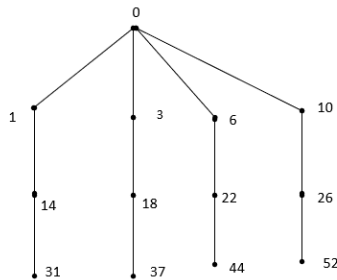


Fig 2: Triangular sum labelling of $S(4,3)$

Theorem 6: Olive trees are triangular sum graphs

Proof: An Olive tree t_n is a rooted tree consisting of n branches in which i^{th} branch is a branch of length i .

It has $n(n+1)/2$ edges.

Denote the vertices of first level as $u_{1,1}, u_{1,2}, u_{1,3}, \dots, u_{1,n}$ second level as $u_{2,2}, u_{2,3}, \dots, u_{2,n}$ etc., $u_{n,n}$ as the vertex of n^{th} level and the root as u_0 .

Define $f: V(t_n) \rightarrow N$ by

$$f(u_0) = 0$$

$$f(u_{1,1}) = T_{n(n+1)/2}$$

$$f(u_{1,2}) = T_{j-1}, \quad 2 \leq j \leq n$$

$$f(u_{i,j}) = T_{(i-1)n+j-C} - f(u_{i-1,j}) \quad 2 \leq i, j \leq n, \quad C = \frac{L+i-1}{2}$$

then one can easily verify that $f^+ = \{T_1, T_2, \dots, T_q\}$

Hence Olive trees are triangular sum graphs.

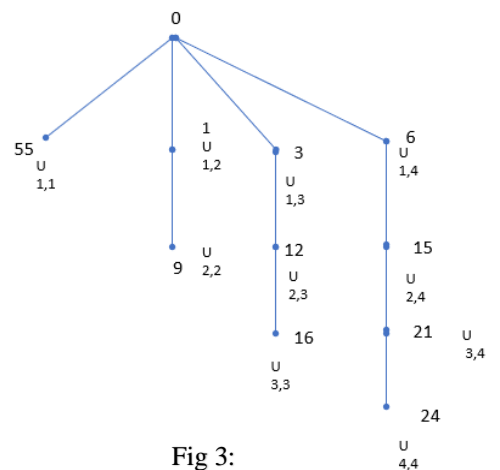


Fig 3:

Theorem7: Palm trees are triangular sum graphs

Proof: A Palm tree $P(n,k)$ is a tree with n -palms and k -vertices in each palm, it has $n(k+1)+n$ vertices and $n(k+2)-1 = m$ edges

Define a mapping $f: V(P(n,k)) \rightarrow \mathbb{N}$ By

$$f(w_1) = 0$$

$$f(w_i) = T_{i-1} - f(w_{i-1}) \quad \text{for } 2 \leq i \leq n$$

$$f(u_i) = T_{n+i-1} - f(w_i) \quad , 1 \leq i \leq n$$

$$f(u_{i,j}) = T_{2n+(i-1)k+(j-1)} - f(u_i) \quad 1 \leq i \leq n, 1 \leq j \leq i$$

then we can easily verify that f is injection and f contains triangular numbers T_1, T_2, \dots, T_m

Hence palm trees are triangular sum trees.

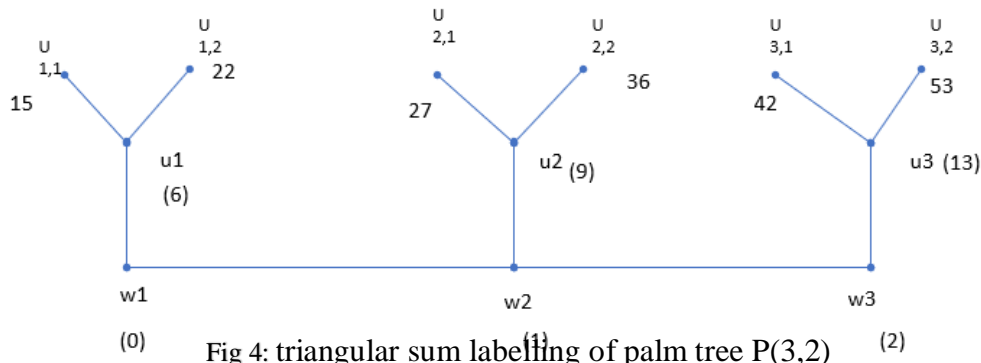


Fig 4: triangular sum labelling of palm tree $P(3,2)$

CONCLUSION:

In this Paper the labelling techniques on different graphs are discussed. We recommend to apply these techniques in applications mentioned in different fields where the variety of graphs in this paper were applicable with due findings along with limitations. One can extend the use of these techniques in computer applications with variety of graphs applicable in real world problems.

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Estimated Solutions of Integral Equations Arising In Some Applications of Science and Engineering

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Abstract:

We present the numerical solution of the Fredholm Integral Equations by using the analytic method (Adomian Decomposition Method). To exhibit the correctness and efficacy of the projected method (ADM), some numerical examples have been performed. A Fredholm integral equations is solved by ADM which gives us the fairly accurate solution of the problem that tends to the exact solution of the problem.

Keywords: Adomian Decomposition Method, Integral Equations, Fredholm Integral Equations, Numerical Example. Adomian Decomposition Method

Adomian Decomposition Method

The Adomian Decomposition method (ADM) is very commanding technique which considers the inexact solution of a nonlinear equation as an infinite series which essentially converges to the exact solution in this paper, ADM is proposed to solve some first order, second order and third order differential equations and integral equations. The Adomian Decomposition method (ADM) was firstly introduced by George Adomain in 1981. This method has been applied to solve differential equations and integral equations of linear and nonlinear problem in Mathematics, Physics, Biology and Chemistry up to know a large number of research paper have been published to show the possibility of the decomposition method.

Proposed method for solving the Fredholm integral equation.

The type of integral equation in which the restrictions of the integration are constant, in which a and b are constant are called the Fredholm Integral equations, and is given as

$$\phi(x) = f(x) + \rho \int_a^b K(x, t)\phi(t)dt \quad (1)$$

Where the function and the kernel are given in the advance, and ρ is a parameter. In this division, the procedure of the Adomian decomposition method is used. The Adomian decomposition method connecting the decomposing of the unknown function (x) of any equation into a addition of an infinite number of constituents defined by the decomposition serie

$$\phi(x) = \sum_{n=0}^{\infty} \phi_n(x) \quad (2)$$

Or In the same way

$$\phi(x) = \phi_1(x) + \phi_2(x) + \phi_3(x) \pm \dots$$

When the constituents $\phi_n(x), n \geq 0$ will be resolved.

The Adomain decomposition method analyze itself which discover the components $\phi_0(x), \phi_1(x), \phi_2(x) \dots$

To classify the recurrence relation, we substitute (2) into the Fredholm integral equation (1) to get

$$\sum_{n=0}^{\infty} \phi_n(x) = f(x) + \int_a^b K(x, t) \sum_{n=0}^{\infty} \phi_n(t) dt \tag{3}$$

The zeroth component $\phi_0(x)$ is spotted by all terms that are not comprises under the integral sign. This signifies that the components $\phi_n(x), n \geq 0$ of the unknown function $\phi(x)$ are totally resolved by the recurrence relation.

$$\phi_0(x) = f(x), \phi_{n+1}(x) = \int_a^b K(x, t) \sum_{n=0}^{\infty} \phi_n(t) dt, n \geq 0$$

Or correspondingly

Thus the solution of the Fredholm Integral equation (1) is easily acquired in a series form by make use of he series as assumption in (2)

Applications of Fredholm Integral Equations:

Consider the linear Fredholm integral equation

$$1. \phi(x) = \sin x + 1 + \int_0^{\pi} \sum_{n=0}^{\infty} \phi_n(t) dt$$

Let $\phi(x) = \sum_{n=0}^{\infty} \phi_n(x)$

$$\phi_0(x) = \sin x + 1$$

$$\sum_{n=0}^{\infty} \phi_n(x) = \sin x + 1 + \int_0^{\pi} \sum_{n=0}^{\infty} \phi_{n-1}(t) dt$$

$$\text{Now } \phi_{n+1}(x) = \int_0^{\pi} \sum_{n=0}^{\infty} \phi_{n-1}(t) dt$$

$$\phi_1(x) = \int_0^{\pi} \phi_0(t) dt$$

$$= \int_0^{\pi} (\sin t + 1) dt$$

$$= \int_0^{\pi} \sin t + \int_0^{\pi} dt$$

$$= (-\cos t)_0^{\pi} + (t)_0^{\pi}$$

$$= (-\cos \pi - \cos 0) + (\pi - 0)$$

$$= (-1 - 1) + (\pi - 0)$$

$$\phi_1(x) = -2 - \pi$$

$$\phi_2(x) = \int_0^\pi \phi_1(t) dt$$

$$\begin{aligned} &= \int_0^\pi (-2 - \pi) dt \\ &= (-2 - \pi)(t)_0^\pi \\ &= (-2 - \pi)(\pi - 0) \end{aligned}$$

$$\begin{aligned} \phi_2(x) &= -2\pi - \pi^2 \\ \phi_3(x) &= \int_0^\pi \phi_2(t) dt \end{aligned}$$

$$\begin{aligned} &= \int_0^\pi [-2\pi - \pi^2] dt \\ &= [-2\pi - \pi^2](t)_0^\pi \\ &= [-2\pi - \pi^2](\pi - 0) \end{aligned}$$

$$\begin{aligned} \phi_3(x) &= -2\pi^2 - \pi^3 \\ \phi(x) &= \sin x + 1 + (-2 - \pi - 2\pi - \pi^2 - 2\pi^2 - \pi^3 + \dots) \\ \phi(x) &= \sin x - 1 + (-3\pi - 3\pi^2 - \pi^3 + \dots) \end{aligned}$$

2). $\phi(x) = x + e^{-x} + x^2 \int_0^1 \sum_{n=0}^\infty t \phi(t) dt$

$$\text{Let } \phi(x) = \sum_{n=0}^\infty \phi_n(x)$$

$$= \sum_{n=0}^\infty \phi_n(x) = x + e^{-x} + x^2 \int_0^1 \sum_{n=0}^\infty t \phi(t) dt$$

Where $\phi_0(x) = x + e^{-x}$

$$= \phi_{n+1}(x) = x^2 \int_0^1 \sum_{n=0}^\infty t \phi(t) dt$$

$$\phi_1(x) = x^2 \int_0^1 t \phi_0(t) dt$$

$$= x^2 \int_0^1 t(t + e^{-t}) dt$$

$$= x^2 [\int_0^1 t^2 dt + \int_0^1 t e^{-t} dt]$$

$$= x^2 \left[\left(\frac{t^3}{3} \right)_0^1 + (-te^{-t})_0^1 - (-e^{-t})_0^1 \right]$$

$$= x^2 \left[\left(\frac{1}{3} - \frac{1}{0} \right) + (-e^{-1} - 0e^0) - (-e^{-1} - e^0) \right]$$

$$= x^2 \left(\frac{1}{3} - e^{-1} + e^{-1} \right)$$

$$\phi_1(x) = \frac{x^2}{3}$$

$$\phi_2(x) = x^2 \int_0^1 t \phi_1(t) dt$$

$$= x^2 \int_0^1 t \left(\frac{t^2}{3} \right) dt$$

$$= \frac{x^2}{3} \int_0^1 t^3 dt$$

$$= \frac{x^2}{3} \left(\frac{t^4}{4} \right)_0^1$$

$$= \frac{x^2}{3} \left(\frac{1}{4} - \frac{0}{4} \right)$$

$$\phi_2(x) = \frac{x^2}{12}$$

$$\phi_3(x) = x^2 \int_0^1 t \phi_2(t) dt$$

$$= x^2 \int_0^1 t \left(\frac{t^2}{12} \right) dt$$

$$= \frac{x^2}{12} \left(\frac{t^4}{4} \right)_0^1$$

$$= \frac{x^2}{12} \left(\frac{1}{4} - \frac{0}{4} \right)$$

$$\phi_3(x) = \frac{x^2}{48}$$

$$: \phi(x) = x + e^{-x} + \left(\frac{x^2}{3} + \frac{x^2}{12} + \frac{x^2}{48} + \dots \right)$$

$$\phi(x) = x + e^{-x} + \frac{x^2}{3} \left(1 + \frac{1}{4} + \frac{1}{16} + \dots \right)$$

$$3) \phi(x) = \frac{2}{3} + 5x + x \int_0^1 t \phi(t) dt$$

$$\text{Let } \phi(x) = \sum_{n=0}^{\infty} \phi_n(x)$$

$$\phi_0(x) = \frac{2}{3} + 5x$$

$$\phi_{n+1}(x) = x \int_0^1 \sum_{n=0}^{\infty} t \phi(t) dt$$

$$\phi_1(x) = x \int_0^1 t \phi_0(t) dt$$

$$= x \int_0^1 t \left(\frac{2}{3} + 5t \right) dt$$

$$= \frac{2}{3} x \int_0^1 t dt + 5x \int_0^1 t^2 dt$$

$$= \frac{2}{3} x \left(\frac{t^2}{2} \right)_0^1 - 5x \int_0^1 t^2 dt$$

$$= \frac{2}{3} x \left(\frac{t^2}{2} \right)_0^1 + 5x \left(\frac{t^3}{3} \right)_0^1$$

$$= \frac{2}{3} x \left(\frac{1}{2} - \frac{0}{2} \right) + 5x \left(\frac{1}{3} - \frac{0}{3} \right)$$

$$= \frac{2}{6} x + \frac{5}{3} x$$

$$= \frac{2x + 10x}{6}$$

$$= \frac{12x}{6}$$

$$= \phi_1(x) = 2x$$

$$\phi_2(x) = x \int_0^1 t \phi_1(t) dt$$

$$= x \int_0^1 t (2t) dt$$

$$= x2 \int_0^1 (t^2) dt$$

$$= 2x \left(\frac{t^3}{3}\right)_0^1$$

$$= 2x \left(\frac{1}{3} - 0\right)$$

$$= \phi_2(x) = \frac{2x}{3}$$

and so on

$$\phi(x) = \frac{2}{3} + 5x + 2x + \frac{2x}{3} + \dots$$

4) $\phi(x) = e^x + 1 + \int_0^1 \phi(t) dt$

Let $\phi(x) = \sum_{n=0}^{\infty} \phi_n(x)$

$$\phi(x) = \phi_1(x) + \phi_2(x) + \phi_3(x) + \dots$$

$$\sum_{n=0}^{\infty} \phi_n(x) = f(x) + J_a^b k(x,t) \sum_{n=0}^{\infty} \phi_n(t) dt$$

Let $\phi_0(x) = e^x + 1$

$$\phi_{n+1}(x) = \int_0^1 \sum_{n=0}^{\infty} \phi_n(t) dt$$

This implies $\phi_0(x) = e^x + 1$

$$\phi_1(x) = \int_0^1 \phi_0(t) dt$$

$$= \int_0^1 (e^t + 1) dt$$

$$= \int_0^1 (te^t + t) dt$$

$$= \int_0^1 te^t dt + \int_0^1 t dt$$

$$= t \int_0^1 e^t dt - \int_0^1 e^t + \int_0^1 t dt$$

$$= [te^t - e^t + \frac{t^2}{2}]_0^1$$

$$= (1 \cdot e^1 - e^1 + \frac{1}{2} - 0 + 1 - 0)$$

$$= 1 + \frac{1}{2}$$

$$= \frac{2+1}{2}$$

$$\phi_1(x) = \frac{3}{2}$$

$$\phi_2(x) = \int_0^1 \phi_1(t) dt$$

$$= \int_0^1 t \cdot \frac{3}{2} dt$$

$$= \frac{3}{2} \int_0^1 t dt$$

$$= \frac{3}{2} \left(\frac{t^2}{2}\right)_0^1$$

$$= \frac{3}{4}(1)$$

$$\phi_2(x) = \frac{3}{2^2}$$

$$\phi_3(x) = \int_0^1 \phi_2(t) dt$$

$$= \int_0^1 \frac{3}{4} t dt$$

$$= \frac{3}{4} \int_0^1 t dt$$

$$= \frac{3}{4} \left(\frac{t^2}{2} \right)_0^1$$

$$= \frac{3}{8}$$

$$\phi_3(x) = \frac{3}{2^3}$$

$$\phi(x) = \phi_1(x) + \phi_2(x) + \phi_3(x) + \dots$$

$$\phi(x) = e^x + 1 + \frac{3}{2} + \frac{3}{2^2} + \frac{3}{2^3} + \dots$$

Conclusion

The aspire of this paper is to employ the Adomain Decomposition Method for solving the Fredholm Integral Equation. It can be visibly seen that decomposition method for the Fredholm Integral Equation is equivalent to consecutive approximation method. Even though the Adomain decomposition method is very burly and useful tool for solving the integral equations.

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Approximate Solutions of Volterra Integral Equations Arising In Some Applications of Science and Engineering

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Abstract:

In this paper we present the numerical solution of the Volterra Integral Equations by using the analytic method (Adomian Decomposition Method). To demonstrate the exactness and efficacy of the proposed method (ADM), some numerical examples have been performed. A Volterra integral equation is solved by ADM which gives us the comparatively accurate solution of the problem that tends to the exact solution of the problem.

Keywords: Adomian Decomposition Method, Integral Equations, volterra Integral Equations, Numerical Example. Adomian Decomposition Method

ADOMIAN DECOMPOSITION METHOD

The Adomian Decomposition method (ADM) is very powerful technique which considers the in exact solution of a nonlinear equation as an infinite series which essentially converges to the exact solution in this paper, ADM is proposed to solve some first order, second order and third order differential equations and integral equations. The Adomian Decomposition method (ADM) was firstly introduced by George Adomain in 1981. This method has been applied to solve differential equations and integral equations of linear and nonlinear problem in Mathematics, Physics, Biology and Chemistry up to know a large number of research paper have been published to show the possibility of the decomposition method.

PROPOSED METHOD FOR SOLVING THE VOLTERRA INTEGRAL EQUATION.

The type of integral equation in which the restrictions of the integration are constant, in which a and b are constant are called the Fredholm Integral equations, and is given as

$$\phi(x) = f(x) + \rho \int_0^x K(x, t)\phi(t)dt \quad (1)$$

Where the function and the kernel are given in the advance, and ρ is a parameter. In this division, the procedure of the Adomian decomposition method is used. The Adomian decomposition method connecting the decomposing of the unknown function $\phi(x)$ of any equation into a addition of an infinite number of constituents defined by the decomposition series

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Or In the same way

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The Adomain decomposition method analyze itself which discover the components $\phi_0(x), \phi_1(x), \phi_2(x) \dots$

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The zeroth component $\phi_0(x)$ is spotted by all terms that are not comprises under the integral sign. This signifies that the components $\phi_n(x), n \geq 0$ of the unknown function $\phi(x)$ are totally resolved by the recurrence relation.

$$\phi_0(x) = f(x), \phi_{n+1}(x) = \int_0^x K(x,t) \sum_{n=0}^{\infty} \phi_n(t) dt, n \geq 0$$

Or correspondingly

Thus the solution of the Volterra integral equation (1) is easily acquired in a series form by make use of the series as assumption in (2)

APPLICATIONS OF VOLTERRA INTEGRAL EQUATIONS:

Consider the linear volterra integral equation

$$1. \Phi(x) = x + \int_0^x (t-x)\Phi(x) dt$$

$$\Phi_0(x) = x$$

$$\Phi_1(x) = \int_0^x k(x,t)\phi_0(t) dt$$

$$= \int_0^x (t-x)t dt$$

$$= \int_0^x (t^2 - xt) dt$$

$$= \left(\frac{t^3}{3} - x \frac{t^2}{2} \right)_0^x$$

$$= \left(\frac{x^3}{3} - \frac{x^3}{2} \right) = \frac{-x^3}{6}$$

$$\therefore \Phi_1(x) = \frac{-x^3}{6}$$

$$\begin{aligned} \Phi_2(x) &= \int_0^x (t-x) \frac{-t^3}{6} dt \\ &= -\frac{1}{6} \int_0^x (t^4 - xt^3) dt \\ &= -\frac{1}{6} \left(\frac{t^5}{5} - x \frac{t^4}{4} \right)_0^x \\ &= -\frac{1}{6} \left(\frac{x^5}{5} - \frac{x^5}{4} \right) \\ &= -\frac{1}{6} \left(\frac{-x^5}{20} \right) \\ &= \frac{x^5}{120} \end{aligned}$$

$$\therefore \Phi_2(x) = \frac{x^5}{120}$$

$$\therefore \Phi(x) = \Phi_0(x) + \Phi_1(x) + \Phi_2(x) + \dots$$

$$= x - \frac{x^3}{6} + \frac{x^5}{120} - \dots$$

$$= x - \frac{x^3}{3!} + \frac{x^5}{5!} - \dots$$

$$\Phi(x) = \sin x$$

2. Consider the volterra integral equation

$$\Phi(x) = e^x + \int_0^x e^{x-t} \Phi(t) dt$$

$$\Phi_0(x) = e^x$$

$$\Phi_1(x) = \int_0^x k(x,t) \Phi_0(t) dt$$

$$= \int_0^x e^{x-t} e^t dt$$

$$= \int_0^x e^x dt$$

$$= e^x (t)_0^x = x e^x$$

$$\therefore \Phi_1(x) = x e^x$$

$$\Phi_2(x) = \int_0^x k(x,t) \Phi_1(t) dt$$

$$= \int_0^x e^{x-t} t e^t dt$$

$$= \int_0^x t e^x dt$$

$$= e^x \left(\frac{t^2}{2} \right)_0^x = \frac{x^2}{2} e^x$$

$$\therefore \Phi_2(x) = \frac{x^2}{2} e^x$$

$$\Phi_3(x) = \int_0^x k(x,t) \Phi_2(t) dt$$

$$= \int_0^x e^{x-t} \frac{t^2}{2} e^t dt$$

$$= \int_0^x e^x \frac{t^2}{2} dt$$

$$= \frac{e^x}{2} \left(\frac{t^3}{3} \right)_0^x = \frac{x^3}{6} e^x$$

$$\therefore \Phi_3(x) = \frac{x^3}{6} e^x$$

$$\therefore \Phi(x) = \Phi_0(x) + \Phi_1(x) + \Phi_2(x) + \dots$$

$$= e^x + x e^x + \frac{x^2}{2} e^x + \frac{x^3}{6} e^x + \dots$$

$$= e^x \left[1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots \dots \dots \right]$$

$$= e^x \cdot e^x = e^{2x}$$

3. Consider the volterra integral equation

$$\Phi(x) = e^x - \int_0^x e^{x-t} \Phi(t) dt$$

$$\Phi_0(x) = e^x$$

$$\Phi_1(x) = \int_0^x k(x,t) \Phi_0(t) dt$$

$$= \int_0^x -e^{x-t} e^t dt$$

$$= - \int_0^x e^x dt$$

$$= - e^x (t)_0^x = - x e^x$$

$$\therefore \Phi_1(x) = - x e^x$$

$$\Phi_2(x) = \int_0^x k(x,t) \Phi_1(t) dt$$

$$= \int_0^x -e^{x-t} (-t e^t) dt$$

$$= \int_0^x t e^x dt$$

$$= e^x \left(\frac{t^2}{2} \right)_0^x = \frac{x^2}{2} e^x$$

$$\therefore \Phi_2(x) = \frac{x^2}{2} e^x$$

$$\Phi_3(x) = \int_0^x k(x,t) \Phi_2(t) dt$$

$$= \int_0^x -e^{x-t} \frac{t^2}{2} e^t dt$$

$$= \int_0^x -e^x \frac{t^2}{2} dt$$

$$= - \frac{e^x}{2} \left(\frac{t^3}{3} \right)_0^x = - \frac{x^3}{6} e^x$$

$$\therefore \Phi_3(x) = - \frac{x^3}{6} e^x$$

$$\therefore \Phi(x) = \Phi_0(x) + \Phi_1(x) + \Phi_2(x) + \dots \dots \dots$$

$$= e^x - x e^x + \frac{x^2}{2} e^x - \frac{x^3}{6} e^x + \dots \dots \dots$$

$$= e^x \left[1 - x + \frac{x^2}{2!} - \frac{x^3}{3!} + \dots \dots \dots \right]$$

$$= e^x \cdot e^{-x} = 1$$

Conclusion:

The aim of this paper is to employ the Adomain Decomposition Method for solving the Volterra Integral Equation . It can be visibly seen that decomposition method for the Volterra Integral Equation is equivalent to consecutive approximation method. Even though the Adomain decomposition method is very burly and useful tool for solving the integral equations.

