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Impact of Different Promotional Strategies in Film industry by using Trapezoidal Fuzzy Cognitive Maps (TpFCM)

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Abstract— In this paper, we define the new fuzzy tool called Trapezoidal Fuzzy CognitiveMaps (TpFCM) to analyze the social problem. Usually in Fuzzy Cognitive Maps (FCMs) we analyze the causes and effects of therelationships among the concepts to model the behavior of any system. But this new model gives thecauses and effects of the relationships among the concepts to model behavior with ranking of anysystem.This model was introduced by Kanimozhiraman, A.Praveen Prakashin the year 2014. In this paper, we analyze the film industry problem using TpFCM. Itis organized as follows: In first section, we give the brief introduction to FCMs. Sectiontwo gives the basic definitions of FCM. In section three, we derive the definitions for TpFCM and Hidden pattern of the dynamical system. In fourth section, we analyzed the concept of the problem using TpFCM. In final section, we give the conclusion based on our study.

Keywords— Fuzzy Cognitive Maps (FCMs), Unsupervised,Trapezoidal fuzzy numbers, Film Industry.

I. INTRODUCTION

Lotfi A. Zadeh (1965)[10] has introduced a mathematical model called Fuzzy Cognitive Maps (FCMs). After a decade, Political scientist Axelord (1976) used this fuzzy model to study decision making in social and political systems. Then Kosko (1986, 1988,1997) [7,8] enhanced the power of cognitive maps considering fuzzy values for the concepts of the cognitive map and fuzzy degrees of interrelationships between concepts. FCMs can successfully represent knowledge andhuman experience, introduced concepts torepresent the essential elements and the causeand effect relationships among the concepts tomodel the behavior of any system. It is a veryconvenient, simple and powerful tool, which issued in numerous fields such as social,economic and medical etc. Usually weanalyze the number of attributes as ON-OFFposition. The concept of general fuzzy number was introduced by change and Zadeh [22in 1972.Since then, many researchers studied the theory of fuzzy number, and achieved fruitful results[23,24]. On the other hand ranking is very important concept, and many methods for ranking have also been studied[25,26]. The ranking of Trapezoidal fuzzy number plays a very important role in linguistic decision making and some other fuzzy application systems. The method Trapezoidal Fuzzy Cognitive Maps (TpFCM)gives the weightage of each and every attribute using which ranking of the attribute is done. Now we provide the basicdefinitions for FCMs to develop the Trapezoidal Fuzzy Cognitive Maps (TpFCM).

II. PRELIMINARIES

In this section, some concepts and methods used in this paper are briefly introduced.

2.1. Fuzzy set theory

The fuzzy set theory is to deal with the extraction of the primary possible outcome from a multiplicity of information that is expressed in vague and imprecise terms. Fuzzy set theory treats vague data as probability distributions in terms of set memberships. Once determined and defined, sets of memberships in probability distributions can be effectively used in logical reasoning.

2.2. Trapezoidal fuzzy number and the algebraic operations

2.2.1. Trapezoidalfuzzy number

A Trapezoidal fuzzy number A with four parameters $a_1 \leq a_2 \leq a_3 \leq a_4$ is denoted as
$A = (a_1, a_2, a_3, a_4)$ in the set of real numbers R. μ

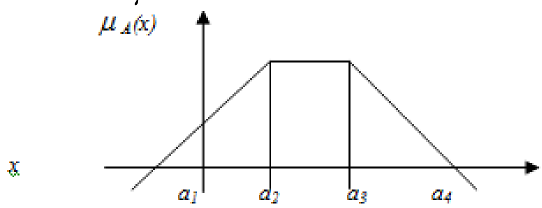

Figure 1: Trapezoidal fuzzy number A= (a_1, a_2, a_3, a_4)

Its membership function can be given by

$$\mu_A(x) = \begin{cases} 0 & , x < a_1 \\ \dfrac{x-a_1}{a_2-a_1} & , a_1 \le x \le a_2 \\ 1 & , a_2 \le x \le a_3 \\ \dfrac{x-a_4}{a_3-a_4} & , a_3 \le x \le a_4 \\ 0 & , a_4 < x \end{cases} .$$

2.2.2. Operation of Trapezoidal fuzzy number

Let $A_1 = (a_{11}, a_{12}, a_{13}, a_{14})$ and $A_2 = (a_{21}, a_{22}, a_{23}, a_{24})$ be two Trapezoidal fuzzy numbers in the set ofreal numbers R. Then, the following are the operations that can be performed on Trapezoidal fuzzy numbers:

(i) Addition:

$A_1+A_2 = (a_{11}+a_{21}, a_{12}+a_{22}, a_{13}+a_{23}, a_{14}+a_{24})$.

