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A STUDY ON THE IMPACT OF MOBILE USAGE AMONG YOUNGSTERS IN CUDDALORE DISTRICT OF TAMIL NADU USING NEUTROSOPHIC COGNITIVE MAPS (NCM)

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ABSTRACT

In this paper we have analyzed the impact of mobile usage among youngsters in Cuddalore District of Tamil Nadu and found it's solution using Neutrosophic Cognitive Maps(NCMs) which is the generalization of Fuzzy Cognitive Maps(FCMs).

Keywords: Fuzzy Cognitive Maps (FCMs), Neutrosophic Cognitive Maps(NCMs).

INTRODUCTION

In this paper we are going to study Neutrosophic Cognitive Maps (NCMs). In 1965 L.A. zadeh has inserted a model of mathematical. That is called Fuzzy Cognitive Maps. Nowadays the usage of mobile phone among youngsters is very high. In this manner we come to know that the behavior of the youngsters becomes silly with human beings. Impact on self characteristics is also shown under loss of their valuable time which will not be revised, loss of costly energy by youngsters, poor standard in studies, adamant character becomes habit that no one without a mobile phone, the friendship characteristics become mostly bad through mobile phone, because of the mobile phone's intercity in time spending loneliness, inability to sleep by phone calls.

PRELIMINARIES

Definition 1.1.1 Neutrosophic adjacency matrix

Let C_1, C_2, \dots, C_n be nodes of a NCM. Let $N(E)$ be defined as $N(E) = (e_{ij})$ where e_{ij} is the weight of the directed edge $C_i C_j$, where $e_{ij} \in \{-1, 0, 1, I\}$. $N(E)$ is called the neutrosophic adjacency matrix.

Definition 1.1.2 Instantaneous state neutrosophic vector

Let C_1, C_2, \dots, C_n be the nodes of an NCM. $A = (a_1, a_2, \dots, a_n)$ where $a_i \in \{0, 1, I\}$. A is called the instantaneous state neutrosophic vector and it denotes the on-off-indeterminate state position of the node at an instant.

$a_i = 0$ if a_i is off (no effect)

$a_i = 1$ if a_i is on (has effect)

$a_i = I$ if a_i is indeterminate (effect cannot be determined) for $i = 1, 2, \dots, n$

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Definition 1.1.3 Limit Cycle

If the NCM settles with a neutrosophic state vector repeating in the form $A_1 \rightarrow A_2 \rightarrow \dots \rightarrow A_1 \rightarrow A_1$ then this equilibrium is called a limit cycle of the NCM.

Definition 1.1.4 Combined NCMs adjacency neutrosophic matrix

Finite number of NCMs can be combined together to produce the point effect of all the NCMs. If $N(E_1), N(E_2), \dots, N(E_p)$ be the neutrosophic adjacency matrices of a NCM with nodes C_1, C_2, \dots, C_n then the combined NCM is got by adding all the neutrosophic adjacency matrices $N(E_1), N(E_2), \dots, N(E_p)$. We denote the combined NCMs adjacency neutrosophic matrix by $N(E) = N(E_1) + N(E_2) + \dots + N(E_p)$.

CONCEPT OF THE PROBLEM

Main is an attempt to assess the impact of mobile usage among youngsters in cuddalore. For that, using linguistic questionnaire and the expert's opinion we have taken the following six concepts $\{M_1, M_2, \dots, M_6\}$.

The following concepts are taken as the main nodes of our problem.

- M_1 - Loss of time and energy.
- M_2 - Bad impact on studies
- M_3 - Adamant character
- M_4 - Characterless friendship
- M_5 - Loneliness feeling
- M_6 - Insomnia (Inability to sleep)

Now we draw the directed graph with neutrosophic graph of two experts in the following Figure 1 and Figure 2.

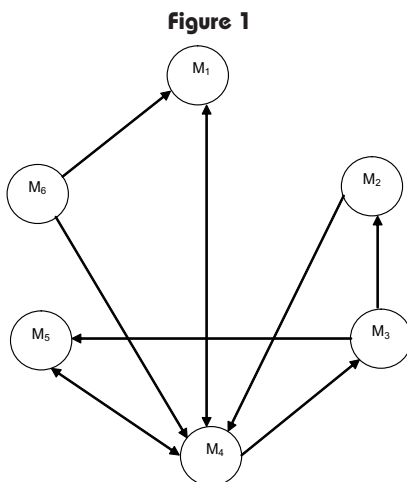


Figure 1 gives the directed graph with M_1, M_2, \dots, M_6 as nodes and

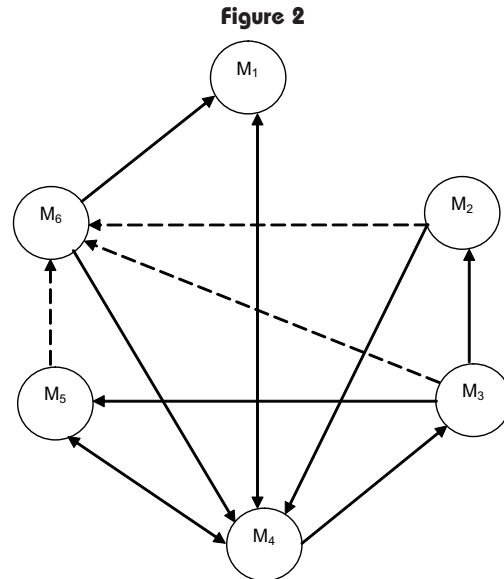
Figure 2 is also gives M_1, M_2, \dots, M_6 as nodes and neutrosophic directed graph.