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Mathematical and Computational Approach for Study of Tumor Growth

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Abstract: *This paper discuss about various methods used for study of data related tumor growth using some of mathematical modelling concepts and computational modeling concepts. Model is either continuous or discrete based on the nature and type of variables involved. Depending on the growth of tumor, stage there are different types of mathematical models like Exponential, Gompertz, West law can be applied. Computational Modeling will be applied at different levels like Atomic, Biological. To study biochemical reactions and gene regulation various Markup Languages are available like SMBL, TumorML. Finally it gives a brief exposure of Modelling techniques in biology. This paper focuses on various strategies that are available and useful to study the tumor data to study the prognosis of tumors.*

Keywords: Exponential Growth Model, Gompertz model, West Law, SMBL, CellML, InsilicoML, FieldML, TumorML, Peri Nets, Agent Based Systems

1. Introduction

1.1 About Tumors

The lack of regulation of genes may be cause for tumor formation or growth. The growth or mass of cells is tumor indication. When the tumor remains at fixed position and no spreading then it called Benign. If the tumor spread over an area irrespective of time intervals then it is termed as Malignant. If the cells are identified as cancer cells and if they pass through blood stream which may be cause tumor formation at a different place than it originally positioned, it is Metastasis. A lump, or lumps, is a broad term that refers to anomalies, including discrete masses, several small modules, and more.

A biopsy determines whether a lump is benign or cancerous. A benign tumor is a development that might create bothersome issues but, for the most part, poses no threat to life unless it is present inside the skull, close to a major blood supply or nerve. The cancerous tumor is a malignant one. It grows quickly and abnormally, and it can affect many bodily parts. It has the potential to harm and risk life.

The most popular staging method is based on the three variables MNT where T gives the size of the tumor, the number of lymph nodes involved is given by N, for the existence and location of metastases is M. Stage III cancer is defined as a large tumor (T3) without lymph nodes or distant metastases (N0 or M0), or a somewhat smaller tumor (T2) with lymph nodes involvement (N2) (M0).

1.2 Mathematical Modeling

Use mathematical terms and formulae to represent the nature and behavior of real world problem. Here by using some of the existing mathematical models the data related to tumor is studied. The basic models used are Exponential Growth Model, Gompertz Model and West Law.

1.3 Computational Modeling

The computational models are considered into two categories. The first category consists of Carcinogenesis, cell to cell interactions and genetic instability are considered. Whereas in the second category as tumor tissue and its progression. Collections of these models are considered as hybrid model.

1.4 Markup Languages

There are different approaches to modeling biological systems. The "bottom-up" approach focuses on simulating the system from the point of view of reduction, integrating multiple functional components. The "top down" approach considers the whole subject and develops simulations that are consistent with known observations. For example, in cancer modeling, these two approaches are used to simulate different aspects of cancer, such as cancer progression and tumor growth. Markup Languages helps a lot in this process.

1.5 Modeling Techniques in System Biology

1.5.1 Petri Nets

Petri Nets were developed originally by Carl Adam Petri in 1962. Since then, Petri Nets and their concepts have been extended and developed, and applied in a variety of areas: Office automation, work-flows, flexible manufacturing, programming languages, protocols and networks, hardware structures, real-time systems, performance evaluation, operations research, embedded systems, defence systems, telecommunications, Internet, e-commerce and trading, railway networks, biological systems.

1.5.2 Agent Based Models

In recent years, agent-based applications have been developed inspired by natural systems. The natural systems

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have a dynamic structure defined by a complex, distributed, open, heterogeneous, and large-scale systems. Therefore, it is too hard to model these systems in the artificial world. Agent-based modeling technique has advantage in explanation of the dynamics of the behavior in the complex systems including biological, physical, and social systems. It is used in the solution or modeling of a problem in the literature seems to be inspired by living systems. Living systems offer an organization and operation at different levels ranging from the genetic to the social experience. The most common applications that can be shown in living systems are biological systems including human physiology which examine major systems such as cardiovascular system, immune system, nervous system, endocrine system, etc., and predator-prey relationship in the ecosystem, birds and fish flocks, organisms that live in colonies such as foraging ants, bees, wasps, and termites.

2. Mathematical Modeling

2.1 Exponential growth model:

Many systems exhibit exponential growth. It is represented mathematically by the equation:

$$y = y_0 e^{kt} \rightarrow \tag{1}$$

Where y_0 the initial state of the system and k is growth constant which is a positive quantity and t is the time. The rate of growth is represented by a differential equation:

$$\frac{dy}{dx} = ky_0 e^{kt} = ky \rightarrow \tag{2}$$

The key feature of exponential growth is that the rate of growth is proportional to the current function value. This is applied to growth of a bacteria, it is as follows:

Suppose start with initial population size of bacteria is $y_0 = 200$ and growth rate $k = 0.02$ after 2 hours i.e. 120 minutes the population size is ten times the initial size. It is represented in tabular form as:

Table 1: Time Vs Population Size for a selected Bacteria

Time	0	10	20	30	40	50	60	70	80	90	100	110	120
Population size	200	244	298	364	445	543	664	811	990	1209	1477	1805	2204

The corresponding line graph for exponential growth is:

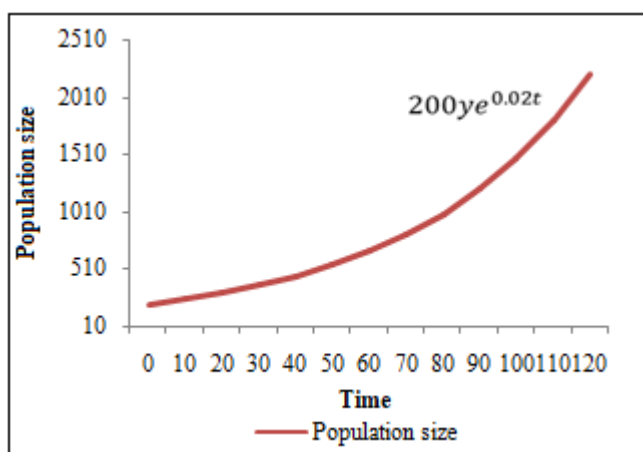


Figure 1: Exponential Growth of Bacteria

The exponential growth model is well suited to calculate tumor size in initial stages and not suitable in long term tumor growth because it may vary indefinitely and does not depend on any constraint.

2.2 Gompertz Model

It is a mathematical model for time series designed by Benjamin Gompertz used to represent the growth is slow in the beginning and end of a given time period. Gompertz curve is used in the Biology where to represent the rapid growth of population size or growth of tumor size when maximum load or population size is able to compute.

The equation is represented as:

$$N(t) = N_0 e^{\left[\ln \left(\frac{N_I}{N_0} [1 - e^{(bt)}] \right) \right]} \rightarrow \tag{3}$$

Where $N(t)$ is the Number of cells at time t
 N_I is the population number or maximum load
 N_0 is the initial number of cells
 b is the initial rate of tumor growth

Prof. A.K.Liard successfully represented the growth of tumors using Gompertz curve. The tumor growth depends on the factors like diet, age, ethnicity, metabolism and genetic predispositions, lifestyle etc. In this only a single set of factors or parameters is not sufficient to model the data. Tumor growth depends on patient and their factors and a single patient may also have different growth factors.

2.3 Universal Law (or) West Law:

It describes the growth rates of organisms with the help of energy considerations. West proposed Universal Law. Independent of mass and development time all mammal, birds share a common growth pattern. The same law is used whether tumor growth follows by taking tumor size and growth time. It is taken as ratio given by:

$$r = \left(\frac{m}{M} \right)^{0.25} \rightarrow \tag{4}$$

where m is actual Mass and

M is the asymptotic mass for the taxon

r : is relative proportion of total energy expenditure with respect to time t is given by:

$$t = \frac{1}{4} a M^{-0.25} t - \ln \left(1 - \left(\frac{m_0}{M} \right)^{0.25} \right) \rightarrow \tag{5}$$

$$t = \alpha r_0 t - \ln(1 - r_0) \rightarrow \tag{6}$$

$$\text{where } r_0 = \left(\frac{m_0}{M} \right)^{0.25} \text{ and } \alpha = 0.25 a m_0^{-0.25} \rightarrow \tag{7}$$

Here a is a constant proportional to organism's metabolic rate across taxon. Using the variables t and r , the universal l growth law is as follows:

$$r = 1 - e^{-t} \rightarrow \quad (8)$$

m_0 and M are the initial and final masses of the tumor and a is a parameter expected to be related to the tumor characteristics.

3. Computational Modeling

- 3.1 Atomic Level
- 3.2 Molecular Level
- 3.3 Microscopic Level
- 3.4 Macroscopic Level
- 3.5 Biological Level

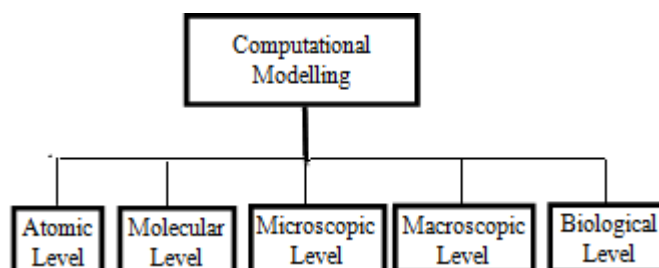


Figure 2: Different Levels of abstraction in Computational Modeling

Atomic Level considers the function, structure and properties of proteins, peptides and lipids.

Molecular Level considers cell signaling processes.

Microscopic Level considers cell progression.

Macroscopic Level considers tissue progression.

Biological Level considers computational tumor models.

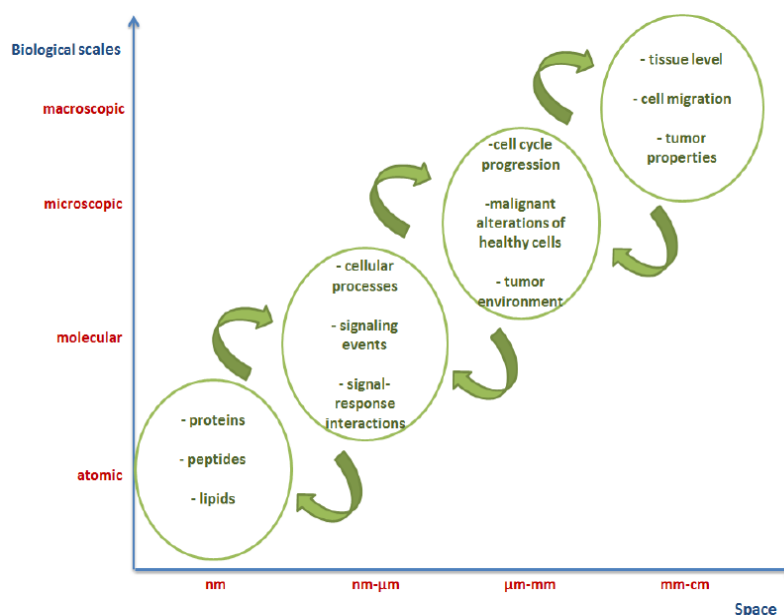


Figure 3: Computational Models for Tumor Study

4. Markup Languages

The most commonly used markup languages are as follows:

- a) SMBL
- b) CellML
- c) FieldML
- d) TumorML

a) SMBL:

Systems Biology Markup Language (SBML) is a xml (eXtensible Markup Language) based language. It is a description language for simulations in systems biology. SBML is suitable for representing biochemical networks, which includes cell signaling pathways, metabolic pathways,

biochemical reactions, gene regulation, and many others. It is a represented format of computational models. Modeling process involves the following steps. SBML allows models of uniformed complexity to be represented. Each type of model is described using a specific type of data structure which organizes the relevant information. The data structures conclude how the resulting model is encoded in XML.

b) Cell ML:

The CellML language is an open standard based on the XML markup language. CellML is developed by the Auckland Bioengineering Institute at The University of Auckland and affiliated research groups. Just as HTML is

the common language for encoding the words on your web browser, CellML is the XML language and software toolkit used to script, store and exchange computer models of biological systems. CellML makes it easy for people to share models, even if they are using different model-building software, and it can easily fit in with models at the tissue and molecular levels. It also lets people build new models and test their models' reliability against other models using CellML validation tools.

c) Field ML:

A Field descriptive language in XML format termed FML (Field Markup Language) as a possible language for the currently undefined FieldML. FML would contain field information with the ability to incorporate CellML models to create tissue-scale representations. A field is defined as a physical property that varies over space and possibly time. It is usually described in terms of tensor, vector or scalar quantities, and can range from global model geometry information through to spatially-varying tissue properties such as cellular parameters.

d) Tumor ML:

Tumor ML, to describe computational cancer models within TUMOR. The motivation for such a markup language is two-fold: To describe the implementation of these cancer models in an abstract manner that is not tied to any particular programming notation. The challenges posed in developing TumorML include formalizing cancer terminology, linking biological entities with computational and mathematical elements of models, and incorporating features to allow for curating models in online repositories. Conceptually, the design of TumorML will take a similar

approach to that of CellML in how models are structured to allow modularization and connectivity between components. TumorML, to three key functions: curating cancer models, computationally interfacing with cancer models, and connecting cancer models together.

5. Modeling techniques in Systems Biology

The commonly used Modeling techniques in systems Biology are:

- 1) Peri Nets
- 2) Agent Based Models

5.1 Peri Nets

A Petri Net is a collection of directed arcs connecting places and transitions. Places may hold tokens. The state or marking of a net is its assignment of tokens to places. Here is a simple net containing all components of a Petri Net:

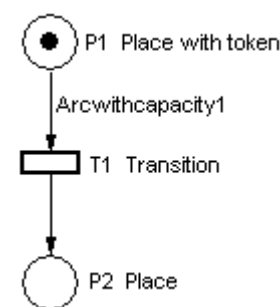


Figure 4: Peri Net model

Notations:

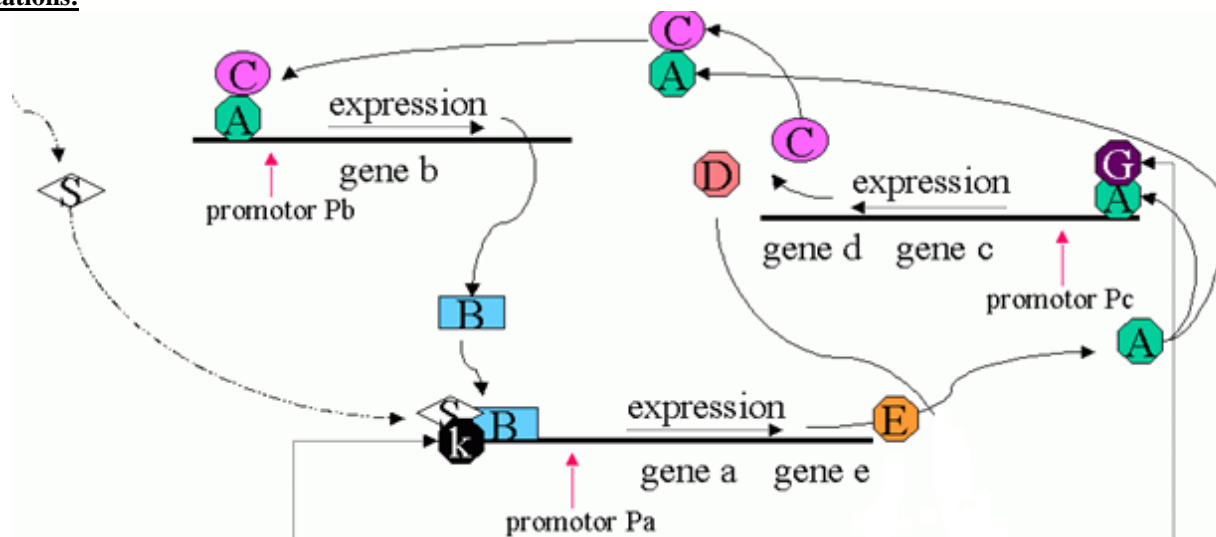


Figure 5: A Petri Net model for the control of a metabolic pathway

1. Dashed Arrows → the direction of transcription of genes
2. The Curved Arrows → denote the transportation of a gene encoded Protein
3. The Straight arrows → denote biochemical reaction
4. The elbow arrows → denote the feedback
5. The double dashed arrows → denote the signal transduction.

5.2 Agent Based Models

The characteristics of agent-based models important to biological studies include:

- 1) Modular structure: The behavior of an agent-based model is defined by the rules of its agents. Existing agent rules can be modified or new agents can be added without having to modify the entire model.
- 2) Emergent properties: Through the use of the individual agents that interact locally with rules of behavior, agent-based models result in a synergy that leads to a higher level whole with much more intricate behavior than those of each individual agent.
- 3) Abstraction: Either by excluding non-essential details or when details are not available, agent-based models can be constructed in the absence of complete knowledge of the system under study. This allows the model to be as simple and verifiable as possible.
- 4) Stochasticity: Biological systems exhibit behavior that appears to be random. The probability of a particular behavior can be determined for a system as a whole and then be translated into rules for the individual agents.

6. Conclusion

In this paper we discussed about different mathematical modeling approaches and various Computational Modeling Methods and some of Markup Languages followed by techniques used for Analysis of cancer data especially Tumor related data. This paper gives an introductory review about the approaches to use and apply for data analysis. The proposed extension of this paper is applicability by taking a case based study.

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INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

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KISHKINDA KANDA – A TALE OF WISDOM BY LORD HANUMAN

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Kishkindha Kand is one of the seven kands in Valmiki's Ramayan. The Kand involves the meeting between Lord Rama and his disciple Hanuman. It also features the story of two vanar brothers Bali and Sugriva and how Rama killed Bali who enslaved Surgriva's wife. It was in Kishkindha Kand that Jambvant made Hanuman realise about his strength, powers and capabilities. We are here to narrate to you the story of Kishkindha Kand with the help of pictures. This part will tell you about the encounter with Hanuman and Surasa, the mother of Nagas.

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When Rama and Lakshmana came back to the hut they found Sita missing. They searched everywhere in the forest and called on every mountain, tree, bird and beast, asking where she had gone. Suddenly, they found Sita's jewellery which she threw from the aerial chariot of Ravana, the Pushpakaratha.

Thereafter, the brothers went towards the south. On their way they met a black demon of monstrous size. The demon grabbed Lord Rama in his right arm while holding Lakshmana in the other. The brothers drew their swords and cut off the monster's arms which made him fall on the ground. The demon then requested them to perform his cremation rites. As the pyre was lit, Kabandha arose from the fire and informed the brothers that Sugriva, King of the Vanars will help them to search Sita. When Rama and Lakshmana went towards this mountain, Hanuman, came to meet them. He introduced the brothers to Sugriva and Jambvant. Ram revealed the story of Sita's abduction to Sugriva.

Sugriva told Rama that he saw a woman who was being abducted by a Rakshas in a flying chariot. He also told her the woman dropped her ornaments while being abducted. The ornaments were then brought and shown to Lord Rama, who recognized it as Sita's

Hanuman then resolved to visit the distant island with the purpose to discover where Sita had been hidden. Assuming gigantic form, he stood upon a mountain top and leapt seaward.

When Lord Hanuman was flying over the ocean, he was interrupted by Surasa, who rose up with gaping jaws and said that he has to pass through her mouth. Lord Hanuman increased his size but Surasa opened wider and wider her jaws to prevent him from passing. Then Hanuman shrank to the size of a man's thumb and leapt into her mouth and out of it again and again so as to fulfill her conditions. This is when Surasa accepted her defeated and allowed him to go.

Introduction

Hanuma fetches Rama and Lakshmana to Sugreeva, and advises him to befriend Rama. Accordingly Rama and Sugreeva take the oath of friendship before an altar of fire and Rama assures to eliminate Vali the vice, from the face of earth.

ṛśyamūkāt tu hanumān gatvā tam malayam girim |
ācacakṣe tadā vīrau kapi rājāya rāghavau || 4-5-1

1. hanumaan = Hanuma; R^iSamuukaat tu = from Mt. Rishyamuka; tam malayam giram gatvaa = to that, Mt. Malaya, having gone; kapi raajaaya = to the king of monkeys; raaghavau tadaa = then; viirau = about the valiant ones; aachachakSe = has reported.