(ii) Subtraction:

$A_1-A_2 = (a_{11}-a_{21}, a_{12}-a_{22}, a_{13}-a_{23}, a_{14}-a_{24})$.

(iii) Multiplication,Division and inverse need not be Trapezoidal fuzzy number.

2.2.3. Degrees of the Trapezoidal fuzzy number[5]

Table 1:The linguistic values of the Trapezoidal fuzzy numbers are

Linguistic term	Linguistic values of Trapezoidal fuzzy number
Very low	(0.1, 0.2,0.3, 04)
Low	(0.2, 0.3, 0.4, 0.5)
Medium	(0.4, 0.5, 0.6, 0.7)
High	(0.6, 0.7, 0.8, 0.9)
Very High	(0.8, 0.9, 1, 1)

III. PROPOSED T_PFCMS

TpFCM are more applicable when the data in the first place is an unsupervised one. The TpFCM works on the opinion of three experts. TpFCM models the world as a collection of classes and causal relations between classes. It is a different process when we compare to FCM. Usually the FCM gives only the ON-OFF position. But this TpFCMis more precise and it gives the ranking for the causes of the problem by using the weightage of the attribute, it is the main advantage of this newTpFCM.

3.1. Basic definitions of TpFCM

3.1.1. Definition

When the nodes of the TpFCM are fuzzy setsthen they are called as Fuzzy Trapezoidal nodes.

3.1.2. Definition

TpFCMs with edge weights orcausalities from the set {−1, 0, 1} are calledsimple TpFCMs.

3.1.3. Definition

ATpFCM is a directed graph with conceptslike policies, events, etc., as nodes andcausalities as edges. It represents causalrelationships between concepts.

3.1.4. Definition

Consider the nodes/concepts TpC1, TpC2,…,TpCnof the Trapezoidal FCM. Suppose the directedgraph is drawn using edge weight $Tpe_{ij} \in \{-1, 0, 1\}$. The Trapezoidal matrixM be defined byTp(M) = (Tpe_{ij}) where $Tpe_{ij}$is the Trapezoidal weight of the directed edge TpC_iTpC_j. Tp(M) iscalled the adjacency matrix of TpFCMs, also known as theconnection matrix of the TpFCM.It is important to note that all matricesassociated with aTpFCM are always squarematrices with diagonal entries as zero.

3.1.5. Definition

Let TpC1, TpC2,…,TpCnbe the nodes of aTpFCM. A=(a1, a2,…,an) where $Tpe_{ij} \in \{-1, 0, 1\}$. A is called the instantaneous state vectorand it denotes the on-off position of the nodeat an instant.

$$\text{Instantaneous vector} = \begin{cases} {}_{Tp}a_i = 1 & , Maximum(Weight) \\ {}_{T_p}a_i = 0 & , Otherwise \end{cases}$$

Definition 3.1.6: Let ${}_{TP}C_1, {}_{TP}C_2, \ldots, {}_{Tp}C_n$ be the nodes of a TpFCM. Let $\overrightarrow{{}_{TP}C_1 {}_{TP}C_2}, \overrightarrow{{}_{TP}C_2 {}_{TP}C_3}, \ldots, \overrightarrow{{}_{TP}C_i {}_{TP}C_j}$, be the edges of the TpFCM (i≠ j). Then, the edges form a directed cycle. A TpFCM is said to be cyclic if it possesses a directed cycle. A TpFCM is said to be acyclic if it does not possess any directed cycle.

Definition 3.1.7: A TpFCM with cycles is said to have a feedback.

Definition3.1.8: When there is a feedback in a TpFCM, i.e., when the causal relations flow through a cycle in a revolutionary way, the TpFCM is called a dynamical system.

Definition3.1.9: Let $\overrightarrow{_{TP}C_{1TP}C_2}, \overrightarrow{_{TP}C_{2TP}C_3}, \ldots, \overrightarrow{_{TP}C_{iTP}C_j}$, be a cycle. When $_{TP}C_i$ is switched on and if the causality flows through the edges of a cycle and if it again causes $_{TP}C_i$, we say that the dynamical system goes round and round. This is true for any node $_{TP}C_i$, for i = 1, 2, …, n. The equilibrium state for this dynamical system is called the hidden pattern.