The connection matrix E related to the graph in figure 1 is given below

$$E = \begin{bmatrix} 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 1 & 0 & 0 \end{bmatrix}$$

According to this adroit no connection however exists between adamant character and insomnia (inability to sleep).

Now we can use a different format,



Here the matrix N (E) related to the neutrosophic directed graph is:

$$N(E) = \begin{bmatrix} 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 & 1 & 1 \\ 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 & 1 \\ 1 & 0 & 0 & 1 & 0 & 0 \end{bmatrix}$$

Suppose let us take the state vector

$$A_1 = (1 \ 0 \ 0 \ 0 \ 0 \ 0)$$

The effect on E and N (E).

$$A_1 E = (0 \ 0 \ 0 \ 1 \ 0 \ 0) \mapsto A_2$$

$$\begin{aligned}
 A_2E &= (1 \ 0 \ 1 \ 0 \ 1 \ 0) \\
 &\hookrightarrow (1 \ 0 \ 1 \ 0 \ 1 \ 0) = A_3 \\
 A_3E &= (0 \ 1 \ 0 \ 2 \ 1 \ 0) \\
 &\hookrightarrow (0 \ 1 \ 0 \ 1 \ 1 \ 0) = A_4 \\
 A_4E &= (1 \ 0 \ 1 \ 2 \ 1 \ 0) \\
 &\hookrightarrow (1 \ 0 \ 1 \ 1 \ 1 \ 0) = A_5 \\
 A_5E &= (1 \ 1 \ 1 \ 2 \ 2 \ 0) \\
 &\hookrightarrow (1 \ 1 \ 1 \ 1 \ 1 \ 0) = A_6 \\
 A_6E &= (1 \ 1 \ 1 \ 3 \ 2 \ 0) \\
 &\hookrightarrow (1 \ 1 \ 1 \ 1 \ 1 \ 0) = A_7 = A_6
 \end{aligned}$$

Thus the impact of mobile usage among youngsters increases loss of time and energy, Bad impact on studies, Adamant character, Characterless friendship, Loneliness feeling.

We can find the effect of $A_1 = (1 \ 0 \ 0 \ 0 \ 0 \ 0)$ on $N(E)$.

$$\begin{aligned}
 A_1 N(E) &= (0 \ 0 \ 0 \ 1 \ 0 \ 0) \hookrightarrow A_2 \\
 A_2 N(E) &= (1 \ 0 \ 1 \ 0 \ 1 \ 0) \\
 &\hookrightarrow (1 \ 0 \ 1 \ 0 \ 1 \ 0) = A_3 \\
 A_3 N(E) &= (0 \ 1 \ 0 \ 2 \ 1 \ 2I) \\
 &\hookrightarrow (0 \ 1 \ 0 \ 1 \ 1 \ I) = A_4 \\
 A_4 N(E) &= (1+I \ 0 \ 1 \ 2+I \ 1 \ 2I) \\
 &\hookrightarrow (1 \ 0 \ 1 \ 1 \ 1 \ I) = A_5 \\
 A_5 N(E) &= (1+I \ 1 \ 1 \ 2+I \ 2 \ 2I) \\
 &\hookrightarrow (1 \ 1 \ 1 \ 1 \ 1 \ I) = A_6 \\
 A_6 N(E) &= (1+I \ 1 \ 1 \ 3+I \ 2 \ 3I) \\
 &\hookrightarrow (1 \ 1 \ 1 \ 1 \ 1 \ I) = A_7 = A_6
 \end{aligned}$$

CONCLUSION

While analyzing FCM and NCM, in FCM the concepts M_6 is in OFF state. The other concepts M_1, M_2, M_3, M_4 and M_5 are ON state. Where as in NCM the concepts M_1, M_2, M_3, M_4 and M_5 are ON state but M_6 is in the indeterminate position.

The FCM gives the result as if there is no effect by loss of time and energy. But the NCM gives the result the effect between them.

1. The result of mobile usage of youngsters is bad impact of low academic performance where comparing with college and school studies.
2. To avoid the usage of mobile phones by more quantity, parents have to take care of their children's and also teachers have to take care of their students.
3. Their should be some limited for sale of mobile for youngsters among mobile model and technology.

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