A Solution for the misery of people in Tanzania

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Abstract— The Imperative reasons for misery of people in Tanzania using combined overlap block fuzzy cognitive maps(COBFCMS) defined by W.B Vasantha kandaswamy is analyzed in this paper. The combined overlap block FCM's defined in this method become effective when the number of concepts can be grouped and are large in numbers. In this paper we analyzed the problem and are large in number. In this paper we analyzed the problem and find out the major reasons for misery of people in Tanzania. This paper has six sections, first section gives the information about development of fuzzy cognitive maps, second section gives preliminaries of fuzzy cognitive maps, and combined overlap block fuzzy cognitive maps, in section three we explain about the reasons why the people in Tanzania having life misery, in section four we explain the method of determining their hidden pattern, in section five, we give the concept of the problem, final section gives the conclusion based on our studies.

Index Terms— FCMS, CBFCMS, Misery.

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1 INTRODUCTION

Political scientist R.Axelrod[1] introduced cognitive maps for representing social scientific knowledge and describing the methods that are used for decision making in social and political systems. Then B. Kosko[2,3,4] 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 and human experience, introduce concept to represent the essential elements and cause the effect relationships among the concepts to model the behavior of any system. It is a very convenient, simple and powerful tool, which is used in numerous fields such as social economic and medical etc. the purpose of study is to identify risk groups, poverty has various manifestations including lack of income and productive resource sufficient to ensure sustainable livelihoods, hunger and malnutrition ,ill health ,limited or lack of access to education and other basic services, increased unsafe environments and social discrimination. Moreover the data is an unsupervised one and also there is uncertainity in the concepts.

Hence fuzzy tools alone has the capacity to analyze these concepts. Hence it is chosen here.

2 PRELIMINARIES

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Fuzzy cognitive maps (FCMs) are more applicable when the

data in the first place is an unsupervised one. The FCMs work on the opinion of experts. FCMs model the worlds as a collection of classes and causal relation between classes.

Definition 2.1: An FCM is a directed graph with concepts like policies, events etc. As nodes and causalities as edges. It represents causal relationship between concepts.

Definition 2.2: When the nodes of the FCM are fuzzy sets then they are called as fuzzy nodes.

Definition 2.3: FCMs with edge weights or causalities from the set {-1,0,1} are simple

Definition 2.4: The edges e_{ij} take values in the fuzzy causal interval [-1,1]. $e_{ij} = 0$ indicates no causality $e_{ij} > 0$ indicates causal increase C_j increases as C_i increases (Or C_j Decreases as C_i Decreases). E <0 indicates causal decrease or negative causality. C Decreases as C increases (And or C_j Increases as C_i Decreases). Simple FCMs have edge values in {-1,0,1}. Then if causality occurs, It occurs to a maximal positive or negative degree. Simple FCMs provide a quick first approximation to an expert stand or printed causal knowledge. If increase (Or decrease) in one concept leads to increase(or decrease) in another, Then we give the value 1.If there exists to relation between the two concepts, The value 0 is given. If increase (or decrease) in one concept decreases(or increases) another, then we give the value -1. Thus FCMs are described in this way. Consider the or concepts C_1, ,…, C_n Of the FCM. Suppose the directed graph is drawn using edge weight $e_{ij} \varepsilon$ {0,1,-1}. The matrix E be defined by E= (e_{ij}), Where the e_{ij} is the weight of the directed edge C_i, c_j. E is called the adjacency matrix of the FCM, also known as the connection matrix of the FCM. It is important to note that all matrices associated with an FCM are always square matrices with diagonal entries as zero.

Definiton 2.5: Let C_1 , c_2,…. C_n be the nodes of an FCM. Let A=(a_1, a_2 ,…., a_n). Where $a_i \varepsilon$ {0,1}. A is called the instantaneous state vector and it denoted the on off position of the node at

an instant

$a_i = 0$ if a_i is off=1

$a_i = 1$ if a_i is on, where i=1,2,…,n.

Definition 2.6: Let $C_1, C_2, ……, C_n$ be the nodes of an FCM. Let $C_1 C_2, C_2 C_3,…, C_i C_j$, be the edges of the FCM (i≠j). Then, the edges form a directed cycle. An FCM s said to be cyclic if it possesses a directed cycle. An FCM is said to be a cyclic if it does not possess any directed cycle.