Definition 3.1.10: If the equilibrium state of a dynamical system is a unique state vector, then it is called a fixed point. Consider a TpFCM with $_{TP}C_1$, $_{TP}C_2$,…,$_{Tp}C_n$ as nodes. For example let us start the dynamical system by switching on $_{TP}$C1. Let us assume that the TpFCM settles down with $_{TP}$C1 and $_{Tp}$Cni.e., the state vector remains as (1, 0, 0, …, 0, 1). This state vector (1, 0, 0,…, 0, 1) is called the fixed point.

Definition 3.1.11: If the TpFCM settles down with a state vector repeating in the form $A_1 \rightarrow A_2 \rightarrow \ldots \rightarrow A_i \rightarrow A_1$, then this equilibrium is called limit cycle.

3.2. Method of determining the hidden pattern ofTpFCMs

Let $_{TP}C_1$, $_{TP}C_2$,…,$_{Tp}C_n$ be the nodes of aTpFCM with feedback. Let Tp(M) be theassociated adjacency matrix.
Step 1: Let us find the hidden pattern whenTpC_1 is switched ON. When an input is givenas the vectorA_1 = (1, 0,…, 0), the data shouldpass through the relation matrix M. This isdone by multiplying A_i by the trapezoidal matrixM.
Step 2: Let A_iTp(M) = (a1, a2,…, an) get a Trapezoidal vector. Suppose A_1Tp(M) = (1, 0,…,0) gives a Trapezoidal weight of the attributes,we call it as A_iTp(M)weight.
Step 3: Adding the corresponding node of the four experts opinion, we call it as A_iTp(M)sum.
Step 4: The threshold operation is denotedby() i.e., $\overrightarrow{A_1}$Tp(M)Max(weight). That is byreplacing a_i by 1 if $a_i$is the maximum weight ofthe Trapezoidal node (i.e.,a_i=1), otherwise by0(i.e., a_i=0).
Step 5: Suppose A_1Tp(M)→ A_2 then considerA_2Tp(M)weight is nothing but addition ofweightage of the ON attribute and A_1Tp(M)weight.
Step 6: Find A_2Tp(M)sum(i.e., summing of thefour experts opinion of each attributes).
Step 7: The threshold operation is denoted by() i.e., $\overrightarrow{A_2}$Tp(M)Max(weight). That is by replacing a_i by 1 if a_i is the maximum weight of the Trapezoidal node (i.e.,a_i=1), otherwise by 0 (i.e., a_i=0).
Step 8: If A_1Tp(M)Max(weight)=A_2Tp(M)Max(weight)thenit is dynamical system end otherwise repeat the same procedure.
Step 9: This procedure is repeated till we get a limit cycle or a fixed point.

IV. CONCEPT OF THE PROBLEM

We have taken the following 11concepts {$_{TP}$C1, *Tp*C2,…,*Tp*C10,TpC11}from film industry and analyzed the strategies by using linguistic questionnaire and the expert's opinion. The following concepts are taken as the main nodes of our problem.
TpC_1- Radio publicity
TpC_2-Online Advertisements
TpC_3- E-mail marketing
TpC_4-Social Media
TpC_5- Direct Mail
TpC_6-Trailers in televisions and movie theatres
TpC_7- SMS marketing
TpC_8-Collaboration with retail products for promoting the movie
TpC_9-Free movie tickets:
TpC_{10}-Promotional tours and interviews
TpC_{11}-Paid advertisements in newspapers and magazines
TpC_1- Radio publicity:
Radio publicity:" Nowadays, more and more people tend to tune in to their radios while travelling. This growing popularity is also used for move marketing where details regarding the movies are broadcasted over the channels. "
TpC_2Online Advertisements:
Online Advertisements: Movies tend to gain more publicity these days by way of advertisements in the internet. Online advertisements can pop-up in between browsing by the user and may carry creative multimedia content to garner attention by the users."
TpC_3- E-mail marketing:
E-mail marketing: " E-mail marketing is a non-conventional approach to movie promotions. In this, delegates of the movie try to market the movie by means of conveying the information to the people through electronic mails. It may or may not contain multimedia content. "

TpC_4- Social Media

Social Media: " Social media has become a powerful tool for marketing. It is cheap and effective and contributes to a large extent in the overall popularity of the movie. Social media marketing makes use of social networking sites like Facebook, Twitter, etc. and also video channels like YouTube for marketing their movies."