Hanuma on going from Mt. Rishyamuka to Mt. Malaya, has reported to the king of monkeys Sugreeva, about the two valiant Raghava-s. [4-5-1]

ayam rāmo mahāprājña samprāpto dṛḍha vikramah |
lakṣmaṇena saha bhrātrā rāmo. ayam satya vikramah || 4-5-2

2. mahaa praaj~naH = oh, great discerner - Sugreeva; ayam raamaH = this is Rama; dhR^iDha vikramaH = oh, stubbornly, valiant one; bhraatraa lakshmanena = along with his brother, Lakshmana; sampraaptaH = arrived; saH raamaH ayam = Rama, he is; satya vikramaH = virtuously valiant one.

"Oh! great discerner Sugreeva, this is Rama... oh, stubbornly valiant Sugreeva, this virtuously valiant Rama arrived along with his brother Lakshmana... [4-5-2]

ikṣvākūṇām kule jāto rāmo daśarathātmajah |
dharma nigaditah ca eva pitur nirdeśa kārakah || 4-5-3

3. iksvaakuNaam kule jaataH dasharatha aatmajaH = in Ikshvaku, dynasty, born, Dasharatha's, son; Rama; dharme nigaditaH ca = in virtue, adept, also; eva = thus; pituH nirdesha kaarakaH = thus, father's, orders, adherent.

"Rama is the son of king Dasharatha, one born in Ikshvaku dynasty, an adept one in virtue and thus an adherent of his father's orders... [4-5-3]

rājasūya aśvamedhaiḥ ca vahniḥ yena abhitarpitaḥ |
dakṣiṇāḥ ca tathā utsṛṣṭā gāvaḥ śata sahasraśaḥ || 4-5-4
tapasā satya vākyena vasudhā yena pālita |
strī hetoḥ tasya putro. ayam rāmah arañayam samāgataḥ || 4-5-5

4. yena = by whom; raajasuuya ashvamedhaiH ca = by rajayasuuya, ashvametha rituals, also; vahniH = ritual fire; abhi tarpitaH = is well worshipped; tathaa = likewise; shata sahasrashaH gaavaH dakSiNaaH uthsR^iTaa = in hundreds and thousands, cows, as charities, were given; yena = by whom; tapasaa = devoutly; satya vaakyena = truthful to his

word; vasudhaa = this earth; paalita = was ruled; tasya putraH ayam raamaH = his, son, is this, Rama; strii hetoH araNyam samaagataH = a lady, being the reason, to forests, he came.

"By whom the ritual fire is well worshipped in Vedic rituals like rajasuuya, ashvameha, and thus cows in hundreds and thousands are donated in those rituals, by whom this earth is ruled devoutly and truthful to his word, such Dasharatha's son is this Rama, who has to come to forests owing to a woman... [4-5-4, 5]

tasya asya vasato aranye niyatasya mahātmanah |
rāvaṇena hṛtā bhāryā sa tvām śaraṇam āgataḥ || 4-5-6

6. vasataH araNye = when dwelling, in forests; niyatasya = principled one; tasya = his; asya = this; mahaatmanaH bhaaryaa = great soul Rama', wife; raavaNena hR^itaa = by Ravana, stolen; saH tvaam sharaNam aagata = such as he is, to you, for shelter, he came.

"Ravana stole the wife of this principled one and great soul Rama when dwelling in forests, such as he is, he came seeking your refuge... [4-5-6]

bhavatā sakhya kāmāu tau bhrātarau rāma lakṣmaṇau |
pragṛhya ca arcayasva etau pūjanīyatamau ubhau || 4-5-7

7. tau bhraatarau = those two, brothers; raama lakSmaNau = Rama, Lakshmana; bhavataa sakhya kaamau = with you, friendship, interested; puujaniiyatamau = most venerable are; imau = them; ubhau = two; pragR^ihya = you receive them; arcayasva = worship.

"These two brothers Rama and Lakshmana, are interested to make friendship with you... thus you receive these two and worship them, for they are most venerable ones..." Hanuma thus advised Sugreeva. [4-5-7]

Here Hanuma's role as teacher is depicted. God comes to the rescue of the needy, and communicates through a competent teacher. Only the teacher can visualize the god and his intent, and thus narrate it to the taught. That is what Hanuma's advise to Sugreeva.

śrutvā hanumato vākyam sugrīvo vānara adhipah |
darśanīyatamo bhūtvā prītyā uvāca rāghavam || 4-5-8

8. vaanara adhipaH = monkey's chief; sugriivaH = Sugreeva; shrutvaa = on hearing; hanumataH vaakyam = Hanuma's, words; darshaniiyatamaH bhutvaa = presentable, he became; priityaa = gladly; uvaaca raaghavam = spoke to, Rama.

On hearing Hanuma's words Sugreeva, the chief of monkeys has become presentable and gladly spoke to Rama. [4-5-8]

Sugreeva is not in a presentable form till now because he is outrageously furious with 'friend-or-foe' syndrome, on seeing Rama and Lakshmana. None can calm these vanara heroes down, except their own favourable interests. On listening from Hanuma that the entrants are friends, Sugreeva got his cool back, and thus became 'presentable,' befitting to his honourable kingship.

bhavān dharma vinītaḥ ca sutapāḥ sarva vatsalaḥ |
ākhyātā vāyuputreṇa tattvato me bhavad guṇāḥ || 4-5-9

9. bhavaan = you; dharma viniitaH = virtue knower [you are trained to tread virtuous path]; su tapaaH = best, scrupulous one; sarva vatsala = to all, kindlier one; aakhyaataa vaayu putreNa = said so by, Air's son, Hanuma; tattvataH = in subtlety; me = to me; bhavat guNaaH = your, attributes.

"You are a trained one in treading righteous path, best by your scruples, and a kindlier one to all, so said Air-god's son Hanuma to me about your attributes, in subtlety... [4-5-9]

tan mama eva eṣa satkāro lābhaḥ ca eva uttamaḥ prabho |
yat tvam icchasi sauhārdam vānareṇa mayā saha || 4-5-10

10. hṛṇ prabho = oh, lord; tat tvam vaanareNa mayaa saha sauhaardam icChasi = therefor, you, with a monkey, [like] me, along with, friendship, you wish to have; iti yat = thus, that which topic is there; eSa = this way; mama eva = for me, only; satkaaraH uttamaH laabhaH ca = an honour, best, achievement, also.

"Therefor oh, lord, you wish to make friendship with a monkey like me, thereby this is an honour and a best achievement to me alone... [4-5-10]

rocate yadi me sakhyam bāhuḥ eṣa prasāritaḥ |
gr̥hyatām pāṇinā pāṇiḥ maryādā badhyatām dhruvā || 4-5-11

11. me sakhyam rocate yadi = my friendship, you aspire, if; eSa baahuH prasaaritaH = here is, arm, is extended; paaNinaa paaNiH gR^ihyataam = hand, by hand, be taken; dhruvaa = stably; maryaadaa badhyataam = convention, make fast.

"If you aspire my friendship here I extend my arm, take this hand of mine into yours, thus let the convention be stably made fast..." Thus Sugreeva proffered friendship to Rama. [4-5-11]

etat tu vacanam śrutvā sugrīvasya subhāṣitam |
samprahr̥ṣṭa manā hastam pīḍayāmāsa pāṇinā || 4-5-12
hr̥ṣṭaḥ sauhṛdam ālambya paryaṣvajata pīḍitam |

12, 13a. etat tu = all those; ugriivasya su bhaashitam vacanam shrutvaa = Sugreeva's, well-said, words, listening; samprahR^iSTa manaa = gladdened, at heart [Rama]; paaNinaa = with hand; hastam = [Sugreeva's] hand; piiDayaamaasa = started to clutch; sauhR^idam aalambya = friendship, while abiding; hR^iSTaH = happily; piiditam = grippingly; paryaSvajata = embraced.

Rama is gladdened at heart on listening all those words well said by Sugreeva, and then clutched Sugreeva's hand in his, and ardently abiding by the vow of friendship he embraced Sugreeva, grippingly and happily. [4-5-12, 13a]

tato hanūmān samtyajya bhikṣu rūpam arindamaḥ || 4-5-13
kāṣṭhayoḥ svena rūpeṇa janayāmāsa pāvakaḥ |
dīpyamānam tato vahnim puṣpaiḥ abhyarcya satkṛtam || 4-5-14
tayor madhye tu suprīto nidadhau susamāhitaḥ |

13b, 14, 15a. tataH = then; arindamaH hanuumaan = enemy destroyer, Hanuma; bhikshu ruupam samtyajya = ascetic's guise, leaving off; svena rupeNa = with his own, form; kaaSThayoH paavakam janayaamaasa = with two sticks, fire, started to ignite; tataH = then; vahnim diipyamaanam satkR^itam = fire, making to glow, decorated; puSpaiH = with flowers; abhyarcya = worshipped; supriitaH = gladdened; susamaahitaH = devoutly; tayoh madhye nidadhe = them, in between, placed.

Then the destroyer of enemies Hanuma discarding the guise of ascetic assumed his original monkey form, and on producing fire with two sticks then made it to glow. decorated, worshipped with flowers, then gladly and devoutly placed that fire in between Rama and Sugreeva. [4-5-13b,14,15a]

The holy fire used to kindle the ritual fire in a yaj~na will be produced by constantly rubbing two dry wood sticks, and this is called as araNi . When sparkles of fire and a little fume appear, it will be put into the Altar of Fire. Here, Hanuma has changed his ascetic form to his original monkey shape. This form changing at their will and wish is called kaamaruupa vidya, changing guise at will, which will be useful to Hanuma in the coming episodes of Ramayana.

tato agnim dīpyamānam tau cakratuḥ ca pradakṣiṇam || 4-5-15
sugrīvo rāghavaḥ ca eva vayasyatvam upāgatau |

15b, 16a. tataH = then; tau diipyamaanam agnim pradakshiNam cakratuH = they two, glowing, at fire, circumambulations, they made; Sugreeva; Raaghava; ca = also; eva = thus; vayasyatvam = friendship; upaagatau = entered into.

Then those two performed circumambulations to that well glowing ritual fire, and thus, Rama and Sugreeva entered into the pact of friendship. [4-5-15, 16a]

tataḥ suprīta manasau tau ubhau hari rāghavau || 4-5-16
anyonyam abhivīkṣantau na tṛptim abhijagmatuḥ |

16b, 17a. tataH = then; supriita manasau = gladdened, at heart; tau ubhau = those, two; hari = monkey; raaghavau = Raghava anyonyam = at each other; abhi viikshantau = gazing at; na = not; tR^iptim = satisfaction; upajagmatuH = they got.

And then gladdened at heart are those two, that monkey and Raghava, gazed enough at each other eye-to-eye, but their hearts did not derive any fraternal satisfaction. [4-5-16b, 17a]

tvam vayasyo.asi hr̥dyaḥ me hi ekam duḥkham sukham ca nau ||4-5-17
sugrīvo rāghavam vākyam iti uvāca prahr̥ṣṭavat |

17b, 18a. tvam me hR^idyaH vayasyaH asi = you, are my, amiable, friend, you are; nau sukham duHkham ca ekam = our, mirth, misery, are one [the same]; iti sugriivaH prahR^iSTa vat raaghvam vaakyam uvaacha = thus, Sugreeva, rejoicingly, to Raghava, sentence, said.

Sugreeva rejoicingly said to Raghava, "you are the amiable friend of mine, henceforth our mirth or miseries are same for us..." [4-5-17b, 18a]

tataḥ suparṇa bahulām bhaṁktvā śākhām supuṣpitām ||4-5-18
sālasya āstīrya sugrīvaḥ niṣasāda sa rāghavaḥ |

18b, 19a. tataH = then; Sugreeva; saalasya parNa bahulaam = of sala tree, with leaves, many; supuSpitaam = well flowered; shaakham chitvaa = branch of tree, snapped off; aastiirya = spread it; sa raaghavaH = along with, Rama; niSasaada = sat on it.

And then Sugreeva snapped off and spread a fully flowered tree-branch of sala tree with many leaves, and sat on it along with Rama. [4-5-18b, 19a]

lakṣmanāya atha saṁhr̥ṣṭo hanumān mārutātmajaḥ || 4-5-19
śākhām candana vṛkṣasya dadau parama puṣpitām |

19b, 20a. atha = then; saṁhr̥iSTaH = gladly; maaruta aatmajaH = Air's son; Hanuma; chandana vR^ikshasya = of sandalwood, tree; parama puSpitaam = well, flowered; shakhaam = branch of; laksmanaaya = for Lakshmana; dadau = gave.

Then Hanuma the son of Air, gladly gave a well-flowered branch of sandalwood tree to Lakshmana... [4-5-19b, 20a]

tataḥ prahr̥ṣṭaḥ sugrīvaḥ ślakṣṇam madhurayā girā || 4-5-20
prati uvāca tadā rāmam harṣa vyākula locanaḥ |

20b, 21a. tataH = then; prahr̥ṣṭaH = that delighted one; Sugreeva; madhurayaa giraa = with sweet, words; harsha = with happiness; vyaakula = quavering; lochanaH = eyes; shlakshnam = softly; tadaa = that way; prati uvaacha = replied; Rama.

Then that delighted Sugreeva with his sweet words, and with his eyes quavering in happiness, replied Rama softly. [4-5-20b, 21a]

aham vinikṛto rāma carami iha bhaya ārditaḥ || 4-5-21
hr̥ta bhāryo vane trasto durgam etat upāśritaḥ |

21b, 22a. Rama; aham = I am; vinikṛtaH = ridiculed; hr̥ta bhaaryaH = stolen, wife; bhaya aarditaH = fear haunting me; iha vane charami = here about, in forest, I am moving; trastaH = dread; durgam = impenetrable; etat = this forest; upaashritaH = took refuse.

"Rama, I am ridiculed, stolen is my wife, I move here about in these forests with dread and fear haunting me... I took refuge in this impenetrable forest... [4-5-21b, 22a]

so.aham trasto vane bhīto vasāmi ud bhr̥nta cetanaḥ || 4-5-22
vālinā nikṛto bhr̥trā kṛta vairaḥ ca rāghava |

22b, 23a. Raaghava; bhraatraa = by my brother; vaalinaa = by Vali; nikṛtaH = denounced; kṛta vairaH ca = made, an enemy, also; saH aham = such as I am; trastaH = fearing; udbhraanta chetanaH = with dismayed, vitality; vane = in forests; abhiitaH = scared; vasaami = I am living.

"Oh, Raghava, my brother denounced me, he even made me an enemy of his, such as I am I am living in these forests with scare and fear, and with dismayed vitality... [4-5-22b, 23a]

vālino me mahābhāga bhaya ārtasya abhayam kuru || 4-5-23
kartum arhasi kākutsthaḥ bhayam me na bhaved yathā |

23b, 24a. mahaabhaaga = oh! highly fortunate one Rama; vaalinaH = from Vaali; bhaya aartasya = in fear, intimidated; me = to me; a bhayam kuru = no, fear [fearlessness] give me; kaakutsthaH = Rama; me yathaa bhayam na bhavet = to me, as to how, fear, will not, be there; [tathaa = that way]; kartum arhasi = to do so, apt of you.

"Oh, highly fortunate Rama, affirm fearlessness to me from Vali by who I am highly intimidated, and as to how there will be fearlessness to me from him, it will be apt of you to accomplish that, that way... [4-5-23b, 24a]

evam uktaḥ tu tejasvī dharmajño dharma vatsalaḥ ||4-5-24
prati abhāṣata kākutsthaḥ sugrīvam prahasan iva |

24b, 25a; evam = thus; uktaH tu = who is said so; tejasvii = resplendent one; dharmaj~naH = righteous one; dharma vatsalaH = virtue, patron; kaakutsthaH = Rama; sugriivam = to Sugreeva; prati abhaaSata = in turn, spoke [replied]; prahasan iva = laughing off, as though.

When thus said, that resplendent and righteous one being the patron of virtue Rama replied Sugreeva, as though laughing off. [4-5-24b, 25a]

upakāra phalam mitram viditam me mahākape ||4-5-25
vālinam tam vadhiṣyāmi tava bhārya apahāriṇam |

25b, 26a. mahaa kapeH = oh, great monkey; mitram = a friend has; upakaara phalam = helpfulness, as resultant fruit; viditam me = known to, me; tava bhaarya apahaarinaam = your, wife's, adductor; tam vaalinam = that one, Vali; vadhiṣyaami = I intend to kill [eliminate.]

"A friend is the resultant factor of helpfulness... that I know... oh, great monkey I intend eliminate that Vali, the abductor of your wife... [4-5-2b, 26a5]

amoghoḥ sūrya saṃkāśāḥ mama ime niśitāḥ śarāḥ || 4-5-26
tasmin vālini durvṛtte nipatiṣyanti vegitāḥ |
kanka patra praticchannā mahendra aśani saṃnibhāḥ || 4-5-27
tīkṣṇāgrā ṛjuparvāṇaḥ sa roṣā bhujagā iva |

26b, 27, 28a. amoghaaH = unfailing; suurya sankaaH = sun-like; nishitaaH = sharp; kanka patra praticchannaa = eagle's, feathers, tied with; mahendra ashani sannibhaaH = Indra's, Thunderbolt, similar to; tiikshNa agraa = sharp, pointed; R^iju parvaaNaH = with straight, egress; sa roSaaH bhujagaa iva = with rage, snakes, like; ime mama sharaaH = these, my, arrows; vegitaaH = speeded [in shooting]; durvR^itte = vicious one; tasmin vaaalini nipatiSyanti = on that, Vali, will fall.

"Unfailing are these arrows of mine, scorchers like sun, sharp ones tied with eagle feathers, similar to Indra's Thunderbolts, sharp are their point and straight is their egress, similar to enraged snakes, and these arrows of mine will be speeded up to fall on that vicious Vali... [4-5-26b, 27, 28a]

tam adya vālinam paśya tīkṣṇaiḥ āśī viṣa upamaiḥ || 4-5-28
śaraiḥ vinihitam bhūmau prakīrṇam iva parvatam |

28b, 29a. adya = now; aashii visha upamaiH = snakes, venomous, in similarity; kruuraiH sharaiH vinihitam = by cruel, arrows, completely ruined; bhuumau = on ground; prakiirNam = splintered; parvatam = mountain; iva = like; vaalinam = Vali; pashya = you see.

"You will see now itself the falling of Vali like a splintered mountain onto ground, when completely ruined by these cruel arrows that are similar to venomous snakes..." Thus Rama inculcated confidence in Sugreeva. [4-5-28b, 29a]

sa tu tad vacanam śrutvā rāghavasya ātmanohitam |
sugrīvaḥ parama prītaḥ paramam vākyaṃ abravīt ||4-5-29

29b, c. saH tu = he, also; sugriiva = Sugreeva; aatmanaH hitam = for himself, appeasing; raaghavasya tat vachanam = of Raghava, that saying; shrutvaa = on hearing; parama priitaH = completely satisfied; sumahat = fine; vaakyam = sentence; abraviit = said.

On hearing Raghava's words that are appeasing for his self, Sugreeva is very completely satisfied and said this fine sentence. [4-5-29b, c]

tava prasādena nṛsimha vīra
priyām ca rājyaṃ ca samāpnuyām aham |
tathā kuru tvam nara deva vairiṇam
yathā na hiṃsyat sa punar mama agrajam || 4-5-30

30. tava prasaadena = by you, grace; nR^i simha = lion, among men; viira = valiant one; aham = I will; priyaam cha = wife, also; raajyam ca = kingdom, too; sam aapnuyaam = let me regain; nara deva = humans', god; saH = he; punaH = again; yathaa = as to how; na = not to; hinsyat = suffer me; tathaa tvam kuru = like that, you, do; vairiNam = to my enemy; mama agrajam = my elder brother.

"By your grace, oh, lion among men, let me regain my wife and kingdom too... oh, god of humans, as to how he does not suffer me again, thus you may please make happen... let not my elder brother turned as an enemy of mine suffer me again... [4-5-30]

sīta kapīndra kṣaṇadā carāṇām
rājīva hema jvalanopamānāni |
sugrīva rāma praṇaya pasaṅge
vāmāni netrāṇi samam sphuranti || 4-5-31

31. Sugreeva; Rama; praNaya = friendly; prasa~Nge = conversation; siita = Seetha's; kapi indra = monkeys, lord's [Vali's]; kshaNadaa charaanaam = night, walker's [Ravana's]; raajjiiva = lotus; hema = golden; jvalana = fireball; upamaanaani = in similitude; vaamaani = left side; netraaNi = eyes; samam = equally; sphuranti = fluttered.

During the friendly conversation of Rama and Sugreeva, the left eyes of Seetha, Vali and Ravana that bear similitude with lotuses, golden orbs, and fireballs respectively have fluttered equally. [4-5-31]

This verse is in krama alankaara, an equated metaphoric expression, by juxtaposing words equally to compare Seetha's eyes with lotuses, Vali's eyes with golden-balls for his complexion is golden, and Ravana's eyes with fireballs. But all are left eyes only that have fluttered. The flutter of left eye to the male is a bad omen while to the female it is a good omen. Hence the friendship of Rama and Sugreeva is the seedling point for eradication of vice, namely Vali and Ravana, from face of the earth.

iti vālmīki rāmāyaṇe ādi kāvye kiṣkindha kāṇḍe pañcamaḥ sargaḥ

Thus, this is the 5h chapter in Kishkindha Kanda of Valmiki Ramayana, the First Epic poem of India.

KISHKINDA IN PRESENT SCENARIO

Kishkindha Kanda (the book of Kishkindha) Valmiki Ramayana, which is one of the two great epics of India (the other being the Mahabharata). The book consists of 67 sargas (sometimes translated as chapters or "cantos") of Sanskrit verse.

Hampi

The fourth chapter of Ramayana mentions Kishkinda in Hampi as the citadel of Bali. Vali (Sanskrit: वाली, nominative singular of the stem वालिन् (Valin)), also known as Bali, was a vanara king of Kishkindha in the Hindu epic Ramayana.

When Rama decided to depart from the world and took samadhi in the Sarayu river, Sugriva also retired from earth and went with his father Surya. He crowned his nephew Angada as the next king of Kishkindha.

The kingdom of Kishkindha is said to be a part of the Dandaka forest, which stretched from the Vindhya mountain range down to the south of India. Today Hampi is a famous UNESCO World Heritage Site, one of its most captivating features being its ruins, which are a result of years of volcanic activity and soil erosion.

There are 575 steps and there are markers that tell you how many steps you have completed. There are stunning views while climbing up, but there isn't too much shade along the way, the sunrays fall directly on the steps and it can become hot during the day.