Definition 2.7: An FCM with cycles is said to have a feedback.

Definition 2.8: Where there is a feedback in an FCM, i.e., When the causal relations flow through a cycle in a revolutionary way, The FCM is called a dynamical system.

Definition 2.9: Let $C_1 C_2, C_2 C_3,…, C_i C_j$, be a cycle when C_i is switched on and if the causality flows through the edges of a cycle and if it again causes C_i, We say that the dynamical system goes round and round. This is true for any node C_i, for i=1,2,…,n. The equilibrium state for this dynamical system is called the hidden pattern.

Definition 2.10: If the equilibrium state of a dynamical system is a unique state vector, Then it is called a fixed point. Consider a FCM with $C_1, C_2,…, C_N$ as nodes. For example let us start the dynamical system by switching on C. Let us assume that the FCM settles down with C_1 and C_n on, i.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 2.11: If the FCM settles down with a state vector repeating in the form $A_1 \rightarrow A_2 \rightarrow … A_I \rightarrow A_1$. Then this equilibrium is called limit cycle.

Definition2.12: Finite number of FCMs can be combined together to produce the joint effect of all the FCMs. Let $E_1, E_2 ,…, E_P$ be adjacency matrices of the FCMs with nodes $C_1, C_2 ,…, C_n$. Then the combined FCM[5,6,7] is got by adding all the adjacency matrices $E_1 ,…, E_P$. We denote the combined FCM adjacency matrix by $E = E_1 + E_2 + … + E_P$

Definition: 2.13: Let P be the problem under investigation. Let $\{C_1, C_2,…, C_n\}$ be n concepts associated with p(n very large). Now divide the number of concepts $\{C_1, C_2,…, C_n\}$ into classes $S_1 ,…, S_t$ where classes are such that

(1) $S_i \cap S_{i+1} \neq \Phi$ where (i=1,2,…,t-1)
(2) $\cup s_i = (c_{1,…………}c_n)$
(3) $(s_i) \neq s_j$ if i≠j in general

Now we obtain the FCM associated with each of the classes $S_1 ,…, S_t$. We determine the relational matrix associated with each S. Using theses matrices we obtain a nxn matrix. This n x n matrix is the matrix associated with the combined overlap block FCM(COBFCM) of blacks of same sizes.

Definition 2.14: Suppose A= $(a_1 ,…, a_n)$ is a vector which is passed into a dynamical system E. Then AE=)$a'_1,…,a'_n$). After thresholding and updating the vectors suppose we get $(b_1 ,…, b_n)$. We denote that by $(a'_1 , a'_2 ,…, a'_n) \rightarrow (b_1, b_2 ,…, b_n)$. Thus the symbol→ means that the resultant vector has been thresholded and updated. FCMs have several advantages as well as some disadvantages. The main advantage of this method it is simple. It functions on experts opinion's. when the data happens to be an unsupervised one the FCM comes handy. This is the only known fuzzy technique that gives the hidden pattern of the situation. As we have a very well known theory, which states that the strength of the data depends on the number of experts opinions we can use combined FCMs with several experts opinions. At the same time the disadvantage of the combined FCM is when the weightages are 1 and -1 for the same $C_i C_j$. We have the sum adding to zero thus at all times the connection matrices $E_1 ,…, E_k$ may not be comfortable for addition. This problem will be easily overcome if the FCM entries are only 0 and 1.

3 REASONS FOR MISERY OF PEOPLE IN TANZANIA

1) Poverty in Tanzania
Poverty has various manifestations including lack of income and productive resource sufficient to ensure sustainable livelihoods, hunger and malnutrition, ill health, limited or lack of access to education and other basic services, increased unsafe environments and social discrimination.

Status of poverty in Tanzania

(a) Largely a rural phenomenon

(b) A factor of subsistence agriculture where the poor are concentrated

(c) Also widespread and increasing in urban communities

(d) Afflicting more intensely the youth , the elderly and persons in large households

(e) Non income poverty is a function of access to livelihood enhancing factors including education, survival of infants, nutrition, clean and safe drinking water, social wellbeing and vulnerability to disease

(2) Crime in Tanzania
   (a) Robbery, armed robberies and burglaries at times resulting in loss of life.