TpC_5- Direct Mail

Direct Mail:"Though it might seem like a good idea, direct mail to people involves a lot of money and time and is not profitable in the long run and hence not feasible. This parameter is avoided by most of the big budget movies as the promoters stick to profitable and affective means of publicity.

TpC_6-Exchange of Reviews by word of mouth

Exchange of reviews by word of mouth:"This is the most cost effective strategy for movie promotion and is a 'Post Release' strategy. This strategy can be both useful and harmful in increasing or decreasing the revenues for the movie depending upon whether the people who have watched the movie liked it or not."

TpC_7- Trailers in televisions and movie theatres:

Trailers in televisions and movie theatres:" Trailers are an important part in marketing a movie. It presents the audience with a small glimpse of the actual movie and hence is a powerful tool in catching the attention of the people. If the trailer is good, then the people turning out to watch the movie will also be proportional.

TpC_8- Collaboration with retail products for promoting the movie: This is a win-win situation for both the retailers and the movie production house. In this, both the parties reach an arrangement where products related to the movie are given free with the retail product. This is an indirect publicity. The retailers are given money by the production house and the movie gets publicity indirectly."

*Tp*C9.- Free movie tickets:

This is not a conventional method used for promotions. This can be done only during the initial days of the release just to gather publicity else in the long run, this strategy will result in huge amount of loss to the production house. Hence this tactic must only be used after careful thought. "

TpC_{10}-Paid advertisements in newspapers and magazines:" This is a tried and tested strategy for movie marketing. This involves buying a particular column of a newspaper page and magazine and displaying movie posters in those columns. Newspapers and magazines are an important means to market a product since they reach out to millions of people."

TpC_{11}-Promotional tours and interviews

Nowadays, it can be seen that movie stars travel across the nation, meeting up fans and giving interviews to media channels. This has become a huge craze and has become one of the prominent contributors to generating movie revenues. Movie stars help gather support from the audience and this in turn helps to promote the movie.

Now we give the connection matrix related with the TpFCM.(workers from film industry)

Table 2 :Connection matrix

$$Tp(M)=\begin{bmatrix} 0 & H & VH & H & H & H & H & H & H & H & H \\ H & 0 & M & M & VH & H & H & H & H & L & M \\ H & H & 0 & VH & M & H & H & H & M & H & H \\ H & VL & VH & 0 & M & H & H & H & M & H & H \\ H & H & M & H & 0 & H & VH & H & M & H & H \\ M & H & H & H & M & 0 & H & VH & M & H & H \\ M & M & H & M & M & H & 0 & VH & L & H & M \\ H & VH & H & M & H & H & H & 0 & L & M & M \\ M & H & M & H & H & H & H & VH & 0 & M & M \\ H & H & M & M & H & H & H & VH & H & 0 & H \\ H & H & M & M & H & H & H & VH & H & M & 0 \end{bmatrix}$$