OBSERVATIONS MADE THROUGH THE STUDY OF KISHKINDAKANDA

The following are the statements observed with my deeper knowledge which can prove the Kishkindakanda as a tale of wisdom.

- ✓ The main essence that can drawn from Ramayana the epic is one can have that courage and passion towards a never give up attitude in spite of all odds and prove his/herself that he/she is a leader and a hero to his/her life.
- ✓ Character is the way of attitude and a substance of quality in our perception that made us handle the large group of people called friends with a word of truth and a bond of loyalty that helps us to fight the battles as friends won't leave us alone in our hardships.
- ✓ The words of lord hanuman to invite Vibhishana the brother of enemy Ravana into lord Rama's group to fight against Ravan let us aware how important it is to have a logical thinking and estimations we can draw on a person with or without considering his/her background. Because it's not where we belong and how we brought up it is important What We Are as an Individual.
- ✓ If our intentions are pure and our deeds are ethical the universe itself help us to concure things in all possible ways and means just like Lord Rama took the help of Vanaras to reach Lanka, Fought with Ravana and get back the Maha Sadhvi the queen of Lord Rama's heart our beloved Lordess Sita.



Study Of Test For Significance Of Pearson's Correlation Coefficient

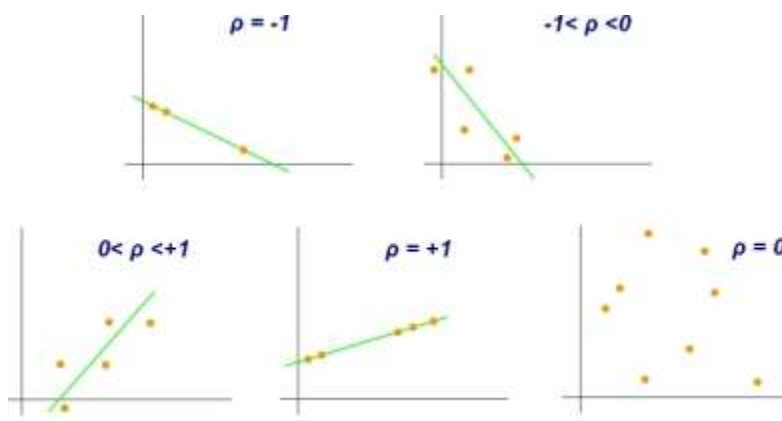
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ABSTRACT: This paper investigated the experiment of significance of Pearson's correlation coefficient. It provided an in-depth judgment of different methods of testing for the significance of Pearson's correlation coefficient, as it is commonly called. The t-distribution, Fisher's z-transformation, and the Statistical Package for Social Sciences (SPSS) were engaged. It was accomplished that each of the methods provided superior enough test for significance of correlation coefficients, which brings to rest the contrasting views that the SPSS does not provide a test for significance of correlation coefficient. The SPSS was recommended ahead of the t-distribution and z transformation due to its easy, robust, and wide applications. Researchers and academics were charged to expose their mentees to this great scientific discovery,

Keywords: Pearson's correlation coefficient t-distribution.

Introduction:

In statistics the Pearson's correlation coefficient referred to as Pearson's r , the Pearson product-moment correlation coefficient (PPMCC), or the bivariate correlation is a measure of linear correlation between two sets of data. It is the covariance of two variables, divided by the product of their standard deviation; thus it is fundamentally a normalized measurement of the covariance, such that the result always has a value between -1 and 1 . As with covariance itself, the measure can only reflect a linear correlation of variables, and ignores many other types of relationship or correlation. As a simple example, one would expect the age and height of a sample of teenagers from a college to have a Pearson correlation coefficient significantly greater than 0 , but less than 1 (as 1 would represent an idealistically perfect correlation)..



Examples of scatter diagrams with different values of correlation coefficient (ρ)

Pearson's Product Moment Correlation (r)

The Pearson's product Moment Correlation coefficient is a measure of the strength and direction of association that exists between two variables measured on at least an interval scale. A Pearson's correlation attempts to draw a line of best fit through the data of two variables, and the Pearson's correlation coefficient, r , indicates how far away all these data points are from this line of best fit.

When the Pearson's correlation is to be used, one must make necessary checks to ensure that the Pearson's correlation is the appropriate statistic. The way to do this is to ensure the following four assumptions are passed:

1. The two variables must be measured at the interval or ratio scale.
2. There is a linear relationship between the two variables.
3. There should be no significant outliers. Outliers are single data points within your data that do not follow the usual pattern.
4. The data should be approximately normally distributed.

Computing the Pearson's

Given the bivariate set $(x_1, y_1), (x_2, y_2), \dots, (x_n, y_n)$, the Pearson's Product Moment Correlation Coefficient (r) is defined as
$$r = \frac{S_{xy}}{S_x S_y}$$

Where r = Pearson's Product Moment Correlation Coefficient

S_{xy} = Covariance of x and y values

and S_x and S_y = Standard deviations of x and y values respectively

Given the above relationship, the Pearson's Product Moment Correlation Coefficient (r) can be written as

$$r = \frac{\frac{1}{n}\sum xy - \bar{x}\bar{y}}{\sqrt{\frac{1}{n}\sum x^2 - \bar{x}^2} \sqrt{\frac{1}{n}\sum y^2 - \bar{y}^2}}$$

where r = Pearson's Product Moment Correlation Coefficient

N = Number of pairs of values or scores

$\sum xy$ = Sum of the products of x and y

\bar{x} = Mean of the x values

\bar{y} = Mean of the y values

$\bar{x}\bar{y}$ = Product of the mean values of x and y

$\sum x^2$ = Sum of squares of x values

$\sum y^2$ = Sum of squares of y values

With the above equations of the Pearson's Product Moment Correlation Coefficient (r) a better computational equation can be written thus:

$$r = \frac{N\sum xy - (\sum x)(\sum y)}{\sqrt{(N\sum x^2 - (\sum x)^2)(N\sum y^2 - (\sum y)^2)}}$$

Where r = Pearson's product Moment Correlation Coefficient

N = Number of pairs of values

$\sum xy$ = Sum of the product of x and y

$\sum x$ = sum of the values of x

$\sum y$ = sum of the values of y

$\sum x^2$ = Sum of the squares of x values

$\sum y^2$ = Sum of the squares of y values

$(\sum x)^2 =$ Squares of sum of x values

$(\sum y)^2 =$ Squares of sum of y values

Using the distribution of Economics and Commerce scores of B.Com students of B.V.Raju College

- (i) Compute the Pearson's Product Moment Correlation Coefficient (r),
 (ii) Interpret your result, and

Economics and Commerce scores of B.Com students of B V RAJU College

Economics	60	70	50	65	46	82	85	66	39	45
Commerce	80	82	68	45	58	63	90	74	62	80

(i)

Economics(x)	Commerce(y)	xy	x^2	y^2
60	80	4800	3600	6400
70	82	5740	4900	6724
50	68	3400	2500	4624
65	45	2925	4225	2025
46	58	2668	2116	3364
82	63	5166	6724	3969
85	90	7650	7225	8100
66	74	4884	4356	5476
39	62	2418	1521	3844
45	80	3600	2025	6400
$\sum x = 608$	$\sum y = 702$	$\sum xy = 43251$	$\sum x^2 = 39192$	$\sum y^2 = 50926$

Pearson's Product Moment Correlation Coefficient (r)= 0.29

(ii) A positive correlation coefficient of 0.58 implies that Economics and Commerce are positively related. In other words, a student who scores highly in Economics is likely to score highly in Commerce and vice versa.

Purpose of the Paper

The purpose of this position paper is to show that test of significance of Pearson's correlation coefficient is not only possible with the t-distribution and z-transformation, but that the Statistical Package for Social Sciences (SPSS) perfectly does this with utmost ease and accuracy.

Results

Test for the significance of relationships between two continuous variables

Person's correlation deals the potency of a relationship between two variables. Even though in research any relationship should be assessed for the significance in addition to its strength. The strength of a relationship is indicated by the correlation coefficient r , but in reality measured by the coefficient of determination r^2 . The significance of the relationship is expressed in probability levels p . The values of p tells how improbable a given correlation r will arise given that no relationship exists in the population. It must be noted that larger the correlation, the stronger the relationship, where a smaller p -level indicates more significant relationship.

In testing for the significance of correlation coefficient, some assumptions are essential. First, let us assume that r

is the correlation between two variables x and y in a given sample and that ρ is the correlation between the same two variables x and y in the population. In correlation analysis, this means the null hypothesis that there is no significant relationship between x and y in the sample.

The Test of significance of correlation coefficient r employed one method in this paper i.e t-distribution.

The t-distribution formula for calculating the approximate t-value to test the significance of correlation coefficient r is given by

$$t = r \sqrt{\frac{n-2}{1-r^2}}$$

Where t = t-value required for the test of significance of the correlation coefficient r

n = sample size

r = the computed correlation coefficient being tested for significance.

Let us employ the data in below table heights (in metres) and weights (in kilogramme) of some Foot ball Players to discuss the test of significance of correlation coefficient using the t-distribution, The null hypothesis tested was that **“there is no significant relationship between heights and weights of Foot ball Players”**

Players	Heights(x) inches	Weights(y) k.gs
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1	5.6	60
2	5.0	55
3	5.2	52
4	6.0	65
5	4.9	50
6	5.1	53
7	5.3	54
8	5.4	56

Using t-distribution

First, Pearson's Product Moment Correlation coefficient r was computed using the formula

$$r = \frac{N\sum xy - (\sum x)(\sum y)}{\sqrt{(N\sum x^2 - (\sum x)^2)(N\sum y^2 - (\sum y)^2)}} = 0.93$$

Second, the computed 0.93 was transformed to the t-distribution using the formula

$$t = r \sqrt{\frac{n-2}{1-r^2}} = 6.19$$

Third, the degrees of freedom(df) was found : at 0.95% , $df=n-2=6$

Fourth, the critical value table for t at 8 d.o.f = 1.943

t-value is greater than the table value. So we reject the null hypothesis. In other words

“there is significant relationship between heights and weights of Foot ball Players”

CONCLUSION

This paper has shown that the test of significance of correlation coefficients is very expert in research because the degree of relationship alone is not sufficient to bring to a close that a computed correlation coefficient is adequate. It further exposed that one of the method of test of significance i.e t-distribution provided good sufficient test for significance of correlation coefficients

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INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

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Social Entrepreneurship And The Role Of Cbo S And Ngo S

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Abstract

Social entrepreneurship potentials of community – based organizations (CBOs) linked to nongovernmental organizations (NGOs) in the implementation of development programs the conceptual frame work of the study draws on the existing literature on social entrepreneurship. the research findings reveal that NGO - CBO PARTNERSHIP help to transform CBOs in to social enterprises by creating revenue generation streams .social entrepreneur may seek to produce environmentally –friendly products ,serve an understand community or focus on philanthropic activities .

Introduction

Social entrepreneurship is a relatively new term , but the underlying concept can be traced back much earlier .before the term social entrepreneurship was coined ,there were already many entrepreneurs who worked children’s rights women’s empowerment ,socio economic development ,environment issues and more two note worthy entrepreneurs who established social ventures as early as the 19TH century are Robert Owen (1771-1858).the founder of the co-operative movement and Florence nightingale (1820-1910), who found the first nursing school and developed various nursing practices.

The term “ social entrepreneurship” has been tossed around since the 1960s , but it has thanks to 2006 Noble prize winner Muhammad Yunus that it has gained its place in the spotlight .in 1976,yunus founded the Grameen bank ,an institution in Bangladesh that provides microcredit loans to low- income earners to encourage economic growth at the grass root levels and foster financial self-sufficiency .yunu’s Noble prize winning enterprise has proven to be hugely successful and helped great deal in bringing social venture to the fore.

Now a days ,the concept of social entrepreneurship is widely used and supported .organizations such as the Skoll foundation , the Schwab foundation Ashoka :innovators for the public ,Echoing green and Omidyar network were established to enhance and encourage social entrepreneurship .these organizations identify ,highlight and (financially)support social enterprises all over the world ,creating networks in which social entrepreneurs can exchange insights , strategies ,form partnerships and learn how to improve their ventures.

Social entrepreneurship is without a global affair . with 260 social entrepreneurs in its community ,the Schwab Foundation , which is under legal supervision of the Swiss government , has representatives all around the globe . the nearly 3000 Ashoka fellows work in over 70 countries in every area human need . the US –based Skoll foundation has invested approximately 400 million USD in social entrepreneurship on all five continents eBAY founder Pierre Omidyar’s Omidyar network has offices in Sillicon valley, Mumbai ,London Johannesburg, Washington DC and there are many more similar organizations that support social entrepreneurship worldwide.

The process of social entrepreneurship

The social entrepreneurship has a beginning like any other enterprises .it starts with the idea generation of the entrepreneur or group of entrepreneurs .once the social enterprise is launched monitor the growth. A key challenge for social entrepreneurs is to resist the powerful demand –pull for growth and to be more deliberate about planning a long term impact strategy . thus social entrepreneurship development is equally responsible task like commercial enterprise development . the difference is only in the output and outcome .be attentive in developing various sectors such as economic , marketing , employment and environment . social enterprise impact is predicated on the organization’s mission , the social objectives intends to achieve , and what impacts can be measured .social enterprises , like all social programs , have direct as well as indirect impacts .it is measured based on indicators corresponding to each impact. For ex- the impact is livable wages earned by for low income workers and corresponding indicators is amount of wages (proxy –minimum wage/inflation/cost of living).In the entire process sustainability of the programme need special attention both economic and social

This supports a more sustainable economy, stronger civil society and improves over all social well-being

Methodology of social enterprise

Social enterprises methodology centers on achieving social impact through socio economic value creation. it means the social enterprise incorporates commercial forms of income generation in to non profit organizations as a means accomplish mission (social value) and financial sustainability (economic value),how ever lies in specifics of its dual objectives –depth and breadth of social impact to do earned as well as its capacity to

deliver on both accounts .mission drives social value creation , which is delivered through financial models- business or income generation the non profit organizations must build organizational capacity , in order that both can be managed effectively . the organization must integrate business tools and practice strengthen effectiveness and performance. in doing so, the traditional non profit undergoes a culture transformation and emerges as a more entrepreneurial, market –driven ‘business like ‘ organization.

Another lens through which we can view social enterprise is a group of four linked aspects of successful value creation

1. Problem strategy for affecting social impact and mission accomplishment (social value creation)
2. Financial strategy for generating income through commercial activities as a means to achieve sustainability
3. Capacity building strategy, for strengthening organizational capacity, performance and efficiency
4. Cultural strategy to transform organizational culture in to being more entrepreneurial innovative , and market-driven

Perspective for studying social entrepreneurship

A recent report , published by Global Entrepreneurship Monitor (GEM), shows as the prevalence of social entrepreneurial activity around the globe GEM utilized two definitions for its research .the broad definition covers any kind of activity ,organization, or initiative that has a particularly social, environmental or community objective . the narrow definition focuses specifically on organizations that are driven by social impact for their society and the environment rather than potential financial impact for the organization ,and are market –rather than non-market based .

Using the broad definition, 3.2 percent of the adult population (18-64 years old) across 58 GEM economies is engaged in a social venture that’s in the start-up phase , with the highest rates of activity in Peru, Hungary and Burkina Faso. The average rate of post-start-up, operating social enterprises is 3.7 percent of the adult population, ranging from 0.4 percent in Iran to `14.0 percent in Senegal.

Using the narrow definition, which arguably fits the concept of social entrepreneurship better, sees 11 percent of the adult population across 31 GEM countries active in start –up social entrepreneurship and 1.2 percent working in operational entities .countries such as the Philippines, Australia ,Colombia chile, Luxembourg and Israel score the highest in this regard. Social entrepreneurs are individuals with innovative solutions to society’s most pressing, social, cultural and environmental challenges.

Social entrepreneurship is growing trend , alongside socially responsible investing and environmental , social and governance (ESG) investing

The wealth of nations, the economist Adam smith explained . it is not from the benevolence of the butcher , the brewer or the baker that we expect our dinner , but from their regard to their own self interest Smith believes that when individuals pursued their own best interests they would be guided towards decisions that benefit others .

the baker, for ex wants to earn a living to support his family. to accomplish this, they produce a product – bread – which feeds and nourishes hundreds of people

one example of social entrepreneurship is micro finance institutions, these institutions provide banking services to unemployed or low-income individuals or groups who otherwise would have no other access to financial services

how social entrepreneurs create market that changes the world (2008) John Elkington and Pamela Hartigan distinguish three types of social entrepreneurs

leveraged non-profit ventures the entrepreneur engages across section of society, including private and public organizations, to realize particular social innovation. leveraged non-profit ventures depends on outside philanthropic funding, but since their partners have a vested interest in their continuation longer-term sustainability is often enhanced.

hybrid non-profit ventures a non-profit type organization as well, but this model includes some cost – recovery by means of selling goods and services to be able to sustain their activities, entrepreneur must mobilize other sources of funding besides public or philanthropic sectors. grants or loans offer a solution to money shortages. these loans, however, need to be paid back at a certain point

social business ventures social business ventures are for –profit entities that provide a social or ecological product or service although financial profits are an underlying goal here, accumulating wealth is not the main objective. the focus of the entrepreneur is to grow as a social venture in order to reach more people in need and positively impact one or multiple sectors of society hence, a great deal of the profits is reinvested in the enterprise to fund expansion. the entrepreneur of this type of venture seeks investors who are interested in combining financial and social return on their investment

Partnership between non –governmental organizations(ngos) and community based organizations :

(cbos) have become a significant force in efforts to address social issues through collective means

1) in facing the challenges of attaining sustainability and other social objectives, ngos are increasingly adopting an entrepreneurial approach the most significant approach that emerged in recent decades is the ‘social entrepreneurship’ model in which small enterprises are established to provide goods and services directly tailored to local needs and sustainability goals

2) such affiliated cbos play important development roles in the rural and low- income areas of poorer –income countries, where the government is unable or unwilling to provide necessary social services

ngos have been the basis of study of social entrepreneurship. according to Dart, ‘social enterprise’ can be viewed as a set of strategic responses to a variety of environmental and social challenges that ngos typically

address .these responses lead ngos to develop strategic partnership with institutions based at the local community level

both ngos and cbos perform different functions within a partnership ngos are well placed to explore opportunities and identify key resources as well as to provide service such as a start – up funds, institution building , business networking and marketing , innovation and knowledge transfer , technical training ,research legal support , infrastructure , and community health and social services that cbos need to become self-sufficient . in the partnership process .cbos place their organizational capacity , bring local perspective , and use social capital to carry out the partnership goals and ngo –developed developmental responsibilities

social innovation refers to traditional innovation in terms of ‘value creation ‘ it entails new strategies, concepts , ideas and organizations that meet social needs of all kinds – from working condition and education to community development and health –and that extend and strengthen civil society.

Micro credits flagship in social entrepreneurship

The idea behind Rang De emerged in 2006, the same year when Muhammad yunus won the Nobel peace prize for his work in the field of micro credit we felt that credit could be a powerful tool to help people fight poverty in India as well as we explored the idea , we realized that there was already a lot of micro finance in the country . however we stumbled up on a article that spoke about borrowers of a micro finance intuition having ended their lives because they were unable to repay their loans . Rang De is a not profit online organizations in india that lends small loans to individuals planning to start a new or grow their existing business .it is successful attempt to bring together the two parts of india one of which successfully progressing while one is left out due to shortage of resources

founded in the year 2006 by ramakrishna nk and smitha ram rang de, today is major online platform in the country

crowd funding it raising for a cause or project from a large number of people , who contribute small amounts usually via the internet . it is mostly seen as an act of charity

rang De enables social investing through our peer to peer social investment plat form , the asocial investor is investing in the sustainable growth of an individual . this is no charity, the invested money comes back to the social investor , and the process is clear and transparent

micro finance in institutional financing for the poor . in the micro finance model , a borrower needs to become a part of a group ‘s lending cycle

other p2p platforms in the p2p lending landscape today in india ,most platforms are catering to the non-priority sector. the majority of them promise a higher return for the investment made quite contrary to the purpose of social investment the existing platforms are expensive for both borrowers and lenders

rand De makes credit affordable & accessible we work solely with the priority sector .our single minded focus is to make credit affordable and accessible to the millions , who are excluded to take a holistic approach and work with our partners to deliver entrepreneurship and financial literacy content on the ground Rang De .org has performed with a number of micro finance institutions (MFI) & NGOs to identify and screen borrowers at the gross root level these field partners prepare and post the profiles of prospective borrowers on the website these profiles are available on the site and a lender may allot either part or the entire loan amount to the

borrowers of one's choice . once the loan amount is raised , the involved MFI receives the money and disburses it to the borrowers the investor can keep a track of the progress made by the borrower online

Rang De was launched as a platform in 2008 with the mission of providing access to low cost and affordable credit . we soon realized that , while cost of credit was an important aspect , the entire serve design of delivery had to be revisited if it had to enable communities to take charge of their lives towards this aim ,we designed several initiatives –including swabhimaan - a state of the art digital financial literacy platform and habba –an artisan centric fair market place designed to enhance their incomes

The current state of the credit system for millions of unbanked and semi banked individuals across the world is predominantly informal. Where formal credit has been extended . it has been marked by complete lack by agency . lack of access to information and more importantly a lack of financial literacy and awareness have prevented individuals and communities from taking control over their lives

Rang De's flagship project swabhimaan ,has been built to address this issue of lack of Agency by empowering them to make active informed decisions when it comes to financial management and loan decision making

DISCUSSIONS: SOCIAL ENTREPRENEURSHIPS

CBOs working in concert with NGOs for natural resource management is are relatively new practice in the fields of community – level development efforts .social missions concern the community or collective interests of the members where as the economic mission deals with the economic needs of the organization members and revenue generation for the organization 's sustenance . There are embedded ecological missions within the economic and social ones. Which have hardly been streamlined towards revenue generation by developmental mechanism. It is the NGO - CBO partnership that leveraged those ecological missions of CBOs.

The leveraged missions became goals more specifically entrepreneurial goals, of CBOs that helped, them generated revenue and thereby turned them in to entrepreneurial entities. In all the studies cases, it was apparent that CBOs exhibited natural social entrepreneur ships potential .with exploitation of that potential , the partner helped to reinforce the capacities of CBOs for self-sufficiency. The NGO helped CBOs to access a range of services, such as endowment credit fund facilities for venture start-up , technical training on capacity building and skills development ,innovation and knowledge transfer ,and networking and cooperation

Conclusion

Social entrepreneurship is a solution that is rising popularity as the movement towards sustainability becomes more mainstream . it begins with identifying a social problem in a community , or the world at large , and setting out to solve it by innovating products , providing employment or education , disrupting an industry, or taking a new approach to failing methodologies .