   (b) Mugging ,neck-lacing of muggers, assaults, violence against women and children

(c) Manufacture, consumption and sell of illicit liquor "gongo" and crimes associated with alcoholism

(d) Riot and unrest

(e) Embezzlement of public funds ,corruption and bribery

(f) Traffic offences including fatal accidents

Watchtower Bible society states

> "the poor cannot sleep at night because they are hungry ,the rich cannot sleep because the poor are awake, when there is no more social injustice that breed crime, no more haves and have-nots, then there will be no more assassinations, poison gas attacks ,or terrorists bombs."

(3) Health problems in tanzania
   (a) Medical facilities are limited and medicines sometimes unavailable, even in capital city .
   (b) cholera is prevalent in many areas of Tanzania,and several strains of malaria are endemic .
   (c) The HIV infection rate in the population is around seven percent and is even more prevalent among prostitutes and their clients.
   (d) East Africa   trypanosomiasis (sleeping sickness)is carried by the tsetse fly, which is endemic to the northern safari circuit of Tanzania

(4) Drought
Types:
Meteorological, Hydrological, Agricultural and Socioeconomic

Meteorological Drought

Meteorological drought is the amount of dryness and the duration of the dry period. Atmospheric conditions that result in deficiencies of precipitation change from area to area.

Agricultural Drought

Agricultural drought mainly effects food production and farming. Agricultural drought and precipitation shortages bring soil water deficits, reduced ground water or reservoir levels, and so on. More of these effects can be listed by clicking here. Deficient topsoil moisture at planting may stop germination, leading to low plant populations.

Hydrological Drought

Hydrological drought is associated with the effects of periods of precipitation shortages on water supply. Water in hydrologic storage systems such as reservoirs and rivers are often used for multiple purposes such as flood control, irrigation, recreation, navigation, hydropower, and wildlife habitat. Competition for water in these storage systems escalates during drought and conflicts between water users increase significantly.

Socioeconomic Drought

Socioeconomic drought occurs when the demand for an economic good exceeds supply as a result of a weather-related shortfall in water supply. The supply of many economic goods, such as water, forage, food grains, fish, and hydroelectric power, depends on weather. Due to variability of climate, water supply is sufficient in some years but not satisfactory to meet human and environmental needs in other years. The demand for economic goods is increasing as a result of increasing population. Supply may also increase because of improved production efficiency and technology.

(5)Underdeveloped

Internal causes of underdevelopment

A historical perspective is essential in order to understand why tanzania have failed to take part in the international economic development we have seen in this era of globalisation. we must bear in mind that we are employing one specific standard, namely economic growth, which is different from painting a full and balanced picture of the continent's history and culture. Most of the issues dealt with here are the subject of considerable debate, but a fuller account of them is beyond the scope of an article of this kind. The culture of corruption in some Tanzania, saying that those who wanted to start a business or gets a job there "still have to pay a bribe".

But the main reason for the weak development of tanzania after independence is the failure of the state. The "development state", based on a state-controlled economy with a high level of protectionism took on a particular and unfortunate form in Africa. In reality, these countries became what Frederick Cooper has called "gatekeeper states" – states that acquired most of their revenue from customs duties, concessions to foreign companies, visas, foreign exchange control, and foreign aid. In many ways, this built upon the legacy of the colonial period and the slave trade.

6. Government indifference

(a) Accountable governance at local level
(b) Key policy documents, plans and legislation
(c) Annual Accounts and information on local revenues.
(d) Treasury and other government notifications.
(e) Routine budget and expenditure statements.
(f) Routine approval implementation statements.
(g) Financial regulations and government circulars
(h) National budgets and treasury disbursement reports
(i) Approved District, Ward and Village plans and budgets
(j) Financial statements, narrative reports and audit reports.

7. Environmental problem

(a) Loss of wildlife habitats and biodiversity

(b) Deforestation

(c) Land degradation

(d) Deterioration of aquatic systems

(e) lack of accessible, good quality water

(f) environmentally pollution.

8. Infrastructure

(a) road maintenance is poor

(b) operating the internal railway network is poor

(c) technology is under developed
(d) The power sector poses Tanzania's most serious infrastructure challenge.
(e) The port of Dar es Salaam suffers constraints caused by high traffic and poor backward linkages with transport networks.
(f) Poor access to safe water is another challenge, exacerbated by poor budget execution in the sector.