Table 3:The linguistic values of the connection matrix

	${}_{Tp}C_1$	${}_{Tp}C_2$	${}_{Tp}C_3$	${}_{Tp}C_4$	${}_{Tp}C_5$	${}_{Tp}C_6$	${}_{Tp}C_7$	${}_{Tp}C_8$	${}_{Tp}C_9$	${}_{Tp}C_{10}$	${}_{Tp}C_{11}$
${}_{Tp}C_1$	0	0.6, 0.7, 0.8, 0.9	0.8, 0.9, 1, 1	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9
${}_{Tp}C_2$	0.6, 0.7, 0.8, 0.9	0	0.4,0.5,0.6,0.7	0.4,0.5,0.6,0.7	0.8, 0.9, 1, 1	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.2,0.3,0.4,0.5	0.4,0.5,0.6,0.7
${}_{Tp}C_3$	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0	0.8, 0.9, 1, 1	0.4,0.5,0.6,0.7	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.4,0.5,0.6,0.7	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9
${}_{Tp}C_4$	0.6, 0.7, 0.8, 0.9	0.1,0.2,0.3,0.4	0.8, 0.9, 1, 1	0	0.4,0.5,0.6,0.7	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.4,0.5,0.6,0.7	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9
${}_{Tp}C_5$	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.4,0.5,0.6,0.7	0.6, 0.7, 0.8, 0.9	0	0.6, 0.7, 0.8, 0.9	0.8, 0.9, 1, 1	0.6, 0.7, 0.8, 0.9	0.4,0.5,0.6,0.7	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9
${}_{Tp}C_6$	0.4, 0.5, 0.6, 0.7	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.4,0.5,0.6,0.7	0	0.6, 0.7, 0.8, 0.9	0.8, 0.9, 1, 1	0.4,0.5,0.6,0.7	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9
${}_{Tp}C_7$	0.4, 0.5, 0.6, 0.7	0.4,0.5,0.6,0.7	0.6, 0.7, 0.8, 0.9	0.4,0.5,0.6,0.7	0.4,0.5,0.6,0.7	0.6, 0.7, 0.8, 0.9	0	0.8, 0.9, 1, 1	0.2,0.3,0.4,0.5	0.6, 0.7, 0.8, 0.9	0.4,0.5,0.6,0.7
${}_{Tp}C_8$	0.6, 0.7, 0.8, 0.9	0.8, 0.9, 1, 1	0.6, 0.7, 0.8, 0.9	0.4,0.5,0.6,0.7	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0	0.2,0.3,0.4,0.5	0.4,0.5,0.6,0.7	0.4,0.5,0.6,0.7
${}_{Tp}C_9$	0.4, 0.5, 0.6, 0.7	0.6, 0.7, 0.8, 0.9	0.4,0.5,0.6,0.7	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.8, 0.9, 1, 1	0	0.4,0.5,0.6,0.7	0.4,0.5,0.6,0.7
${}_{Tp}C_{10}$	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.4,0.5,0.6,0.7	0.4,0.5,0.6,0.7	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.8, 0.9, 1, 1	0.6, 0.7, 0.8, 0.9	0	0.6, 0.7, 0.8, 0.9
${}_{Tp}C_{11}$	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.4,0.5,0.6,0.7	0.4,0.5,0.6,0.7	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.6, 0.7, 0.8, 0.9	0.8, 0.9, 1, 1	0.6, 0.7, 0.8, 0.9	0.4,0.5,0.6,0.7	0

Attribute $_{TP}C_1$ is ON:

$A^{(1)}$ = (1 0 0 0 0 0 0 0 0 0 0)

$A^{(1)}Tp(M)_{weight}$= ((0, (0.6, 0.7, 0.8,), (0.8,0.9,1,1), (0.6,07,0.8,0.9), (0.6,0.7,0.8,0.9), (0.6,0.7,0.8,0.9),(0.6,0.7,0.8,0.9), (0.6,0.7,0.8,0.9),(0.6,0.7,0.8,0.9)(0.6,0.7,0.8,0.9),(0.6,0.7,0.8,0.9))

$A^{(1)}Tp(M)_{Average}$= (0, 0.75, 0.925, 0.75, 0.75, 0.75,0.75,0.75,0.75,0.75,0.75)

$A^{(1)}Tp(M)_{Max(Weight)}$= (0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0) = $A_1^{(1)}$

$A_1^{(1)}Tp(M)_{Average}$ = (0.75, 0.75, 0, 0.925, 0.55, 0.75, 0.75,0.75, 0.75,0.75,.075)

$A_1^{(1)}Tp(M)_{Max(Weight)}$= (0, 0, 0, 1, 0, 0, 0, 0, 0, 0) = $A_2^{(1)}$

$A_2^{(1)}Tp(M)_{Average}$ = (0.6937, 0.6937, 0, 0.85562, 0.50875, 0.6937, 0.6937, 0.6937,0.50875,0.6937,0.6937)

$A_2^{(1)}Tp(M)_{Max(Weight)}$ = (0, 0, 1, 0, 0, 0, 0,0, 0, 0) = $A_3^{(1)}$

$A_3^{(1)}Tp(M)_{Average}$ = (0.64125,0.12825,0.79087,0,0.47025,0.64125,0.64125,0.64125,0.47025,0.64125,0.64125)

$A_3^{(1)}Tp(M)_{Max(Weight)}$ = (0, 0, 1, 0, 0, 0, 0,0, 0, 0, 0) = $A_4^{(1)}$

$A_2^{(1)} = A_4^{(1)}$

Attribute $_{TP}C_2$ is ON:

$A^{(2)}$ = (0 1 0 0 0 0 0 0 0 0 0)