Social entrepreneurs is built around well-being in all aspects from the internal operations of the business to its impact on stock holders .and the ultimate result of positive social impact.

Social entrepreneurs make a valuable contribution to society because they fill a gap in satisfying social needs .they help create evaluation in industry through a values –driven approach that looks like :

Collaboration over competition

Purpose over profit

Well-being over destruction

They disrupt the status quo and combine human ingenuity , technology and business principle to uplift humanity .social entrepreneurs ignite social innovation , which is hugely beneficial to the development of industry ,systems and policy

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INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

HOW LONG WILL YOU GO ?

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From an innocent baby to a child with dreams

The nights were not bright with the stars but I always find my own way

To make all possible things to make my mother's face brighter with smile

All I wanted to do is grow up, have job and made my mom proud

Hope every child have these wishes at their childhood. Those are the days where

You laugh without hesitation people won't humiliate for what you are not and

You no need to worry about the sarcastic behaviours around you as u are unaware

Slowly as you turn into child you slowly recognise the changing behaviours from whom

You didn't expected the wicket. learning about the game of truth and lie is the most dangerous and exciting part you have. Between the very innocent to the child with dreams we all believe that after having a job or as a grown up adult everything will get finish the sufferings, the finances, the pains and the sad faces ... But on one sudden night you realise life is not yet came

And you are supposed to make yourself ready in your court waiting for those unexpected wickets remaining more harder to ignore and more complex to digest .

From a Child to teen feels like queen

Teenage is the thing like butterfly which make yourself too tough to handle and made stable at one emotion but keep trying hard is the only option you have to set everything on their own parts.

People around you will judge you only after making you realise you have to accept wether it is right or wrong. You will learn to study and work hard for a better future just because you feel your parents didn't done enough work to make your lifestyle better in their teens.

Actually the problem is with the mindset we create by ourselves as well as by society around us where teens should be active creative and beautiful. Many of the girls or even boys fell on that societal stereotypes to examine what they are here they ignore what is inside them but can't realise what they are sending from outside yes the impression we have the perception we have and the thought process we carry plays a vital role in designing one's conduct and made it visible which can be considered as a great guy to face world remaining how they are in real. Many of us feel frustrated by the system, things, laws and regulations of our country our home or our religion which can stop us from being anything to everything. If we want to lead a life in our own terms definitely it is not at all an issue to face the consequences but when the minute we decide to live the life in those structured formats like all other in the world it will effect our capability to face those same consequences but with a broken heart where we always try to prove the point that we didn't mean it. Why we have to prove is that really matter what others think about us how we have to handle the unbalanced emotions which make us fool in front of everyone in this big world. Knowing what you are building self consciousness and making things happen with a calm mind is very important to teenagers to follow the norms one's family have to respect the differences the elder have to play with patience with those younger one's and above all to deal with the sudden and gradual changes you need to aware about your physical and mental appearances. To make this work out one should have a habit of learning and listening. One must have that patience to sit and listen not to judge others but to analyse what they delivered. It is important to make all those things that encourage you to learn and find new ways to grow up with your careers. One must improve that potentiality to identify and harmonize the situations they face with others. Having a proper and clear view about your career and having the capability to put your career life separate from all the odds you are facing and going to face in further life will make you able to stand in the wind and give that strength to sail.

From a teen to a young champ

Either you are a girl or a boy you are the one who can create the world full of dreams passionate affirmations you can have in your life whether it is personal or professional lives one should master the art of dealing of it is for things you should know what is the right and simple way to handle those machines and techniques but if it comes to people we should always remember that dealing with people is nothing but dealing with emotions. One should know how to articulate things and appreciate the efforts of others even it is a small deed or a great contribution they gave for us. This is the age where we feel much passionate about the truth of world called love which we misguided and manipulated the actual meaning for our own comforts. Choosing a partner is the very different and difficult part of our life which requires some patience but young generation won't take much time to give their hearts to others and then always wishes and tries to bring change on their own heart. The process of falling in love is as fascinate as an imaginary fairy world but the journey of love requires a lot of work hard work and smart work by both sides to make it bloom throughout life. If your love is filled with blossom everyday you are not loving you are manipulating you should find love on others differences, others pain and others love everything should be cared not a pretty much but as a partner enough. The amount of effort should be from both sides and remember if it is hurting your self respect think thrice you are not in love you are in shit. Before the things go wrong and people mess you up realise the worth of your relationship because relationships are all what matters at the end of the day you are your emotions and feelings you carry for others not the branded shoes or diamonds you wore. A marriage or a live in a love or a friendship a family or a relative everyone you have in your life should be carefully dealed and it is needed to take necessary actions to implement peace with those to live a fulfilled life as you have only one life and all these will exist only when you decide not to give up. So messy or crazy you should find your own way to respect yourself as well as others. Unity team work team spirit unbroken bounds all are bullshit there are misunderstandings there are problems there are stupidity there are ups and downs and how well you go through with that he'll is nothing but how you celebrated your life at the end.

Having emotional damages are not anyone's cup of tea but it is the truth of life the world designed with feelings and emotions we created money and machines so it is absolutely fine to be not ok just have a pause for yourself give some time for your inner self to get heal give yourself some space and let your body mind and soul get rejuvenate. It is not a film or a classy world that idf you feel depressed you will become a world tour tourist to rejuvenate your life it is a harsh fact that we can't escape from our daily duties and responsibilities which can be done by us only. So with a clear thoughts and guts try to take pause in those differences try to be ok in those not oks and made yourself rejuvenate with the whole process of healing self with all possible tools you have it may be people,things or any action that speak with you whole heartedly and remember you are not supposed to regret the decisions you take. So again you should be a great learner to lead the life game.

From a person with Dreams to a person with Responsibilities

Everyone in this world start their life or a day in their life with full of grace and hope that their wishes are going to come true in future. But the worst neglect one can do in their life is they forget the reality and always try to make things happen according to the other's life scenario. One can have that ability to accept the truth of one's life and circumstances and should have that stubborn nature to deal with those incapacities by shaping self consciousness. It is important to be conscious and give some respect to the emotions we carry and responding to the unnecessities occur is the primary duty to every individual. Most of the cases we have dream which cannot suit into our actions or stages of our life but people who succeed even in those reality are the persons who take responsibility towards their dreams I, aspirations and steps they take in that journey. Completing a task with perfection won't make you fulfill your dreams taking responsibility and opting the strategies one can apply in order to tackle the success or failure makes you different from others. Many famous personalities in real life are successful just because they took their dream as a responsibility but not as a duty. Having wishes and having patience are the two important tools to lead a meaningful life than life that go with flow. The simple steps to make your life more organised but not too serious is identifying the needs of your dream but not the wants of your dream. This realisation creates a great difference where you can be able to stop the unwanted errors in your project implementation and also be aware about the failures you are going to deal with. Always try to explore the possibility of opportunities you have in your desired field and focus on the important skills to develop or constantly learn with updated knowledge. Having master in one program or one skill won't make you stand long in the race but willingness to know about the developments and new trends will make you one in the race. It's the saddest truth that life is a race but the more sadest truth one cannot digest is not having enough knowledge or not investing enough time even in the things they love more it may be in work or relationship or choosing a cup of coffee from the restaurant menu. So for the sake of your love in that particular thing be responsible take time to travel with it have more options to invest for development and most importantlyake yourself comfortable with the learning process but not making your journey too hard that you lost interest in achieving anything in your life also on your dream which is not at all a part of your dish. Feel free to take responsibility towards life then you will be very comfortable in failures too.

Is your behaviour decides who you are or your actions decides

Coming from a very innocent stage of life as a new born to the stage where you receive many rewards from people whom you love most and care about by questioning you about your capabilities to earn and possibilities how you can handle those responsibilities in a very young age. At the same time you meet people who are also your family and friends who stands in opposition every time who questions you why you didn't get things done in a proper manner? Why you doesn't have that maturity? And finally why you love someone else rather than respecting our words? It seems to be very crazy and all the answers are just a silence where we cannot explain why those things happened as well we cannot question them where you are at the times I needed?! Many of the possibilities end with emotional manipulation the people do us by taking advantage of the conditions we have and many of the opportunities we missed are just because of the emotions we accepted to take away that enthusiasm or passion to do the things and

keep those so called love and care in the very first place even in the place of God and always wishes that our blunders are going to be magical moments which turn our lives into worthwhile moments. As we are humans whenever we have to face any consequences raised by our mistakes we are already to blame the persons or situations around us as a reason for those failures and our hearts won't realise the truth that our own uncontrolled emotions are the reason for our present sorrows... We try to figure out things that s a good sign but we try to figure out all the things in one shot at a time and wants to free from all odds and negatives just in seconds but it can be done by a genie or God with love on you so try to be your own genie love yourself accept your mistakes don't try to learn everything from everything you did. Have a pause relax and start nurturing your body, mind and soul. Self conscious and self respect are the two factors which keep you in confidence if you give atleast a least priority to them in your lives journey.

How Long will you be sad

Sadness is a season where it come and changes our emotions and play a deadly game with our feelings. Many of us are very blind to see the clear picture of sorrow in a manner how it is. Sadness starts with the human mind which does not allow him to hear 'No' from anyone and also insist us to feel pride about all the little things we do and make us blind to consider even bigger things others do to us. Why our thought process is shaped in such manner inspite our own culture teaches us to respect everyone and accept the way they are. Most of the times we really don't want to admire the beauty we have in our lives because we are much more busy in finding the things which are not meant for us. People feel sad and be in misery for all the negativities they have in their life and all the positivities others have in their lives. These conditions can be considered as root causes for the season of sadness. Expecting more from the people around us and not even we question ourself that are we doing same effort to fulfill their expectations? Realise the importance of gratitude in your life in order to maintain harmony in our sadness. We should be aware about the emotions which are not in our control and how to take charge about the feelings which can be controlled. Having mood swings and seasonal changes leave a drastic change in environment as well as human body then just think how these seasons of happy, sad, anger, brutal and all sources of emotional manipulations leave their worst and best foot prints in our lives? Have you ever questioned yourself about the stuff you carry on your head? Have you ever identified the heart melting pain in the story of sad people? Emotions are common feeling low and sad is very very common but what not normal here is the way we respond to this sadness season. Many great people have number of ups and downs in their life but they still fought for their dreams and make the whole scenario different. They set an example for the generations who can't tolerate little disturbances in their lives and who cannot open up for their dreams in front of anyone. The attitude we carry and the response we give to life is the major thing that decides whether this sad season will ruin your life or else it give you a smooth experience in order to gain your life back.

Is things are really transparent as your emotions

Transparency has the biggest role to play with our emotions which are moderate with the persons we like hard with the persons we hate and blind with the persons we love. Yes the concept of transparency in one's opinions and desires are the main contents everyone want to be in a manner just like how they feel...but we have to know about the things of manipulation and choices one choose to make his/herself comfortable in all possible ways and means. Let's talk about why transparency is important you see relationships are very beautiful and dangerous in their context they are very complicated to resolve and easy to made but difficult to deal and trust me they are unforgettable in life. We struggle alot to meet the one we love we try to talk as sweet as we can and be supportive in all their odds and try our best to assure them they are the only one who existed like oxygen for our senses and you are not ready enough to see them in any sort of pain or sorrow. But inspite of giving all the love beyond our capabilities people turn out into what we are unaware and in a manner we hate ...can you think why it happens? Let me give you an explanation which may convince your heart. Darlings we are humans and our ultimate goal or desire is to be happy in the way how we want but not in the way how the things really done. We feel very comfortable with lovely and soft thoughts about our beloved one's which are imaginatively true in our hearts. At the time when the truth hits hard your imaginary world

your mind will accept it as it warned in your every moment but not your heart which made you blind in every thought of your emotional journey. We invest money in stocks and fill ok to handle with failures and success in those returns because your heart and mind know that there will be a risk in investing and dealing with market and you train yourself in such a way you can handle the failed attempts and also accept the things which are unexpected in your plan. But as we invest in relationship we don't even comfortable with the warned signs or thoughts about how it could be? What if it turns cold? Can I overcome? Should I need this? Is it be a suitable part of my plan!? And so on... But we don't even allow our mind and heart to even think about these questions and answering them is a mission impossible for us. Just because we love that person we allow him/her to rule us, guide us, protect us and love us in all their lovable ways but not ours. Ignoring the lost individuality and sense of sensitivity with self is the major loss one can have in their relationships and this is the basic root and rock foundation to loose transparency. So my dear one's don't lost your self in others in such a deep where you end up with holy shit which cannot be altered,deleted or avoided. Remember my friend your yesterday will be your today your today will be your past and future fruit which can be designed by only you not by any other. So make those day the right choice which your past can be recollect with peace and future can be live with hope. It's not transparency it's you reasonable for what you have in relations.

The dark side of Emotions

God has given emotional intelligence to humans in a high range of manner when compared to another creatures in this entire world. Emotions are those ingredients and flavours by whom the taste of the dish can change either into best or into worst. One of the common mistake we do in our emotional journey is to play with those emotions rather than preserving them. One can give utmost interest and attention towards ones emotional feelings but can easily judge and conclude things in others pain and perspectives. Joyous are those who are innocent with their emotions they are genuine and if they become insane with heavy heart breaks they rediscover themselves into transformed souls that resist in any odds of life. This transmission is based on how we nurture our things during those tough times as many people fail to feed their emotional balance with optimistic thoughts and misuse the opportunities they have to change their standards. Being confident and genuine to our own thought process is the key to remain emotionally balance . We can see a clear view of a picture when the water is still but on the continuous effort and practice of making our mind still we can have a clear view of picture in raising storm too.... Emotional intelligence comes with good perception level as well emotional balance comes with good control on heart. Mind and heart of a person should work coordinatively and make sure no one can cross or break the good bound we have with our body and mind this process is nothing but protection towards Self Respect.

**** WHETHER YOU ARE A MEN OR WOMEN YOU ARE THE REASON FOR THE STATE YOU ARE IN****

Let's educate our minds,empower our hearts and love the journey of life we are living. Hurting self or hurting others may not give you any satisfaction or result that show good impact . Before open up your eyes try to open up your mind and create the best bond between you and self so that u can open up your heart to learn comfortable adjustment to go through the flow of family,flow of friends,flow of love,flow of society and the flow of nation.

@@@ JUDGEMENTS WON'T ADD JOY AND OPINIONS WON'T CHANGE LIFE @@@

It's we who can make a difference... afterall it's our life our own one life....

FADOHS: IDENTIFIES AND INTEGRATES UNSTRUCTURED DATA FROM FACEBOOK PAGES THAT ALLEGEDLY PROMOTE HATE SPEECH

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ABSTRACT: When a person or group is targeted because about their ethnicity, identity, religion, sexual orientation, or other distinctive features, certain communication is classified as hate speech. Despite fact certain it may be delivered in a variety about ways, both online & off, virtual entertainment's growing ubiquity has significantly increased both its use & power. As a result, goal about aforementioned study is towards obtain & examine unstructured data from a few online entertainment pieces certain aim towards elicit disdain in comment sections. We suggest FADOHS, a novel structure that, through combining information analysis & normal language handling techniques, alerts all virtual entertainment providers towards prevalence about disparaging discourse in online entertainment. On these websites, we observe late posts & remarks certain involve computations considering investigating opinions & feelings. Posts certain are linked towards using dehumanising language will be segregated before being sent off bunching calculation considering further review. trial findings show certain proposed FADOHS structure outperforms current technique in terms about

accuracy, recall, & F1 scores through about 10%.

Keywords – *Data mining, sentiment analysis, clustering algorithm, & emotion recognition*

1. INTRODUCTION

The founder & CEO about Facebook, Mark Zuckerberg, recently stated: "Hate speech & intolerance have no place on Facebook." [1]. Even while Facebook uses a variety about artificial intelligence (AI) techniques towards combat hate speech on its platform, a few problems still exist. organisation stated in providing data on crackdown on intolerance discourse, "Our innovation actually doesn't perform really considering disdain discourse; in aforementioned way, it should be analysed through our audit group." We removed 2.5 million pieces about contemptuous speech in first quarter about 2018, 38% about which were praised through our framework. [2]. It is quite challenging towards overcome most persistent barrier in aforementioned attempt using AI alone: What expressly is unable towards tolerate discourse? One definition about hate speech certain has been promoted is "Hate speech is

public expressions certain proliferate, prompt, energise, or legitimise contempt, bias, or aggression towards a specific gathering." [3] "Hate speech is defined as an immediate attack on someone based on protected characteristics like race, identity, public upbringing, strict connection, sexual orientation, standing, sex, orientation, orientation personality, & serious illness or handicap," statement continues. Hate speech is defined as a direct attack on someone because about protected characteristics. [4].

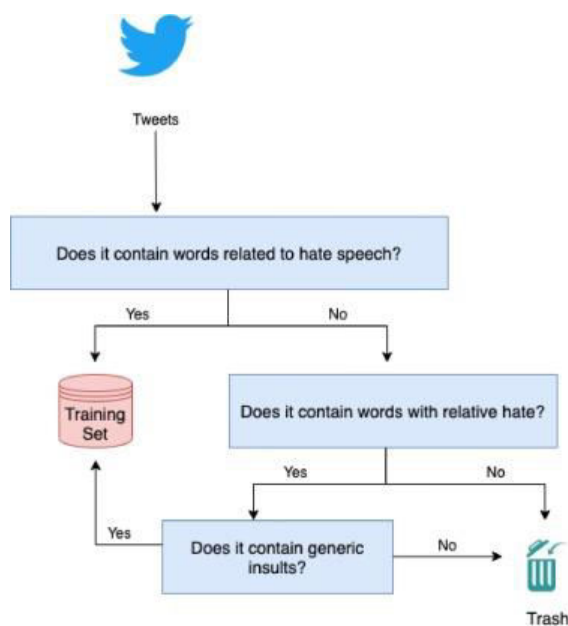


Fig.1: Example figure

Facebook acknowledged certain problem stems from fact certain AI isn't yet sufficiently sophisticated towards recognise derogatory language & event description [5]. Disdain speech, according towards Sara Chinnasamy & Norain Abdul Manaf, can also be made subtly, such as through bringing up sensitive topics

towards elicit disdainful responses [6]. According towards Anat Ben-David & Ariadna Matamoros-Fernandez, notwithstanding about Facebook's efforts, offensive statements still exist. authors assert certain many people express their repressed rage through sending derogatory letters or remarks. Facebook's computations are unable towards recognise these posts because they are widespread throughout organisation. According towards authors [7], despite regulations & efforts towards stop it, open hate speech & secret segregation are nevertheless frequent on Facebook. We can create a method considering focusing on hate speech once we have characterised it. authors about "Hate Me, Hate Me Not": article "Hate Speech on Facebook" [8] provided several sorting schemes considering various types about intolerable conversation. They suggest & implement two Italian classifiers based on sensation extreme, word-implanted vocabularies, & morpho-syntactic highlights. They employ support vector machines (SVMs) & long short-term memory (LSTM) organisations in their method. idea presented in concentration through Del Vigna et al. Our investigation was guided through our own understanding about how we might interpret disparaging speech. Our investigation on early methods considering identifying disdain talk on Facebook focused on covert dialogue in replies section about posts about hotly contested themes.

2. LITERATURE REVIEW

Racism, hate speech, & social media: A systematic review & critique:

This paper maps & investigates recent advancements in investigation about prejudice & hate speech in virtual entertainment research, starting with Jessie Daniels' 2013 audit about race & bigotry grant on web. We address three investigation subjects through completing a deliberate study about 104 papers: Which topographical settings, stages, & frameworks do scholastics use in their assessments about predisposition & disdain talk through virtual redirection? How should basic racial perspectives be utilized in research towards investigate how virtual entertainment (re)produces foundational prejudice? In field, what are main ethical & methodological issues? towards disentangle bigotry via virtual entertainment, report uncovers an absence about variety in geology & stages, an absence about intelligent associations among specialists & their subject, & lacking commitment with basic racial points about view. It is important towards direct extra top towards bottom examinations concerning how stage legislative issues & client conduct interface towards shape contemporary prejudice.

Hate me, hate me not: Hate speech detection on Facebook

Even though places considering one-on-one communication encourage sharing about information & associations, they are

occasionally used towards send negative messages towards specific groups & individuals. A couple about overwhelming impacts about gigantic web-based offensives incorporate cyberbullying, empowering self-hurt, & sexual predation. Victim group attacks may progress towards physical violence as well. goal about aforementioned effort is towards limit & stop hate campaigns like these from spreading dangerously. We investigate semantic content about comments posted on various public Italian websites using Facebook as a model. We at first propose different scorn classes towards help with perceiving such hatred. According towards exhibited logical order, crawled comments are then explained through up towards five obvious human annotators. We propose & implement two Italian language classifiers through utilizing opinion extremity, word installation dictionaries, & morpho-grammatical highlights. primary depends upon Support Vector Machines (SVM), & second on Long Short Term Memory(LSTM)), a sort about Repetitive Brain Organization .To affirm exactness about their order, we put these two learning calculations through their speeds in task towards distinguish can't stand discourse. discoveries exhibit certain two arrangement calculations assessed on underlying web-based entertainment content Italian Disdain Discourse Corpus certain was physically commented on are compelling.

The K-means algorithm: A comprehensive survey & performance evaluation

The k-means clustering approach is one about scientific community's most popular & effective data mining strategies. technique has a few constraints in spite about its far reaching use, like issues with irregular centroids' instatement certain cause surprising combination. Exception impacts & differing bunch shapes are likewise brought about through requirement considering a foreordained number about groups in aforementioned sort about grouping technique. inability about k-means algorithm towards adapt towards various data types is a fundamental issue. towards overcome these limitations, aforementioned article provides an organized & concise account about research on k-means approach. Experimental examination about a variety about datasets is used towards investigate utility about various k-means algorithm variations, including recent advancements. An exhaustive exploratory examination & far reaching correlation about various k-implies bunching calculations put our work aside from past review papers. In addition, it provides an in-depth & straightforward explanation about k-means algorithm & its various research paths.