9. Illteracy
(a) The quality of education at all levels was far from being satisfactory
(b) The education system is characterized by poor internal efficiency due to high wastage rates.
(c) The school curriculum have problems of relevance and appropriateness.
(d) The education sector is under funded

10. Lack of globalization
(a) static thinking ,limited to the experiences and the knowledge of the owner
(b) Risk to focus too much on existing basis of business
(c) Low willingness to introduce more sophisticated

structure
(d) Limited resources(manpower)
(e) Lack of international experienced employee
(f) Limited funds to finance investments and initial operating losses for new activates.

11. Poor salary

(a) Workers without marketable skills may face low wages.

(b) potential economic exploitation

(c) unpleasant working conditions, and few opportunities to attain skills that would allow them to escape their personal and economic situations.

(d) Unexpected costs (such as medical or repair costs)

4 METHOD OF DETERMINING HIDDEN PATTERN

Let C_1, C_2,…, C_n be the nodes of an FCM, With feedback. Let E be the associated adjacency matrix. Let us find the hidden pattern when C_1 is switched on. When an input is given as the vector A_1= (1, 0, 0, …, 0), the data should pass through the relation matrix E. this is done by multiplying A_1 by the matrix E. Let A_1 E= (a_1 ,…., a_n)with the threshold operation that is by replacing a_i by 1 if a_i >k and a_i by 0 if a_i <k (k is a suitable positive integer). We update the resulting concept, The concept C_1 is included in the updated vector by making the first coordinate as 1 in the resulting vector. Suppose A_1 E $\rightarrow$ A_2 then consider A_2 E and repeat the same procedure. This procedure is repeated till we get a limit cycle or a fixed point.

5 CONCEPT OF THE PROBLEM

Using the linguistic questionnaire and the expert's opinion we have taken the following eleven concepts $\{C_1, C_2,...,C_{11}\}$

C_1 = Poverty

C_2 = Crime

C_3 = Health

C_4 = Drought

C_5 = Under development

C_6 = Government in difference

C_7 = Environmental

C_8 = Infrastructure

C_9 = illiteracy

C_{10} = lack of globalization

C_{11} = poor salary

Now we proceed on to apply the effect of combined overlap block. FCM of equal length. Let us consider the eleven concepts $\{C_1, C_2, ..., C_{11}\}$. We divide these concepts into cyclic way of classes, each having just four concepts in the following way.

The directed graph and the relation matrix for the class C = $\{C_1, C_2, C_3, C_7\}$. the expert opinion of an expateriot of Tanzania is given as follows:
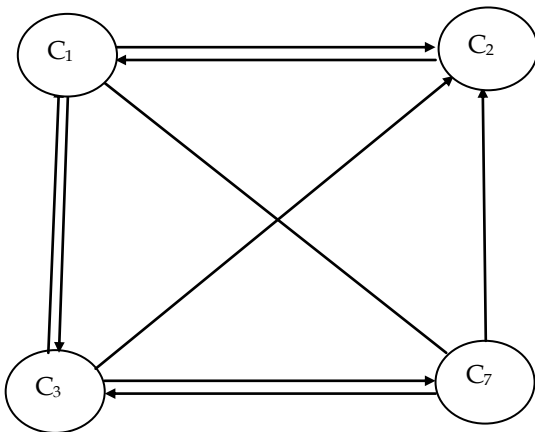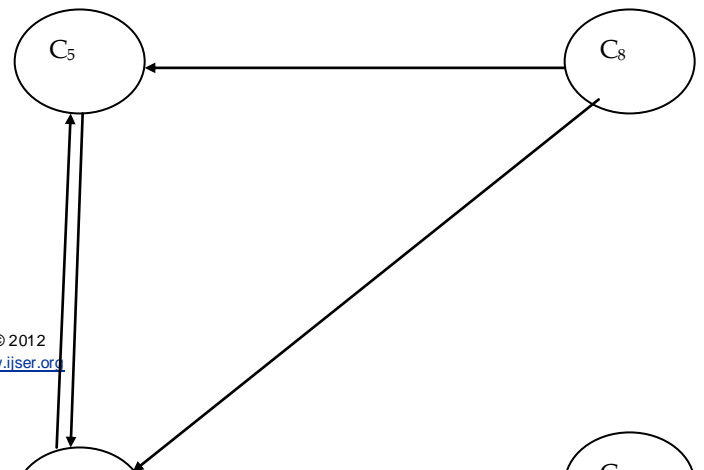

