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A Study on Stress Experienced by Students and Teachers in Professional Courses Using Induced Linked Fuzzy Relational Mapping (ILFRM) Analysis

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Abstract- The students belonging to professional courses are subjected to stress due to personal, environmental and institutional factors. In this education system students became a knowledge box and they fail to value their education. On the other end, the teaching has also become a demanding occupation with undue stress like deadlines to meet, responsibilities to shoulder besides teaching their specialized courses. The paper aims to study the stress levels of both the students and the teachers in professional education using Induced Linked Fuzzy Relational Mapping (ILFRM).

Keywords: Students and teachers stress, Fuzzy cognitive maps, Induced Fuzzy, Hidden pattern.

I. INTRODUCTION

There are 570 engineering colleges in Tamil Nadu as on dec2011, out of which 511 colleges are self-financing colleges. Professional educations have to be the activities of teaching knowledge and professional principles of engineering. Here in this paper, we analyse the stress of both the students and the teachers of engineering colleges using Induced Fuzzy Relational Maps.

Second section deals with the basics that are related to this study. The description and the method of finding the hidden pattern in ILFRM is given in section three and the section four gives the analysis using ILFRM model. In the fifth section we draw the conclusion and some of the remedial measures are given.

II. BASIC DEFINITIONS

We proceed to state the definitions of Linked FRM and the corresponding Induced Fuzzy Relational Maps. In FRMs we divide the very causal associations into two disjoint units, like for example the relation between the teachers(Domain space) and the management(Range space) in the case of stress in professional courses .We denote by D, the nodes $D_1,\ldots,D_n$ of the domain space where D_i

$= \{(x_1,\ldots,x_n)/x_j= 0 \text{ or } 1\}$ for $i = 1,\ldots,n.$

Similarly R, the set of nodes $R_1, \ldots,R_m$ of the range space, where $R_i = \{(x_1,x_2\ldots,x_m)/ x_j = 0 \text{ or } 1\}$ for $i = 1,\ldots,m.$ When $x_i = 1$ or 0 then the node R_i is in the ON state or OFF state respectively.

Definition 2.1

The FRM is a directed graph or a map from D to R with concepts like policies or events etc. as nodes and causalities as edges. It represents causalrelations between spaces D and R.
Let D_i and R_j denote the two nodes of an FRM.The directed edge from D to R denotes the causality ofD on R, called relations. Every edge in the FRM isweighted with a number in the set{0,1}. Let e_{ij} be theweight of the edge D_iR_j,$e_{ij}\in\{0,1\}$The weight of the edge D_iR_j is positive if increasein D_i implies increase in R_j or decrease in D_i impliesdecrease in R_j. That is, causality of D_i on R_j is 1. If $e_{ij}= 0$ then D_i does not have any effect on R_j. We do notdiscuss the cases when increase in D_i implies decreasein R_j or decrease in D_i implies increase in R_j.
Relational matrix of the FRM:Let $D_1,\ldots,D_n$ be thenodes of the domain space D of an FRM and $R_1, \ldots,R_m$ be the nodes of the range space R of an FRM. Letthe matrix E be defined as: $E = (e_{ij})$ where e_{ij} is theweight of the directededge D_iR_j (or R_jD_i), E is calledthe relational matrix of the FRM.

Hidden Pattern: Consider D_iR_j (or R_jD_i), $1<j<m,1<i<n$. When R_j (or D_i) is switched on and if causalityflows through the edges of the cycle and if it againcauses R_i (or D_j), we say that the dynamical systemgoes round and round. This is true for any node R_i (orD_j) for $1 <i< m$, (or $1 < j < n$). The equilibrium stateof this dynamical system is called the hidden pattern.

Fixed point: If the equilibrium state of the dynamicalsystem is a unique state vector, then it is called a fixedpoint. Consider an FRM with $R_1,..,R_m$ and $D_1,\ldots, D_n$ asnodes. For example let us start the dynamical systemby switching on R_1 or D_1. Let us assume that the FRMsettles down with R_1 and R_m (or D_1 and D_n) on i.e. thestate vector remains as (10…01) in R [or (10…01) inD], this state vector is called the fixed point.