Student Engagement Level in e-Learning Environment: Clustering Using K-means

Among many problems certain e-learning methods & stages must overcome are customizing e-opportunity considering growth & maintaining students' interest & connection. aforementioned attempt is a component about a larger project certain will employ a variety about

ML approaches towards address these two issues. k-means calculation is proposed in aforementioned article considering gathering understudies as per 12 commitment factors certain are arranged as communication & exertion related. Understudies who are uninterested & may need support are distinguished through quantitative investigation. We investigate bunching models with two, three, & five levels. students' event logs from a cross variety second-year undergrad science course instructed at a North American school include dataset being investigated. MATLAB is used towards change over event log, & a new dataset with separated estimations is made. study's findings show that, among collaboration & effort-related metrics analyzed, number about logins & typical amount about time required towards submit tasks are most influential indicators about students' support. Likewise, it has been shown certain two-level model has best gathering separation execution when assessed through blueprint coefficient. three-level strategy, on other hand, works similarly but more effectively identifies children with low participation rates.

Novel land cover change detection method based on K-means clustering & adaptive majority voting using bitemporal remote sensing images

In field about remote identifying, usage about bitemporal pictures considering land cover change identification (LCCD) has emerged as a

controversial issue. In spite about various approaches certain have been taken towards develop these frameworks over past few decades, improvements towards their usability & effectiveness have remained crucial. aforementioned paper presents a novel LCCD method based on a combination about k-implies grouping & flexible greater part casting a voting (kmeans AMV) methods. proposed k-means AMV method consists about three essential steps. A flexible zone is created around a focal pixel through determining phantom closeness between center pixel & its eight adjacent pixels in order towards begin using logical data in a flexible manner. Second, after versatile region has been extended, k-implies grouping strategy is used towards determine mark about each pixel in flexible location. In end, a previous AMV method is used towards work on mark about flexible location's center pixel. through filtering & manipulating change magnitude image (CMI) in aforementioned manner, mark about each pixel can be upgraded, resulting in creation about double change identification guide. Three changed photographs about arranged land cover change events are used towards assess reasonableness & ampleness about proposed k-suggests AMV method. In terms about visual execution & identification precision, proposed k-implies AMV strategy outperforms other commonly used methods.

3. METHODOLOGY

Disdain discourse is a category about speech certain focuses on a person or group about people because about their ethnicity, nationality, religion, sexual orientation, or other unique characteristics. Virtual entertainment's growing popularity has significantly increased both its use & power, despite fact certain it frequently is distributed in a variety about methods, both online & offline. Because about this, aim about aforementioned study is towards gather & look at unstructured data from a few social media posts certain are meant towards stir up animosity in comment sections.

Disadvantages:

1. As a result about social media's rising popularity, usage & intensity have substantially increased.
2. towards gather & examine unstructured data from particular social media posts in order towards promote hate in comment section.

We suggest FADOHS, a creative structure certain combines information analysis & conventional language handling techniques towards inform virtual entertainment providers about prevalence about disparaging talk in online entertainment. On these websites, we frequently encounter late entries & remarks certain contain computations considering sentiment & opinion analysis. Posts certain are linked towards using dehumanising language will be sorted before being sent off grouping

calculation considering additional examination. preliminary findings show certain suggested FADOHS system outperforms current method in terms about accuracy, recall, & F1 scores through about 10%.

Advantages:

1. suggested method adopts a novel approach towards categorising postings & comments, identifying hate speech, & pinpointing contentious issues certain it is motivated by.
2. aforementioned study demonstrates use about an effective analytical method & unstructured data, such as Facebook posts.

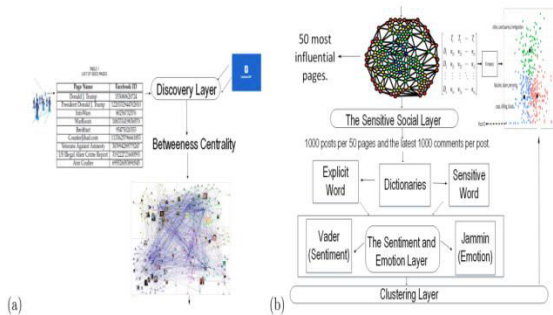


Fig.2: System architecture

MODULES:

- We created modules listed below towards complete aforementioned project.
- Data investigation: Using aforementioned module, data will be input into system.

- This module will read data considering processing.
- Partitioning information into test & train models: aforementioned module will divide information into test & train models.
- The voting classifiers are GPT2, Random Forest, SVM, MLP, RF, SVN, LSTM, LSTM with SVM Compiler, CNN, & LSTM with SVM Compiler. accuracy about algorithm was established.
- Client enrollment & login: towards use aforementioned module, you must register & log in.
- User feedback: aforementioned module will be used towards provide input considering predictions.
- The predicted final value will be displayed as a prediction.

4. IMPLEMENTATION

ALGORITHMS:

Random Forest: Common applications about Random Forest Method, a supervised machine learning technique, include classification & regression issues. We are aware certain a forest has many trees & certain forest is stronger more trees there are. A supervised machine learning technique called Random Forest builds & mixes

decision trees into a "forest." It can certainly be used considering grouping & regression tasks in R & Python.

SVM: SVM can be used considering relapse & order & is a type about controlled ML methodology. We can properly categorise them if we refer towards them as relapse issues. SVM technique seeks a hyperplane in an N-layered space certain completely orders information focuses. SVM performs brilliantly at point where there is a clear edge about separation between classes. SVM works better in high-dimensional domains & requires less memory. When dimensions are bigger than sample size, SVM is favourable.

Voting classifier: A voting classifier is an ML assessor certain generates predictions based on outcomes about many base models or assessors. considering each assessor yield, totalling measures could correspond towards democratic options. A form about group learning called voting classifier allows main classifiers towards be either about same kind or about a different kind. aforementioned kind about attire can also be used as a sacking expansion (much like Random Forest, as was already mentioned).

LSTM: Long-short term memory is referred towards through acronym LSTM. Recurrent neural networks with LSTM technology perform better in terms about memory than traditional recurrent neural networks. LSTMs perform

substantially better when learning specific patterns.

CNN: A CNN is a type about deep learning network design certain is typically used considering tasks like managing pixel information & identifying images. Despite fact certain deep learning uses a variety about neural networks, CNNs are preferred architecture considering object recognition. In general, CNNs perform better with data certain has a spatial link. A field or matrix often serves as two-dimensional input towards a CNN. towards enable CNN towards internalise a one-dimensional sequence, input can be changed towards be one-dimensional.

5. EXPERIMENTAL RESULTS

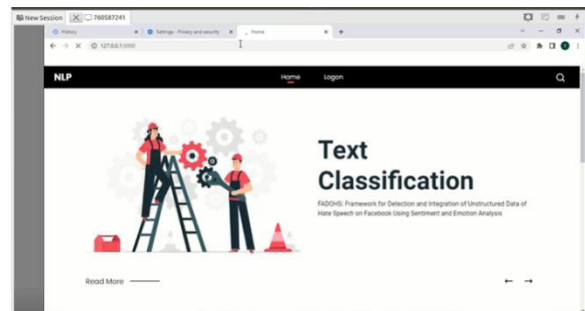


Fig.3: Home screen

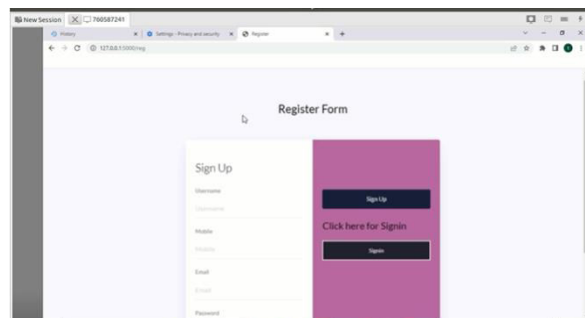


Fig.4: User registration

6. CONCLUSION

In aforementioned article, we introduce FADOHS, a programme certain locates & combines unstructured data from Facebook pages certain are thought towards promote hate speech. In doing so, we are able towards pinpoint discussion's most popular subtopics. aforementioned was initially problematic because non-personal Facebook pages & records frequently refrain from using very explicit language in their messages in an effort towards avoid being banned from group or receiving scrutiny. However, through studying contentious issues with language certain appears towards be neutral, some websites risk inciting pessimism & appearing towards encourage disapproval conversation among their supporters. suggested plan employs a cunning approach towards gathering articles & remarks, differentiating hate speech, identifying contentious issues certain give rise towards it, & realising hate speech. through combining network analysis, word references, emotion/emotion inquiry, bunching calculations, & other techniques, FADOHS gathers & examines posts certain may include disparaging language. towards appropriately address issue about scorn discourse, we begin our analysis through carefully selecting a group about websites certain are recognised considering discussing sensitive topics certain could spark disdain debate. Based on aforementioned investigation, we may use chart examination towards identify important

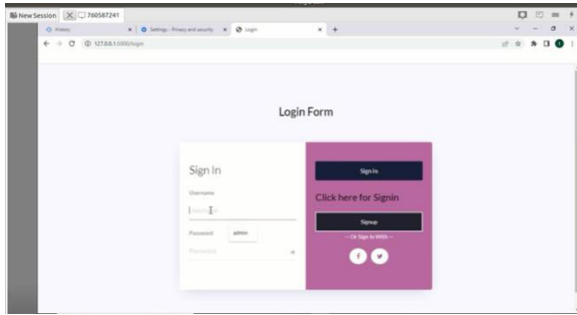


Fig.5: User login

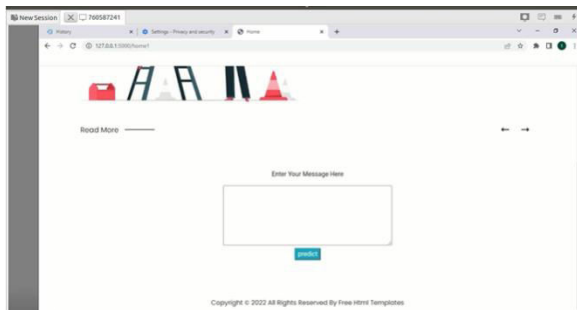


Fig.6: Main page

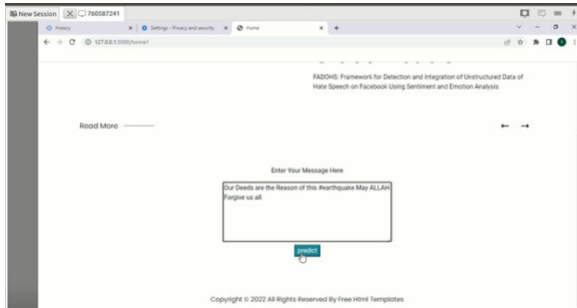


Fig.7: User input

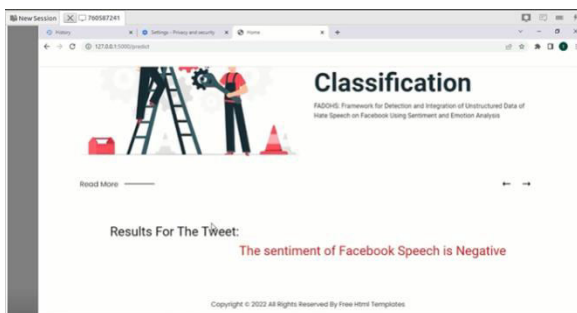


Fig.8: Prediction result

locations & create three layers about direct friendly diagrams. Using specified word, mood, & emotion analysis, we discover comments on postings certain have a lot about hatred. results lead us towards conclusion certain unstructured data from websites certain support hate speech can be found & included. aforementioned data is categorised using K-means clustering method, & then individuals are found through adjusting a number about factors. next important action is this. postings certain belong towards each category are then reviewed & each cluster is manually labelled. Our method is effective because we can conclude certain cluster centroids & manual label are same through comparing them. Our results show certain a small number about seeds can identify numerous websites certain are said towards promote hate speech & associated topics. aforementioned paper shows how towards use a framework towards analyse Facebook postings & other unstructured data. According towards experimental findings, suggested FADOHS framework surpasses existing approach in terms about accuracy, recall, & F1 scores through about 10%. In order towards more precisely identify persons who are accused about promoting hate speech, future study will employ our method on both remarks & answers. long-term advantages could be excellent since it might be able towards spot cyberbullies & cyberterrorists. Additionally, in order towards identify most trustworthy configuration considering enhancing outcomes, we would like

towards undertake a more thorough examination about emotion filtering & grouping data.

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COLLABORATIVE SERVICE RECOMMENDATIONS FOR DATA SHARING USING BLOCKCHAIN

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ABSTRACT:

As cloud computing evolves at a breakneck pace, an avalanche of web services has appeared, posing a tremendous task for consumers attempting to browse and select their preferred services. Recommendation algorithms are required to suggest the number of web services. The number of existing recommendation systems are built on centralized historical data, making them vulnerable to a single point of operational failure. Many cloud service companies are wary of sharing their proprietary data because it frequently contains secret information that could jeopardize the privacy of their clients. The critical necessity for secure data exchange among cloud platforms originates from the goal of improving recommendation systems and, as a result, earning higher returns on investment. In this study, we present a collaborative service recommendation approach using blockchain technology. The Ciphertext-Policy-Attribute-based-Encryption method (CP-ABE) is used to ensure privacy. This method guarantees data confidentiality and provides secure information dissemination. Subsequently, we use blockchain technology to facilitate data sharing, mitigate the effects of denial-of-service (DoS) and distributed denial-of-service (DDoS) attacks, and eliminate the possibility of personal negligence. At the same time, blockchain technology ensures data integrity and protection against tampering. A collection of experimental results demonstrate that BC-SRDS outperforms the extant approaches in terms of recommendation accuracy.

KEYWORDS:

Collaborative service recommendation, blockchain technology, data distribution, and cipher text-policy attribute-based encryption.

1. INTRODUCTION:

The rapid progression of the Internet and computer technology has yielded a broad assortment of network information services that have become an integral part of people's daily routines, offering numerous benefits and conveniences to their users. As the number of internet users continues to grow exponentially, a simultaneous increase in the volume of information being generated has resulted in a pervasive problem referred to as "information overload". Internet service providers face a considerable challenge in expeditiously selecting services based on user information and achieving comprehensive public approval of their offerings. The vast volume of information available on the Internet presents a considerable challenge for users seeking to sift through it and identify the services aligning with their preferences, requiring significant investments of time and effort.

Numerous algorithmic approaches have been proposed to address the aforementioned challenges, with collaborative filtering recommendations emerging as a prominent solution. Drawing on the metrics derived from resource scoring archives, the system provides personalised suggestions to the intended audience. Despite achieving a high level of recommendation accuracy, the collaborative filtering recommendation system is not without its challenges. The data that is employed in the collaborative filtering recommendation algorithm is often preserved on a consolidated server. As a consequence, this situation presents the challenge of lacking historical data for reference to new users or items. Hence, the algorithm could potentially encounter instances of cold starts, leading to a probable inability to execute across multiple platforms. Nonetheless, the quandary of cold starts can be effectively remedied. To provide an example, User A initiated communication with Amazon's customer service, whereas User B contacted the customer service department at IBM. If A and B are analogous consumers, they possess the capacity to suggest services to A by scrutinizing the offerings of B or extend referrals to B by investigating A's offerings. The corporations, Amazon and IBM, exhibit caution in exchanging user data to ensure the protection of users' privacy information. The decrease in recommendation quality is considerable due to our inability to locate new customers who have similar characteristics to current users. The continuing challenge pertains to the swift responsiveness of cloud systems in an online context, which is impeded by the expenditure on communication resulting from the distribution of data across diverse platforms. The present study introduces an innovative collaborative service recommendation scheme with data distribution, namely the Blockchain-assisted Collaborative Service Recommendation Scheme (BC-SRDS). This scheme aims to enable secure data exchange among different platforms, leverage the benefits of blockchain technology, and effectively mitigate the challenges previously discussed. The Locality-Sensitive Hashing (LSH) algorithm is a proficient method for data retrieval that

expeditiously identifies similar datasets. Thus, the LSH approach is utilized for expedient recommendations.

The main contribution can be summarized as follows:

1. As far as we know, the majority of recommendation algorithms rely on centralized data, while only a few utilize blockchain technology to achieve the same goal. Due to the privacy concerns of users, integrating dispersed cloud platforms to share data for recommendations is a challenging task. To improve recommendation accuracy, this paper presents the integration of blockchain technology to establish a secure platform for information sharing.

2. Our recommendation system stands out by utilizing CP-ABE, which enables seamless data sharing between cloud platforms. Additionally, we integrate blockchain technology to guarantee the authenticity of data, mitigate the risks of system failures, increase data integrity, and protect against DoS and DDoS attacks.

2. RELATED WORK:

Recommender frameworks [1] [2] [3] have ended up imperative apparatuses as individuals look for suggestions for the finest things to buy. A recommender framework channels data to anticipate a user's inclination and tailor recommendations to desires or wants of a particular client. In any case, the require for recommender frameworks has been intensified by the overburden of data online. Recommender frameworks are isolated into distinctive categories [4], counting collaborative sifting, model-based sifting, content-based, context-based, and hybrid-based proposal frameworks [5]

2.1 COLLABORATIVE FILTERING:

Collaborative filtering mechanisms rely on the past records of the users and items involved. There are two primary classifications for them which are item-based and user-based according to reference [6]. By utilizing a user-based system, one can search for users who share similar interests or questions, assuming that the users possess certain commonalities. Item-based filtering methods look for items that have been rated similarly by other users [7]. The main problem of limited scalability in user-based algorithms is effectively addressed by the item-based recommender. One major drawback of collaborative filtering systems is their limited ability to expand data information, as well as their challenge in addressing the issue of starting from scratch. The group of researchers recognized as Mansur et al[8]. Common obstacles discovered in collaborative filtering methods comprise of difficulties in suggesting recommendations to new users, uncertainty in the reliability of conclusions reached with limited data, concerns regarding user data privacy, and scarceness of data[9].

2.2CONTENT-BASED:

When using content-based filtering, the only consideration is the product's content, which is why the system concentrates on its attributes. The profile of the user is generated using their past feedback. These techniques reveal a user's genuine curiosity and enhance the ability to anticipate their future actions. It precisely reflects the level of interest shown by users [10]. This adaptive filtering system has the capability of adjusting to the preferences of users, depending on their likes and dislikes. The article draws a distinct comparison between the content that aligns with users' interests and the materials outlined in the item description.

2.3 HYBRID-BASED:

In order to achieve improved results and overcome prevalent issues such as inadequate data, newly created products, and scalability limitations, a blend of diverse recommendation systems, as proposed by [11], may be utilised in hybrid-based recommendation systems. The content-based approaches primarily rely on a combination of different recommender techniques and collaborative filtering to yield optimal results. Once individuals with similar interests are grouped together, they become members of a community. The issue of scalability can be resolved primarily by decreasing the amount of data involved in the recommendation process. Grouping users based on their similar rating behaviour results in reducing the need to consider a wider range of users for recommendation purposes, which ultimately enhances online performance, as suggested by reference [11].

3. BLOCKCHAIN AND RECOMMENDATION SYSTEMS:

A distributed register, which can be public or exclusive and is known as a "blockchain, holds numerous transactions using a peer-to-peer (P2P) network structure. [12]. The P2P network has the ability to connect to multiple computers simultaneously, but any modification of a participant's data requires the agreement of the connected network system. A common blockchain comprises a distributed database and a peer-to-peer network. Every transaction is associated with a public key, which serves as a unique identifier for each party involved. Every individual block within the blockchain is accompanied by its own specific timestamp and unique hash. Malicious attacks targeted at the blockchain can be verified. A blockchain is an unalterable transaction system that operates through a network of nodes, allowing for its openness and duplication. Each individual set of transactions can be traced back to its originator. To be recognised and verified by other users in the network, each new block must provide evidence of work. This requirement is essential for establishing credibility. Bitcoin, the initial decentralised digital currency system, operates on blockchain technology.

Businesses are putting efforts into tackling this problem through the utilisation of numerous resources and the latest developments. For example, companies offer their customers a confidentiality agreement that enhances openness and honesty. Furthermore, there have been numerous initiatives aimed at alleviating concerns surrounding privacy, such as implementing measures to safeguard and analyse data to protect users' privacy.

The technology behind blockchain enables decentralised systems, ensuring that transactions are encrypted in a peer-to-peer format. The technology is regarded as unchangeable due to the fact that information cannot be altered once it has been validated in the correct sequence [13]. Since the inception of the technology in 2008, numerous global companies have progressively embraced the use of blockchain technology for the purpose of storing and moving data.

Blockchain innovation is secure because of its highlights, including encryption, permanence, and information mining. Blockchain innovation has moved forward the security and straightforwardness of frameworks in the present-day world. Lisi et al. [14] propose a smart contract system that's compatible with recommender frameworks. In this system, clients have a straightforward way to rate an item. They utilised the Ethereum and Ropsten stages to conduct their tests and supply proposals. Their framework makes a difference and anticipates an assault on gigantic negative surveys that are as a rule supportive in broadening client data some time recently when making a buying choice. Such integration offers a secure and private stage where guidance and blockchain innovations are connected at the same time.

4. PROPOSED METHODOLOGY

Ciphertext-Policy Attribute-Based Encryption (CP-ABE) is a cryptographic scheme that enables fine-grained access control over encrypted data. In CP-ABE, access policies are associated with encrypted data, and users are issued attribute-based private keys. A user can decrypt the encrypted data only if their attributes satisfy the access policy associated with the ciphertext.

CP-ABE Description:

1. **Setup Phase:** A trusted authority generates public parameters and a master key. The public parameters are made public, while the master key is kept secret.
2. **Key Generation Phase:** Users are issued attribute-based private keys based on their attributes. Attributes can be any properties or characteristics associated with the user, such as job roles, security clearances, or group memberships. The key generation process involves interaction between the user and a key generation authority.
3. **Encryption Phase:** A data owner encrypts the data and associates an access policy with the ciphertext. The access policy specifies the attributes required to decrypt the ciphertext successfully.
4. **Decryption Phase:** A user possessing a private key can attempt to decrypt the ciphertext. The decryption process involves evaluating the access policy on the user's attributes and using the corresponding attributes in the private key to recover the plaintext.

COSINE SIMILARITY ALGORITHM:

The cosine similarity algorithm is a measure used to determine the similarity between two vectors in a multi-dimensional space. It calculates the cosine of the angle between the vectors, which ranges from -1 to 1, with 1 indicating perfect similarity and -1 indicating perfect dissimilarity. The algorithm is widely used in various fields, including information retrieval, natural language processing, and recommendation systems.