	C_1	C_2	C_3	C_7
C_1	0	1	1	0
C_2	1	0	0	0
C_3	1	1	0	1
C_7	1	1	1	0

The directed graph and the relational matrix for the class C = $\{ C_1, C_6, C_9, C_{11} \}$. Given by the expert is as follows: (Religious NGO)
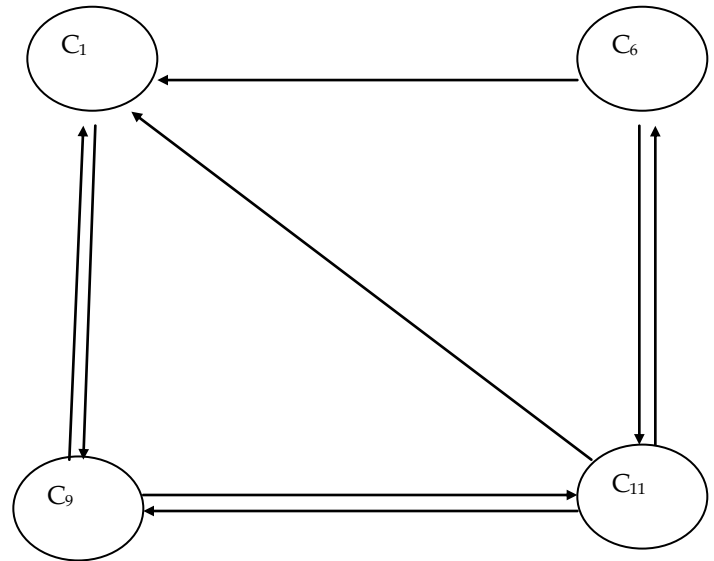
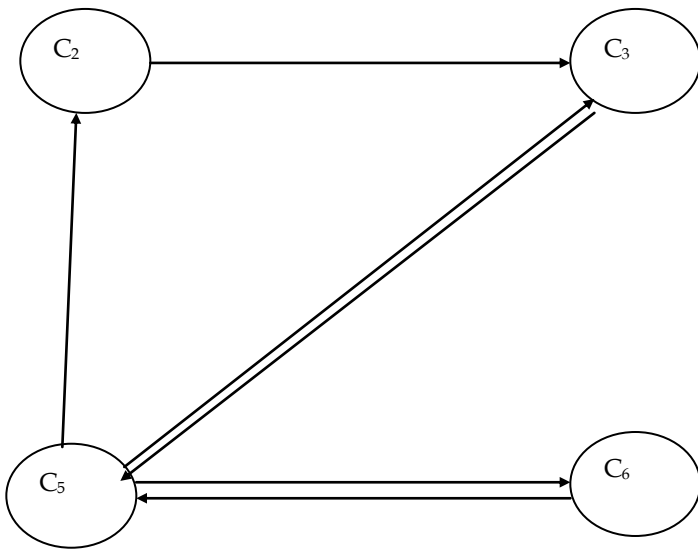|	C_1	C_6	C_9	C_{11}
C_1	0	0	1	0
C_6	1	0	1	1
C_9	1	0	0	1
C_{11}	1	1	1	0

The directed graph and the relational matrix for the class C = $\{C_5, C_8, C_9, C_{10}\}$. Given by the expert is as follows: Faculty of university
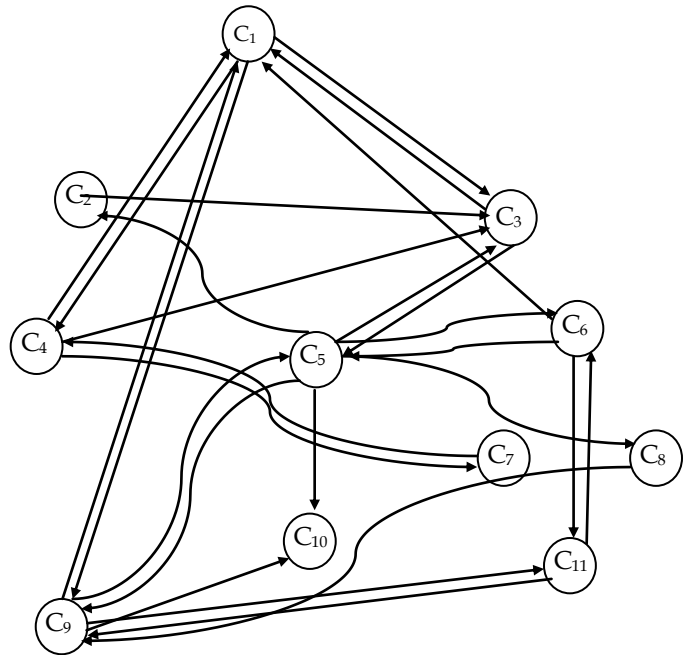
The combined direct graph and combined overlap block FCM of equal sizes as follows:

$$
\begin{array}{c}
\quad\quad C_5 \quad C_8 \quad C_9 \quad C_{10} \\
\begin{array}{c} C_5 \\ C_8 \\ C_9 \\ C_{10} \end{array}
\left[
\begin{array}{cccc}
0 & 1 & 1 & 1 \\
0 & 0 & 1 & 1 \\
1 & 0 & 0 & 1 \\
0 & 1 & 0 & 0
\end{array}
\right]
\end{array}
$$

The directed graph and the relation matrix for the class $C = \{C_2, C_3, C_5, C_6\}$ Given by the expert is as follows: a politician

$$
\begin{array}{c}
\quad\quad C_2 \quad C_3 \quad C_5 \quad C_6 \\
\begin{array}{c} C_2 \\ C_3 \\ C_5 \\ C_6 \end{array}
\left[
\begin{array}{cccc}
0 & 1 & 0 & 0 \\
0 & 0 & 1 & 0 \\
1 & 1 & 0 & 1 \\
1 & 0 & 1 & 0
\end{array}
\right]
\end{array}
$$

$$
C(m)
\begin{array}{c}
\begin{array}{cccccccccccc}
\ C_1 & C_2 & C_3 & C_4 & C_5 & C_6 & C_7 & C_8 & C_9 & C_{10} & C_{11}
\end{array} \\
\begin{array}{c} C_1 \\ C_2 \\ C_3 \\ C_4 \\ C_5 \\ C_6 \\ C_7 \\ C_8 \\ C_9 \\ C_{10} \\ C_{11} \end{array}
\left[
\begin{array}{ccccccccccc}
0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\
0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
1 & 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\
0 & 1 & 1 & 0 & 0 & 1 & 0 & 1 & 1 & 1 & 0 \\
1 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 & 1 \\
1 & 0 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 \\
1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 & 0 \\
1 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0
\end{array}
\right]
\end{array}
$$

Now using the matrix A of the combined overlap block FCM, We determine the hidden pattern. Suppose the concept S_1 is in

the on state and another nodes are in the off sate. Let the initial input vector be X={1 0 0 0 0 0 0 0 0 0 0}

X C(m) = {0 0 1 1 0 0 0 0 1 0 0} =X1
X1 C(m) = {0 0 1 1 0 0 0 0 1 0 0} =X2
X2 C(m) = {3 0 1 0 2 0 1 0 0 1 1} $\rightarrow$ (1 0 1 0 1 0 1 0 0 1 1)=X3
X3 C(m) = {3 1 3 1 1 2 0 2 3 1 0} $\rightarrow$ (1 1 1 1 1 1 0 1 1 1 0)=X4
X4 C(m) = {4 2 4 1 3 1 1 2 4 3 2} $\rightarrow$ {1 1 1 1 1 1 1 1 1 1 1}.
X4 C(m) = {1 1 1 1 1 1 1 1 1 1 1}=X4

Where $\rightarrow$ Denotes the resultant vector after thresholding and updating.

X4 is the hidden pattern which is the fixed point.

CONCLUSION

While analyzing FCM, When the concept C_1 "poverty is in the on state, the other concepts C_2, C_3, C_4, C_5, C_6, C_7, C_8, C_9, C_{10} are in the on state, because of poverty there will be crime, health problem, drought, underdevelopment , government indifference, environmental, infrastructure, illiteracy, lack of globalization, poor salary, Therefore poverty is the major reason for people in Tanzania(east Africa).

SUGGESTIONS:

Building strong member controlled cooperatives.
Promoting good leadership in the cooperatives
Promoting strong and effective cooperative development support institutions.
Improving cooperative education and training.
Achieving the target of accelerated growth will require significant efforts to enhance productivity and increase investment in both human and physical capital.
Increase investment in human capabilities requiring measures to increase the incentives and returns for undertaking such investments, and increased public support in areas where externalities are large i.e.primary education and health care.

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