$A^{(2)}Tp(M)_{weight}$ = ((0.6, 0.7,0.8,0.9), 0, (0.4, 0.5, 0.6, 0.7) , (0.4, 0.5, 0.6, 0.7),(0.8,0.9,1,1),((0.6, 0.7,0.8,0.9),((0.6, 0.7,0.8,0.9) (0.6, 0.7,0.8,0.9),(0.6, 0.7,0.8,0.9),(0.2,0.3,0.4,0.5),(0.4, 0.5, 0.6, 0.7))

$A^{(2)}Tp(M)_{Average}$ =(0.75, 0, 0.55, 0.55, 0.925,0.75,0.75,0.75, 0.75, 0.35,0.55)

$A^{(2)}Tp(M)_{Max(weight)}$ =(0, 0, 0, 0, 1, 0, 0, 0, 0, 0,0) = $A_1^{(2)}$

$A_1^{(2)}Tp(M)_{Average}$ =(0.75, 0.75,0.55,0.75,0,0.75,0.925,0.75,0.55,0.75,0.75)

$A_1^{(2)}Tp(M)_{Max(weight)}$=(0, 0, 0, 0, 0, 0, 1,0, 0,0, 0) = $A_2^{(2)}$

$A_2^{(2)}Tp(M)_{Average}$ =(0.47025,0.4725,0.69375,0.4725,0.4725,0.4725,0.6375,0,0790875,0.29925,0.69375,0.4725)

$A_2^{(2)}Tp(M)_{Max(weight)}$ = (0, 0, 0, 0, 0, 0,0,1, 0,0, 0) = $A_3^{(2)}$

$A_3^{(2)}Tp(M)_{Average}$ =(0.59315, 0.73155,0.593155,0.43498,0.59315,0.59315, 0.59315, 0, 0.276806,0.43498, 0.43498)

$A_3^{(2)}Tp(M)_{Max(weight)}$ = (0, 1, 0, 0, 0, 0, 0,0,0, 0, 0) = $A_4^{(2)}$

$A_3^{(2)}Tp(M)_{Average}$ =(0.54866, 0, 040223, 040223, 0.67668, 0.54866, 0.54866,0.54866, 0.54866, 0.25604, 0.40235)

$A_3^{(2)}TP(M)_{Max(weight)}$=(0,0,0,0,1,0,0,0,0,0,0) = $A_5^{(2)}$

$A^{(2)}= A_5^{(}$

Attribute $_{TP}C_3$ is ON:

$A^{(3)}$ = (0 0 1 0 0 0 0 0 0 0 0)

$A^{(3)}Tp(M)_{weight}$= ((0.6, 0.7, 0.8, 0.9), (0.6, 0.7, 0.8, 0.9), 0, (0.8 0.9,1,1), (0.4, 0.5, 0.6, 0.7), (0.6, 0.7, 0.8, 0.9), (0.6, 0.7, 0.8, 0.9), (0.6, 0.7, 0.8, 0.9), (0.4, 0.5, 0.6, 0.7), (0.6, 0.7, 0.8, 0.9), (0.6, 0.7, 0.8, 0.9))

$A^{(3)}Tp(M)_{Average}$ =(0.75, 0.75, 0, 0.925, 0.55, 0.75, 0.75,0.75, 0.55, 0.75, 0.75)

$A^{(3)}Tp(M)_{Max(weight)}$ = (0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0) = $A_1^{(3)}$

$A_1^{(3)}Tp(M)_{Average}$ =(0.75, 0.15, 0.925, 0, 0.55, 0.75, 0.75, 0.75, 0.55, 0.75, 0.75)

$A_1^{(3)}Tp(M)_{Max(weight)}$ = (0, 0, 1, 0, 0, 0,0, 0,0, 0, 0) = $A_2^{(3)}$

$A_2^{(3)}Tp(M)_{Average}$ =(0.69375, 0.13875, 0.855, 0, 0.50875, 069375, 0.69375, 0.9375, 0.50875, 0.69375, 0.69375)

$A_2^{(3)}Tp(M)_{Max(weight)}$ = (0, 0, 0, 0, 0, 0,0,0, 1,0) = $A_3^{(3)}$

$A_3^{(3)}Tp(M)_{Average}$ =(0.4396, 0.4396, 0.1884, 1.2562, 1.1619, 0.4396, 1.1619, 0.9421, 0, 0.1884)