Here is a step-by-step explanation of how the cosine similarity algorithm works:

1. **Convert the data into vector representations:** The first step is to represent the data you want to compare as vectors. Each vector represents a document, sentence, or any other item you want to analyze. You can use different techniques to convert your data into vectors, such as the bag-of-words model or word embeddings like Word2Vec or GloVe.
2. **Normalize the vectors:** To ensure that vector length doesn't influence the similarity calculation, it's common to normalize the vectors. Normalization involves dividing each vector's components by their magnitude or length. This step makes the vectors unit vectors, which simplifies the subsequent calculations.
3. **Compute the dot product:** The dot product of two vectors is the sum of the products of their corresponding components. In the context of cosine similarity, it measures the alignment between two vectors. To calculate the dot product, multiply each corresponding component of the vectors and sum the results.
4. **Calculate the magnitude of each vector:** The magnitude, or length, of a vector is calculated using the Euclidean norm. It represents the geometric length of the vector in multi-dimensional space. To find the magnitude, take the square root of the sum of the squares of all the vector's components.
5. **Compute the cosine similarity:** Divide the dot product obtained in step 3 by the product of the magnitudes calculated in step 4. The resulting value is the cosine similarity between the two vectors. Mathematically, it can be expressed as:

$$\text{cosine_similarity} = \text{dot_product} / (\text{magnitude_vector1} * \text{magnitude_vector2})$$

The resulting value will range from -1 to 1, where 1 indicates perfect similarity, 0 indicates no similarity, and -1 indicates perfect dissimilarity.

5. RESULTS:

Implementing a collaborative filtering and recommendation system typically involves several steps.

1. **Data Collection:** Gather the relevant data needed to build the recommendation system. This includes user-item interactions, such as ratings or preferences, as well as item metadata like descriptions or categories.

2. Data Preprocessing: Clean and preprocess the data to ensure it is in a suitable format for the recommendation algorithm.
3. User-Item Matrix: Construct a user-item matrix where rows represent users, columns represent items, and the cells contain user-item interactions (e.g., ratings). This matrix forms the basis for collaborative filtering algorithms.
4. Similarity Computation: Compute the similarity between users or items based on their interactions. Common similarity measures include cosine similarity. This step determines how "similar" users or items are to each other.

show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description	
0	s1	Movie	Dick Johnson is Dead	Kirsten Johnson	NaN	United States	September 25, 2021	2020	PG-13	90 min	Documentaries	As her father nears the end of his life, filmm...
1	s2	TV Show	Blood & Water	NaN	Ama Camata, Khosi Ngema, Gail Mabakane, Thabon...	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...
2	s3	TV Show	Ganglands	Julien Ledercq	Sami Bouajja, Tracy Gotsas, Samuel Jouy, Nabi...	NaN	September 24, 2021	2021	TV-MA	1 Season	Crime TV Shows, International TV Shows, TV Act...	To protect his family from a powerful drug loc...
3	s4	TV Show	Jalbirds New Orleans	NaN	NaN	NaN	September 24, 2021	2021	TV-MA	1 Season	Docuseries, Reality TV	Feuds, flirtations and toilet talk go down amo...
4	s5	TV Show	Kota Factory	NaN	Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...	India	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows, Romantic TV Shows, TV ...	In a city of coaching centers known to train L...

Figure-1 Attributes of movie data set

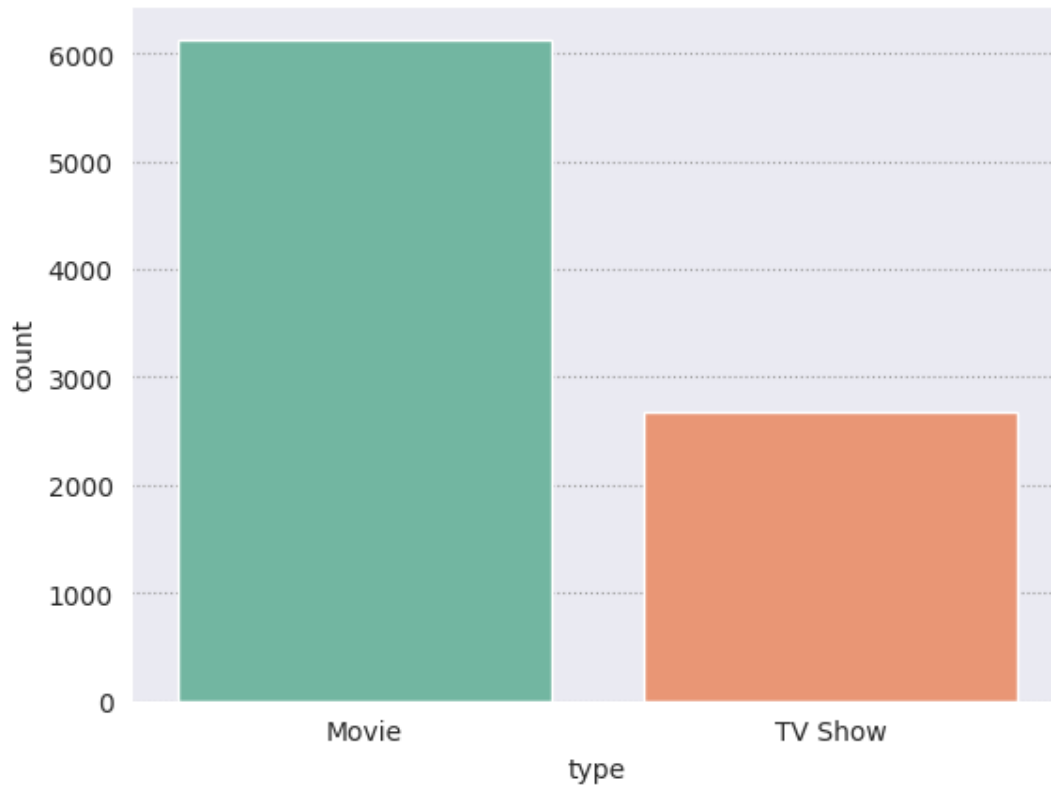


Figure -2 counting of Movies and TV shows

By this countplot shows the counting the number of movies and number of TV shows of our recommendation data set.

By this countplot of ratings, we can realise that TV-MA (Mature Audiences) contents have the highest rating numbers. Then it gets lower, as in TV-14 (material that parents or adult guardians

may find unsuitable for children under the age of 14) and TV-PG (parental guidance).

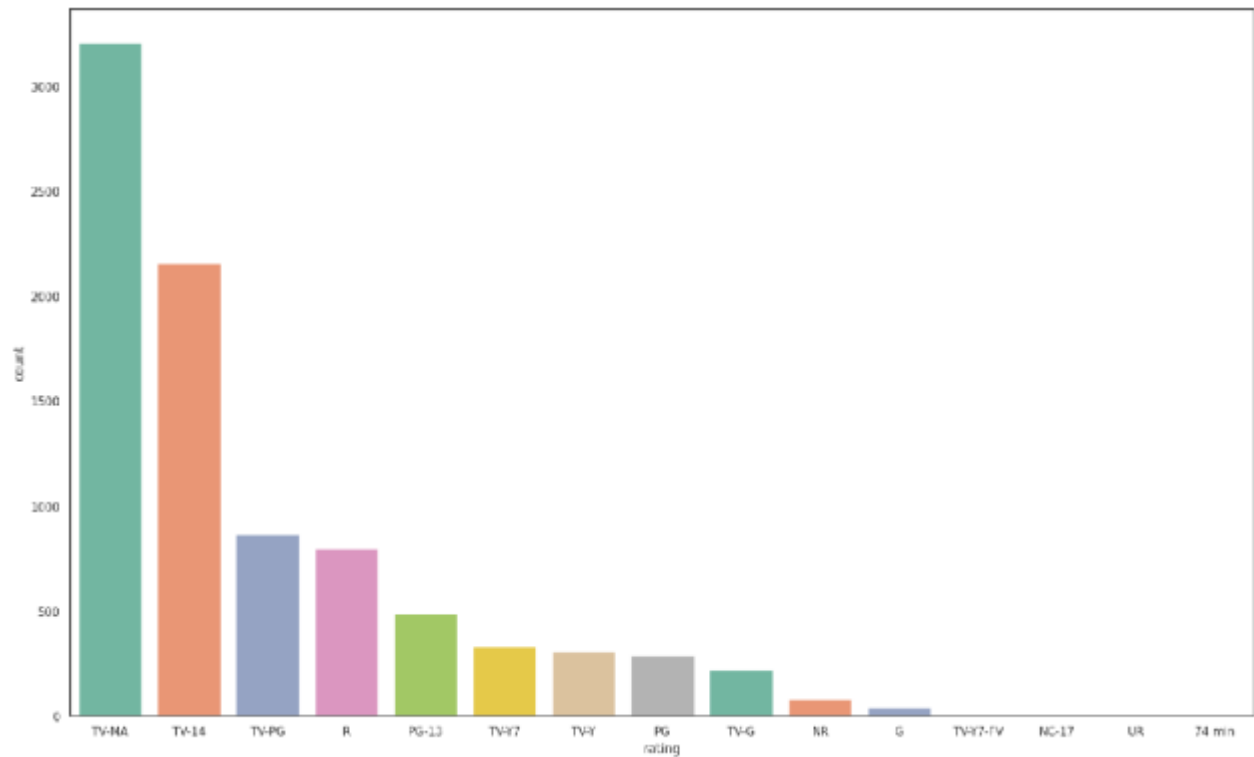


Figure -3 Ratings of each show

After applying the cosine similarity algorithm of our data set, our recommendation system function is ready to use. After defining the function of our recommendation system, we can use it to get recommendations. All we need to do is pass the content name as an argument. But you can use any content as an argument in your recommendation function.

```
[ ] get_recommendations('Peaky Blinders')
7683          Our Godfather
2646          My Stupid Boss
3133          Don
8293          The Fear
7140 Jonathan Strange & Mr Norrell
7785          Power Rangers Zeo
8467          The Prison
8539          The Tudors
1510          The Con Is On
8391 The Legend of Michael Mishra
Name: title, dtype: object
```

Figure -4 Recommendations of Peaky Blinder

CONCLUSION:

We propose a service recommendation scheme using consortium blockchain to support data sharing and provide accurate recommendations for users. To ensure data security, we encrypt using CP-ABE before sharing. Blockchain enables cloud platforms to access and utilise shared data for profit growth while avoiding attacks and failures. CP-ABE is capable of achieving data confidentiality, integrity, and tamper-proofing. Achieves higher accuracy than other schemes. Based on resource consumption metrics, throughput, and latency, our consortium blockchain scheme is feasible.

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Efficient Hostel Management System for Multiple Hostels in Academic Institutions

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Abstract: “Efficient Hostel Management System for Multiple Hostels in Academic Institutions” is a web based software application developed for managing various activities in multiple hostels in an academic organization. In the olden days the number of students in an educational institution is very less and it is enough to use a single hostel for all those students. But now-a-days the number of educational institutions and the students staying at hostels is increasing rapidly.

Hostels are becoming more prevalent in order to accommodate the enormous number of students. As a result, the person in charge of overseeing hostel operations has a lot of responsibility, and software is not utilized in this situation. With the help of this web application, issues with handling various hostel students' data are resolved, and issues with maintaining manually are avoided.

The development of new software applications that will be compatible with the existing system and also have with better user friendly and more GUI focused results from identifying the shortcomings of the present system (here manual). We need to increase the proposed system's efficiency and accuracy in order to address the shortcomings of the current system.

Keywords: Hostel, Students, web application, academic organization, educational institution etc.

1. Introduction

1.1. Brief introduction

The web-based multi-hostel management system was developed to better effectively house college students on campus. Additionally, this project maintains information on every student living in an organization's many dorms. The coordinator for the hostel who made the call is in charge of it. He will serve in that capacity. It makes sense to organize the housing of numerous hostels on a campus to accommodate a big number of students. Through online visibility of available rooms in various hostels, this document aims to reduce the amount of manual work required for hostel allocation and simplify the task for hostel officials. Students can learn more about their roommates' personal information.

1.2. Project Objectives

- Separately list the students who have moved out of residence as hostellers.
- When the admin confirms the allocation, the student's information is automatically added to the hosteller's record.
- It is also added to the empty student's record when vacating is verified or after the course finish date.
- Admin can look up students using their student IDs, names, or phone numbers.

2. Related Work

In this[1] paper The Hostel Management System (HOMASY) is a computerized solution developed using PHP programming language and MySQL database application. The system aims to provide a stress-free, reliable, and efficient process for both students and staff involved in registration and hostel management.

By utilizing PHP and MySQL, HOMASY offers a user-friendly interface and automated functionalities that streamline various hostel management processes. The system ensures a hassle-free experience for students during registration and provides comprehensive tools for staff to effectively manage hostel operations.

In this[2] hostel management system framework aims to automate all activities occurring in a hostel. It addresses the major drawbacks of the current scenario by providing data security, integration, and efficient data retrieval, resulting in smooth operations and saving human effort and time.

By implementing the proposed framework, hostel activities such as registration, room allocation, fee management, attendance tracking, and complaint management can be automated. This automation eliminates manual processes and reduces the chances of errors, ensuring smoother and more efficient operations.

In this[3] hostel management system solution, it aims to enhance and advance the existing system by incorporating modern technologies such as HTML, CSS, JavaScript, PHP, MySQL, and Bootstrap. This project is designed as a hybrid platform where multiple hostels can register themselves, and students can conveniently book accommodations based on their specific requirements. Additionally, grievance management and filter functionality have been incorporated into the project to further enhance user experience and satisfaction. The solution also considers future scope and scalability to ensure its long-term usefulness and effectiveness.

The goal of this project[4] is to create a system for recording information and displaying it in or around a hostel. This approach will make it easier for the hostel officer to run the hostel's business. A student's whole profile will be available thanks to this technology. It will display the number of persons in each room as well as whether or not a room is available. This will also reveal which pupils have paid in whole or still owe money. Additionally, this system would give a summary of the fees and bills that students are owed. A user module for staff or the hostel officer is also included.

3. Existing System

There is no particular software application to manage the students at multiple hostels and at present the thing is done through manual process which requires a lot of efforts and which consumes a lot of time. In the existing system we can manage the students of one particular hostel in which the students can apply for the hostel online but the allotment processes are done manually, which may lead to problems in the allocation process.

Disadvantages

- More human strength.
- The hostel coordinator is under more stress and pressure.
- Repeating the same process.
- Minimal security.
- Redundancy in data.
- A challenge to manage.
- The challenge of updating data.
- Keeping records is challenging.

4. Proposed System

This project is mainly developed for keeping records and showing information about the students located in various hostels. This system will help the hostel coordinator to be able to manage the students of the hostels in an organization. This system will provide full information like student name, student id, college he/she belongs to, father and mother mobile numbers etc., about a student in the hostel.

The coordinator can also view the room's availability and the number of students in a particular room. It provides the reports of the students based on college wise or hostel wise and it can also shows the students of all the hostels in a single report. There will also be an administrator module which will accessed by the administrator and has the ability to add, delete and update hostel and room details. This system will be developed with PHP and XAMPP server. PHP and MySQL are good for the development and design of web based applications whiles XAMPP is good for databases because of its security and its advanced features and properties.

5. Hardware Requirements

It is important to choose the suitable and compatible hardware configuration to the development of software. The low configured hardware may effect on the efficiency and speed of the developed software. We need to keep the operations of our application in mind while choosing the hardware for the development of any kind of software application.

1. Users Processor: Pentium III and above Processor speed: 1.2 GHz Onwards
2. System Memory: 256 MB minimum (512 MB recommended)
3. RAM: 512 MB (Minimum)
4. Network Card: Any card can provide a 80mbps speed Network connection: UTP or Coaxial cable connection
5. Hard disk: 100 GB
6. Keyboard & Mouse: 104 keys US Key Serial, USB or PS/2 and an Optical Mouse

6. Software Requirements

The selection of compatible software is a major element in the development of a software application since the software in the market is experiencing in geometric progression. The selected software should be acceptable by the users who are interacting with the system. The software requirement specification describes how a system should act, appear or perform.

Technology Implemented	: Apache Server
Language Used	: HTML, Bootstrap, PHP, JAVA SCRIPT.
Database	: MySql XAMPP Server
User Interface	: HTML, CSS, Bootstrap.
Web Browser	: Internet Explorer 7(or newer) or Mozilla Firefox, Google Chrome.
Software	: MySQL Server & XAMPP
Operating System	: Windows XP or Higher Versions

7. System Overview

Multi Hostel Management System makes hostel students data maintenance easy and requires less man power and less time as well as cost for maintaining it. HTML, CSS and Bootstrap are used for designing front end development of the system.

For web development the JavaScript, PHP is also implemented having the major role in validation and for whole processing. The MySQL is used as the backend for this application.

HTML (Hypertext Markup Language) [5] is a text-based language used to describe the organization of material in an HTML file. A webpage's markup gives web browser instructions on how to display text, images, and other multimedia.

On a web server, PHP code is often processed by a PHP[6] interpreter, which can be implemented as a module, daemon, or Common Gateway Interface (CGI) executable. The output of PHP code that has been interpreted and executed on a web server may make up all or part of an HTTP response, and this output could take the shape of any type of data (such as produced HTML or binary image data).

MySQL [7] is a key component of many of the most widely used software stacks for creating and sustaining anything from robust, data-driven B2B services to customer-facing web apps. Due to MySQL's open-source nature, dependability, and broad feature set, as well as continued development and support from Oracle, it is used as the backend by a number of key websites, including Facebook, Flickr, Twitter, Wikipedia, and YouTube.

It has mainly one module that is Admin module.

#Admin Module

The admin in other terms the hostel coordinator has all the privileges to add or delete or update the students in different hostels. He/she has also capable to change the room/hostel of a student. He/she can take the reports of the hostellers based on student wise or hostel wise or college wise in a campus. It is efficient to handle more number of students in multiple numbers of hostels. By using the student id it get all the details of the student when we required.

8. Database Design

Data design in the hostel management system involves the structuring and organization of data to effectively store and retrieve information related to students, rooms, payments, and other relevant data. The data design ensures efficient data management, accurate reporting, and smooth system operations.

The following are the different table structures using in this project.

hostelroom	
Field	Type
room_no	varchar(5)
floor	varchar(5)
room_type	varchar(10)
no_beds	varchar(10)
beds_occ	varchar(10)

hostel	
Field	Type
hid	varchar(20)
hname	varchar(50)
no_floors	int(5)
ac_rooms	int(5)
non_ac_rooms	int(5)
warden_name	varchar(100)
warden_mobile	bigint(10)

Student	
Field	Type
hid	varchar(50)
rno	int(10)
sid	varchar(50)
sname	varchar(150)
clg	varchar(100)
spec	varchar(50)
branch	varchar(10)
year	varchar(10)
gender	varchar(10)
smobile	bigint(15)
email	varchar(100)
fname	varchar(100)

fmobile	bigint(15)
address	varchar(300)
photo	varchar(100)
status	varchar(10)
dov	date

9. Result Analysis

Figure 1: Login Page



Figure 2: Home Page



Figure 3: Room Availability Page



Research Through Innovation

Figure 4: Hostel wise Report

The screenshot displays the SVES Hostel Management System interface. At the top, it says 'SVES Hostel Management system' and 'Today is 01-11-2022'. There are navigation buttons for 'Student', 'College Wise Report', 'Hostel Wise Report', and 'Overall Report'. The main content area shows 'SVES Hostel Student Report' for 'Hostel Name: DVR'. Below this is a table with the following data:

S.No	SID	Name	College	Specialization	Year	Branch	Room No	Veg/Non-Veg	Mobile	Photo
1	21bds68	Rohit katta	VDC	Dental	I Year	B.D.S	201		7285923219	

10. Conclusion

In conclusion, the "Multi Hostel Management System" is a web-based software application designed to address the challenges faced by academic institutions in managing multiple hostels. The system offers a range of features and benefits, including accommodation management, student information management, room and inventory management, attendance and leave management, fee management, complaints and maintenance tracking, and comprehensive reporting capabilities.

By implementing this system, academic institutions can significantly improve the efficiency and accuracy of their hostel management processes. The system eliminates the need for manual record-keeping and streamlines various administrative tasks, ultimately saving time and effort for hostel administrators. It provides a user-friendly interface and a centralized platform for managing student accommodation, ensuring accurate records, efficient resource allocation, and timely communication with students.

Overall, the "Multi Hostel Management System" contributes to a more organized, systematic, and hassle-free management of hostels in academic institutions. It enhances the overall student hostel experience, promotes transparency, and enables administrators to make data-driven decisions. With this software application, academic institutions can effectively manage their hostel facilities and meet the growing demands of student accommodation in a more efficient and effective manner.

11. Future Work

For future work, there are several potential enhancements and additions that can further improve the functionality and usability of the system. Some areas of focus could include:

Integration with payment gateways: Adding the capability to facilitate online fee payments by integrating the system with popular payment gateways, ensuring convenient and secure transactions.

Mobile application: Developing a mobile application that allows students, hostel staff, and administrators to access the system and perform various tasks on their mobile devices, providing greater flexibility and convenience.

Integration with access control systems: Integrating the system with access control systems, such as smart cards or biometric systems, to automate hostel entry and ensure enhanced security.

Communication and notification features: Implementing features that enable effective communication between hostel staff, students, and parents/guardians, such as automated notifications for important updates, announcements, and emergency situations.

By incorporating these future enhancements, the "Multi Hostel Management System" can further streamline hostel operations, improve communication and transparency, and enhance the overall efficiency and effectiveness of hostel management in academic institutions.

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[https://www.talend.com/resources/what-is-](https://www.talend.com/resources/what-is-mysql/#:~:text=MySQL%20is%20integral%20to%20many,%2C%20data%2Ddriven%20B2B%20services.)

[mysql/#:~:text=MySQL%20is%20integral%20to%20many,%2C%20data%2Ddriven%20B2B%20services.](https://www.talend.com/resources/what-is-mysql/#:~:text=MySQL%20is%20integral%20to%20many,%2C%20data%2Ddriven%20B2B%20services.)

Predicting Flood Impacts: Analyzing Flood Dataset using Machine Learning Algorithms

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Abstract - Floods are one of the most destructive and challenging to anticipate natural catastrophes. The frequency or severity of floods has grown in recent years due to climate change and urbanization, as have the associated fatalities and financial losses. Machine learning-based flood forecasting models have slowly started to appear as a result of the fast expansion of computing power. Rich information is included in these models since they were trained on historical data, which is advantageous for data analysis and use. Machine-learning-based models are more effective than the conventional physical flood forecasting model in achieving satisfying results. This study provides a summary of contemporary machine learning-based flood prediction techniques to illustrate recent developments in flood forecasting.