$A_3^{(3)}Tp(M)_{Max(weight)}$ = (0, 0, 0, 1,0, 0, 0,0,0, 0) = $A_4^{(3)}$

$A_4^{(3)}Tp(M)_{Average}$ =(0.1884, 0.1884, 0.1884, 0, 1.1619, 1.1619, 1.2562, 1.1619, 0.9421, 0.4396)

$A_4^{(3)}Tp(M)_{Max(weight)}$ = (0, 0, 1, 0, 0, 0,0,0,0, 0, 0) = $A_5^{(3)}$

$A^{(3)} = A_5^{(3)}$

Do the process for the remaining attributes

Table 1: Weightage of the attributes

Attributes	TpC_1	TpC_2	TpC_3	TpC_4	TpC_5	TpC_6	TpC_7	TpC_8	TpC_9	TpC_{10}	TpC_{11}
(1 0 0 0 0 0 0 0 0 0 0)	0.64125	0.12825	0.79087	0	0.47025	0.64125	0.64125	0.64125	0.47025	0.64125	0.64125
(0 1 0 0 0 0 0 0 0 0 0)	0.54866	0	0.40235	0.40235	0.67668	0.54866	0.54866	0.54866	0.54866	0.25604	0.40235
(0 0 1 0 0 0 0	0.641	0.641	0	0.790	0.470	0.641	0.641	0.641	0.470	0.641	0.6412

0 0 0 0)	25	25		875	25	25	25	25	25	25	5
(0 0 0 1 0 0 0 0 0 0 0)	0.641 25	0.128 25	0.790 875	0	0.470 25	0.641 25	0.641 25	0.641 25	0.470 25	0.641 25	0.6412 5
(0 0 0 1 0 0 0 0 0 0 0)	0.593 15	0.593 15	0.434 98	0.593 15	0	0.593 15	0.731 55	0.593 15	0.434 98	0.593 15	0.5931 5
(0 0 0 0 0 1 0 0 0 0 0)	0.402 35	0.402 35	0.548 66	0.402 35	0.402 35	0.548 66	0	0.676 68	0.256 04	0.548 66	0.4023 5
(0 0 0 0 0 0 1 0 0 0 0)	0.402 35	0.402 35	0.548 66	0.402 35	0.402 35	0.548 66	0	0.676 69	0.256 04	0.548 66	0.4023 5
(0 0 0 0 0 0 0 1 0 0)	0.548 66	0.676 68	0.548 66	0.402 35	0.548 66	0.548 66	0.548 66	0	0.256 04	0.402 35	0.4023 5
(0 0 0 0 0 0 0 0 1 0 0)	0.402 35	0.402 35	0.548 66	0.402 35	0.402 35	0.548 66	0	0.676 69	0.256 04	0.548 66	0.5486 6
(0 0 0 0 0 0 0 0 0 1 0)	0.402 35	0.402 35	0.548 66	0.402 35	0.402 35	0.548 66	0	0.676 69	0.256 04	0.548 66	0.4023 57
(0 0 0 0 0 0 0 0 0 0 1)	0.402 35	0.402 35	0.548 66	0.402 35	0.402 35	0.548 66	0	0.676 69	0.256 04	0.548 66	0.4023 57
Total Weight	5.972 25	4.179 33	5.711 03	4.200 42	4.647 84	6.358 42	3.762 62	4.949 29	3.930 63	5.918 59	5.4796 6
Total Average Weight	0.508 8	0.379 93	0.519 18	0.381 85	0.422 53	0.578 039	0.341 148	0.449 93	0.357 33	0.538 05	0.4981 5

V. CONCLUSION

Using new fuzzy model trapezoidal fuzzy cognitive maps TpFCM gives the ranking for the Impact of Different Promotional Strategies in Film industry by using Trapezoidal Fuzzy Cognitive Maps(Tp FCM) are 1.Trailers in televisions and movie theatres, 2.Paid advertisements in newspapers and magazines,3. E-mail marketing,4.Online Advertisements,5. Promotional tours and interviews, 6. Collaboration with retail products for promoting the movie, 7.Direct Mail,8. Social Media, 9.Online Advertisements,10. Free movie tickets,11. SMS marketing. When we apply the FCM above causes are ON stage. But this new model gives the ranking of causes of the problems. This is the main objective of the trapezoidal Fuzzy Cognitive maps Tp FCM.

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