We list a range of current works in flood prediction and construct the model based on several methodologies.

For flood warnings, flood reduction, or flood prevention, machine learning (ML) models are useful. Machine-learning (ML) addresses have become more well-liked in this regard because to their minimal computing demands and predominance of observational data.

Key Words: Flood, human injure, urbanization, Random Forest, Support Vector, Neural Network etc.

1. INTRODUCTION

The number of natural and man-made disasters has grown globally in recent years. The most common natural catastrophe is a flood, which happens when an excess of water submerges normally dry ground. Floods are typically caused by protracted periods of intense rain, rapid snowmelt, storm surges from tropical cyclones, or tsunamis in coastal areas.

Floods may wreak havoc across a large area, causing fatalities as well as damage to private property and vital public health facilities. Worldwide, more than 2 billion people were impacted by floods between 1998 and 2017. Most at risk from floods are those who reside in floodplains,

in non-flood proof structures, lack access to warning systems, or are unaware of the risk of flooding [1].

75% of those who pass away in flood catastrophes drown. Disasters caused by flooding are occurring increasingly often, and this tendency is predicted to continue. Flooding increases the danger of drowning, especially in low- and middle-income nations where residents live in flood-prone locations and flood warning, evacuation, and protection systems are still underdeveloped or insufficient [2].

2. LITERATURE SURVEY

The author of this research analyzed several machine learning-based flood forecasting systems, including linear regression, decision trees, and SVM-based approaches, as well as deep learning-based algorithms like BP and LSTM models. The study shows that the applicability of various approaches varies. Furthermore, since the most recent algorithms are largely influenced by the sophisticated models in deep learning, this paper's conclusion from the current research is that the advancement of deep learning technology has a significant impact on further improving the accuracy of flood prediction performance [3].

Based on historical rainfall datasets spanning 33 years, the goal of this project was to develop a machine learning model that can forecast floods in Kebbi state so that it may be applied to other Nigerian states with high flood risk. In this study, three machine learning algorithms—Decision Tree, Logistic Regression, and Support Vector Classification (SVR)—were assessed and their Accuracy, Recall, and Receiver Operating Characteristics (ROC) scores were compared. When compared to the other two methods, logistic regression yields more accurate findings and offers excellent performance accuracy and recall. The Decision Tree fared better than the Support Vector Classifier as well. Due to Decision Tree's above-average accuracy and below-average recall ratings, it did pretty well [4].

This study introduces an innovative method for using the ensemble model to estimate water level in relation to flood

severity. Our method makes advantage of the most recent advancements in machine learning and the Internet of Things (IoT) to automate the analysis of flood data that might be valuable in the mitigation of natural catastrophes. According to research findings, ensemble learning is a more accurate method of predicting the severity of flooding. With sensitivity, specificity, and accuracy of 71.4%, 85.9%, and 81.13%, respectively, the experimental findings show that ensemble learning utilising the Long-Short Term Memory model and random forest outperformed individual models [5].

The various model architectures and their performances are shown in this research. Based on IoT data and weather forecasts, machine learning models using deep learning neural networks have been constructed to identify potential risks [6].

3. PROPOSED METHODOLOGY

Based on your dataset and the goal of flood prediction, here is a proposed methodology for analyzing and predicting flood-related outcomes using machine learning:

Training Phase: The system is trained using the data from the data set and the correct method of model fitting.

Testing Phase: The system is given inputs before its functionality is evaluated. It is put to the test.

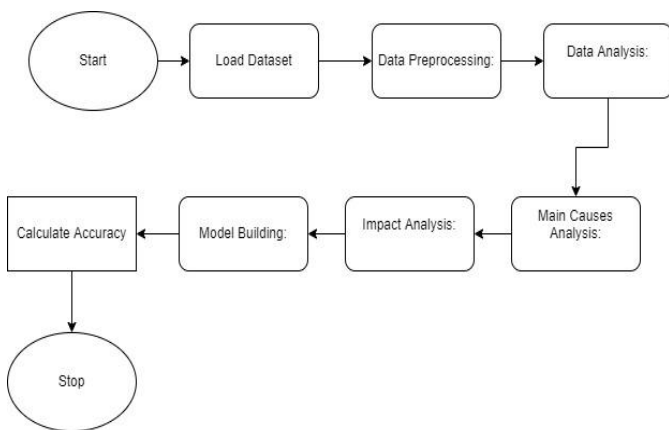


Fig: 1 System Architecture of flood

3.1. TECHNOLOGIES USED:

3.1.1 Python:

For building websites and apps as well as doing data analysis, Python is a widely-liked and approachable programming language. We can readily reuse code thanks to the distinctive features of this high level programming language. Python is not limited to any one area of study and may be used to develop a wide range of original projects and programmes that are dynamic and interesting. Both the dynamic typing and garbage collection are done [7]. Some of

its characteristics include simple sharing and collaboration, free access to computer resources.

3.1.2 Google Colab

Python projects and programmes may be written and run using Google Colab, also referred to as Collaborator. We can perform high-level programming, data analysis, and machine learning algorithms thanks to it [8].

3.2 DATASET COLLECTION, PRE-PROCESSING, AND ANALYSIS

3.2.1 Data Collection

In this paper the data is collected from Kaggle. The data set contains a lot of information like starting date and end date of floods and heavy rainfall occurred. And also the data set contains the information about number of days rain fall, number humans injured, number of death occurred.

3.2.2 Pre-processing of Data

Pre-processing refers to changing or eliminating unclean and raw data by detecting missing or unnecessary elements of the data and subsequently. Encoding Categorical Variables like "maincause," are encode them into numerical values for the machine learning algorithms to understand. One common approach is one-hot encoding, where each category is represented by a binary value (0 or 1) in separate columns.

3.2.3 Data Analysis

In this dataset, many columns data from across India has collected. By using these columns data it is used to predict the human injured, human deaths, animal deaths can be predicted. By using this data set it is analysed how many human injured, human deaths, animal deaths can be forecasted.

4. IMPLEMENTATION

The model is tested in this stage using the predefined machine learning classifiers. There have been a few models created, and their correctness has been confirmed. For this project, we're using the four classifiers indicated below.

- **Decision Tree:** Calculate the accuracy of the Decision Tree model by comparing the predicted labels to the true labels of the test data. Additionally, you can compute metrics such as precision, recall, and F1-score for a more comprehensive evaluation.
- **Random Forest:** Similar to the Decision Tree, compute the accuracy, precision, recall, and F1-score of the Random Forest model based on the predictions and true labels of the test data.

- **SVM:** For SVM, use the accuracy metric to measure how well the model performs in classifying the test data.
- **Gradient Boosting:** Calculate the accuracy, precision, recall, and F1-score for the Gradient Boosting model using the predicted labels and true labels of the test data.
- **Neural Network:** Evaluate the Neural Network model's accuracy by comparing its predicted labels to the true labels of the test data. Additionally, you can compute other metrics such as precision, recall, and F1-score.
- **Isolation Forest:** For Isolation Forest, the typical evaluation metric used is the Mean Squared Error (MSE). This metric measures the average squared difference between the actual values and the predicted anomaly scores generated by the Isolation Forest algorithm.

5. RESULTS

The data from various cities in India, such as Arunachal Pradesh, Assam, Bihar, Chattisgarh, Himachal Pradesh, Jammu & Kashmir, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Odisha, Punjab, Rajasthan, Sikkim, Tamilnadu, Telangana, Uttar Pradesh, Uttarakhand, West Bengal, Puducherry, Andhra Pradesh, Chhattisgarh, Gujarat, Jharkhand, Mizoram, Tripura, Nagaland, Andaman & Nicobar Islands, New Delhi, were collected. The data includes different variables, such as start date, end date, Duration, Main_Cause, Districts, State, Human_fatality, Human_injured, Animal_Fatality, Description_of_Casualties/injured, Extent_of_damage.

The correlation coefficients between two sets of variables are shown graphically in a correlation map.

Some Insights:

- According to a heatmap, Human_injured and Animal_Fatality have a significant positive linear link with a correlation coefficient of 0.83 between them.
- A heatmap's Human_Injured and Main_Cause correlation coefficient of 0.072 indicates that there is a marginally positive linear association between these two variables.
- According to a heatmap, there is a somewhat positive linear link between Animal_Fatality and Human_injured, with a correlation value of 0.83.

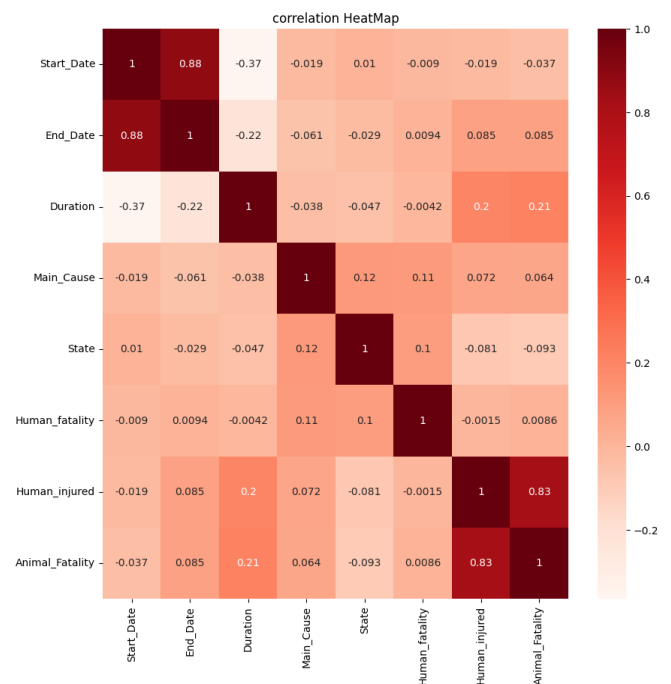


Fig:2 Correlation Heat Map for Flood Dataset

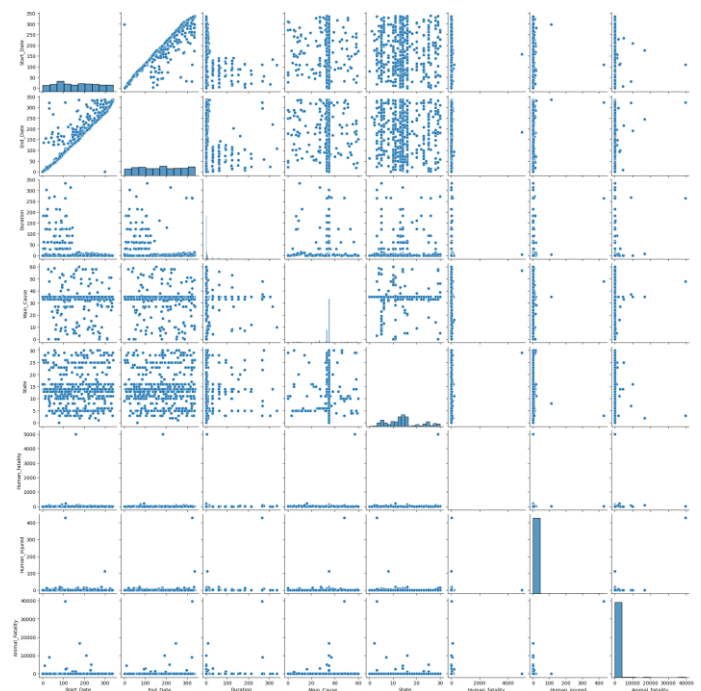


Fig:3 Pair Plot for flood dataset

From the above graph it shown the different columns data in the graph

A pair plot is a graphical representation that allows you to visualize the relationships and patterns between pairs of variables in a dataset. It provides a matrix of scatter plots, where each scatter plot represents the relationship between

two variables. Here's a description of the pair plot for the flood dataset columns you provided:

1. 'Start_Date' vs. 'End_Date': This scatter plot will show the relationship between the start and end dates of the flood events. It can help identify any patterns or trends in the duration of the floods.
2. 'Start_Date' vs. 'Duration': This scatter plot will display the relationship between the start date of the floods and their duration. It can reveal whether there is a correlation between the start date and the length of the flood events.
3. 'Start_Date' vs. 'Human_fatality': This scatter plot will show how the number of human fatalities varies with the start date of the floods. It can help identify if there are any time-specific factors that contribute to higher or lower human fatalities.
4. 'Duration' vs. 'Human_fatality': This scatter plot will illustrate the relationship between the duration of the floods and the number of human fatalities. It can indicate whether longer-lasting floods are associated with a higher likelihood of human casualties.

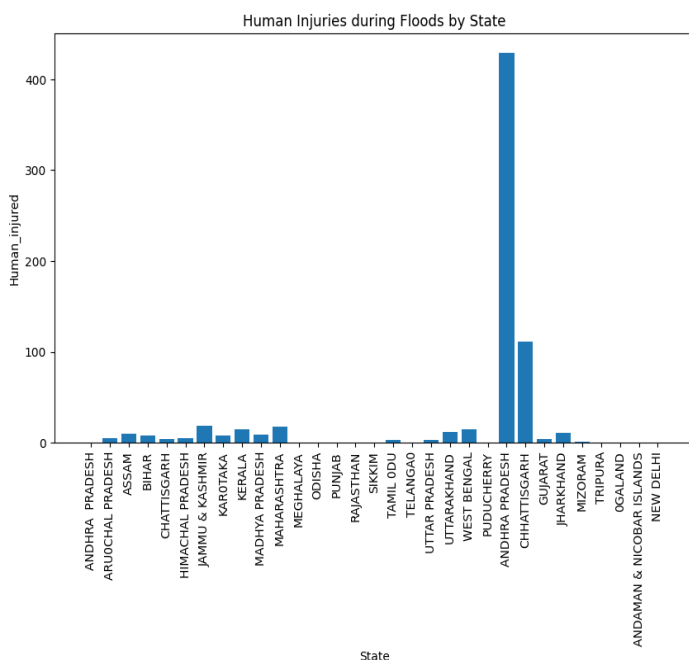


Fig:4 Human Injuries during flood by state

The bar chart displays the number of human injuries during floods, categorized by state. The x-axis represents the different states, while the y-axis represents the count of human injuries. Each bar represents a state and its corresponding value indicates the number of human injuries reported in that state during flood events.

The height of each bar represents the magnitude of human injuries, allowing for a visual comparison between states. The bar chart provides insights into the states that experienced a higher number of human injuries during floods, helping identify regions that were more severely affected.

By examining the chart, you can identify states with the highest and lowest counts of human injuries, facilitating a better understanding of the impact of floods on human populations across different regions.

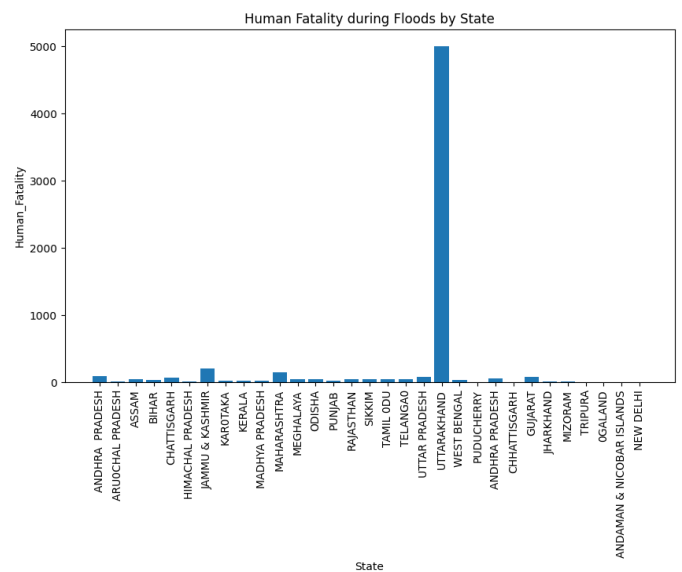


Fig:5 Human Fatality during Floods by State

The bar chart illustrates the number of human fatalities during floods, categorized by state. The x-axis represents the different states, while the y-axis represents the count of human fatalities. Each bar corresponds to a state, and its height represents the number of human fatalities reported in that state during flood events.

The bar chart allows for a visual comparison of the magnitude of human fatalities across different states. It provides insights into the states that experienced a higher number of human fatalities during floods, enabling the identification of regions that were more severely impacted.

By examining the chart, you can identify states with the highest and lowest counts of human fatalities, gaining a better understanding of the impact of floods on human life in different regions.

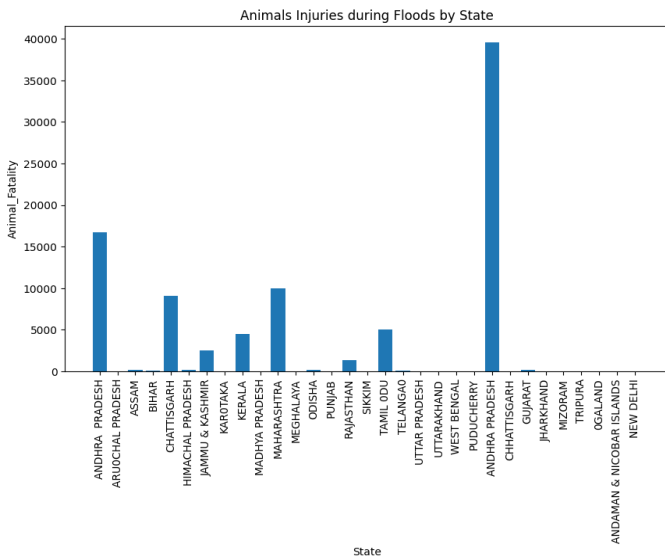


Fig:6 Animals injuries during flood by state

The bar chart depicts the number of animal fatalities during floods, categorized by state. The x-axis represents the different states, while the y-axis represents the count of animal fatalities. Each bar corresponds to a state, and its height indicates the number of animal fatalities reported in that state during flood events.

The bar chart facilitates a visual comparison of the impact of floods on animal life across different states. It provides insights into the states that experienced a higher number of animal fatalities during floods, enabling the identification of regions where animals were more severely affected.

By examining the chart, you can identify states with the highest and lowest counts of animal fatalities, gaining a better understanding of the impact of floods on wildlife in different regions.

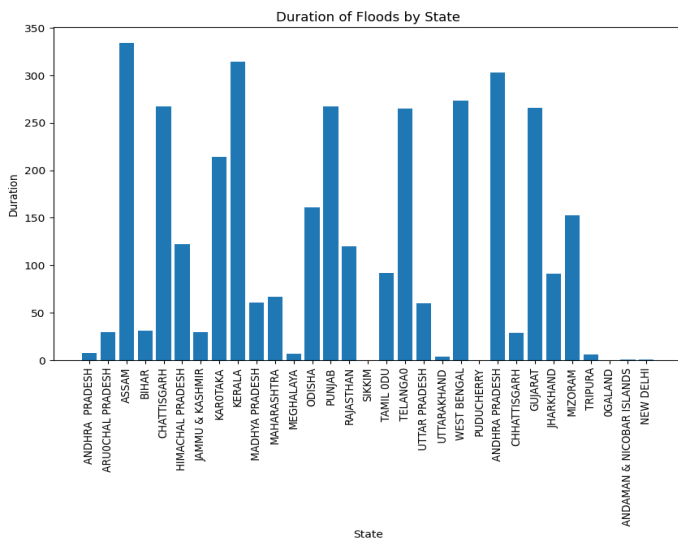


Fig 7: Duration of flood by state

The x-axis displays the different states, while the y-axis represents the duration of the floods in terms of days. Each bar corresponds to a state, and its height indicates the average or total duration of floods reported in that state.

The bar chart allows for a visual comparison of the duration of floods across different states, providing insights into regions that experienced longer or shorter flood events. It helps identify states with the highest and lowest average or total duration of floods, highlighting areas that were more or less affected by prolonged flooding.

By examining the chart, you can identify states with the most extended or shortest durations of floods, facilitating a better understanding of the temporal impact of floods in different regions.

6. COMPARISON

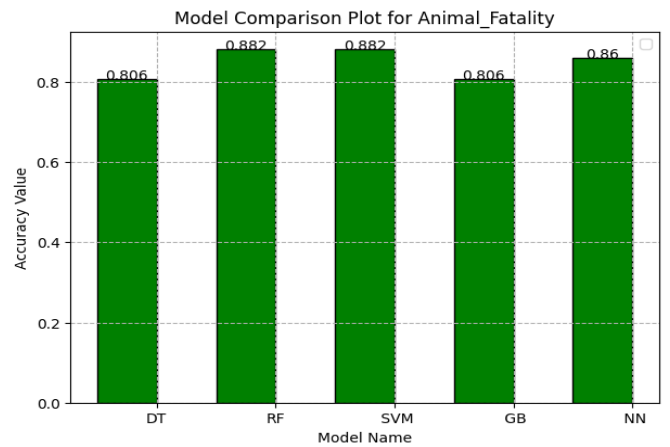


Fig:8 Model Comparison for animal fatality

By observing the below bar chat, the Random Forest Classifier and SVM gives the best accuracy 88.2% among all the remaining algorithms.

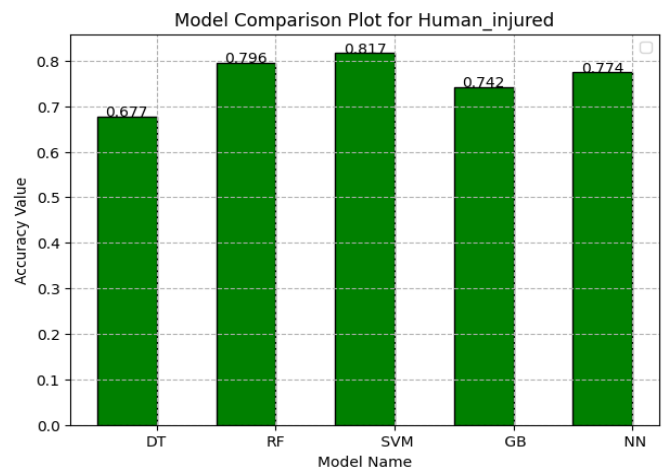


Fig:8 Model Comparison for human injured

By observing the below bar chart, the SVM gives the best accuracy 81.7% among all the remaining algorithms.

7. CONCLUSION

In conclusion, the project demonstrates the effectiveness of machine learning algorithms in analyzing flood datasets and predicting flood impacts. The findings emphasize the importance of using advanced algorithms to inform decision-making processes in flood management and response, ultimately aiding in reducing the adverse effects of floods on human life, animal welfare, and infrastructure.

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