Limit cycle: If the FRM settles down with a statevector repeating in the form $A_1\rightarrow A_2\rightarrow \ldots \rightarrow A_i\rightarrow A_1$ (or $B_1\rightarrow B_2\rightarrow\ldots\rightarrow B_i\rightarrow B1$) then thisequilibrium is called a limit cycle.

Definition 2.2

Linked FRM (LFRM)Two FRMs represented by a relational matrix, say E_1or order m×n and E_2 of order n×t can be linked to forma new relational matrix E of order m × t. There maynot be a direct relationship between the domain spaceof relational matrix E_1 and the range space of E_2butcertainly we could find out the hidden pattern in theLinked FRMs.

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III. METHODS OF FINDING THE HIDDEN PATTERNS

Let $R_1,..R_m$ and $D_1,..,D_n$ be the nodes of a FRMwith feed back. Let M be the relational matrix. Let usfind a hidden pattern when D_1 is switched on. We passthe state vector C_1through the Connection matrix M.A particular attribute, say, D_1 is kept in ON state andall other components are kept in OFF state. Let C_1 o Myields, C_1. To convert to signal function, choose thefirst two highest values to ON state and other values toOFF state with 1 and 0 respectively. We make eachcomponent of C_1 vector pass through M repeatedly foreach positive entry 1 and we use the symbol (≈). Thenchoose that vector which contains the maximumnumber of 1's. That which causes maximum attributesto ON state and call it, say, C_2. Supposing that thereare two vectors with maximum number of 1's are inON state, we choose the first vector. Repeat the sameprocedure for C_2 until we get a fixed point or a limitcycle. We do this process to give due importance toeach vector separately as one vector induces another ormany more vectors into ON state. We get the hiddenpattern either from the limit cycle or from the fixedpoint. We observe a pattern that leads one cause toanother and may end up in one vector or a cycle.

Next we choose the vector by keeping the secondcomponent in ON state and repeat the same to getanother cycle and it is done for all the vectorsseparately. We observe the hidden pattern of somevectors found in all or in many cases. Inference fromthis hidden pattern summarizes or highlights thecauses.

IV. ANALYSIS USING INDUCED LFRM MODEL

We take the following attributes in the case of Management of college authorities:

C_1– Management is not spending any money for the well fare of students and teachers
C_2– More donations has been collected from the students and the poor students is highly stressed due to this.
C_3– The education now became a business for them.
C_4– The management is selfish on there own needs
C_5– In order to make money management gave admission to many students
C_6-Untrained, just engineering graduates are employed as Teachers.
C_7-Most of the persons who start the college are persons with least knowledge on engineering education.
C_8– With week students, the management blame the teachers for the poor result *We take the following attributes in the case of the Teachers:*
T_1– The work load is very high, i.e, the strength of the class is very high and many classes is given to a single teacher.
T_2–Insufficient facilities to the staffs, the salary is very low for them.
T_3– Because of the salary the number of teachers to handle the core paper is less in number.
T_4– Stress due to absentees, because the teacher has to repeat everything.
T_5– Lots of pressure is given to the teacher both from the management and from the senior teachers for completing the portion within a very short period of time.
T_6– Because of the larger strength the teacher has to shout all the time.
T_7–Apart from completing the portions the teacher has to maintain the class.

An expert, a lady teacher presents the following relation between the domain (College Management) and the range (Teachers) attributes and we present it as a relational matrix called as

$$CT = \begin{array}{c} \\ C_1 \\ C_2 \\ C_3 \\ C_4 \\ C_5 \\ C_6 \\ C_7 \\ C_8 \end{array} \begin{array}{c} \begin{array}{ccccccc} T_1 & T_2 & T_3 & T_4 & T_5 & T_6 & T_7 \end{array} \\ \begin{bmatrix} 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 & 0 & 0 & 0 \end{bmatrix} \end{array}$$

We take the following attributes in the case of the Students:

S_1– No proper guidance is given to the students. The students are forced to study what is there in the books.
S_2–The knowledgeable teacher in the core subject is very less.
S_3– Lots of assignments, tests and homework is given to the students so that they cannot enjoy the feast and holidays.
S_4– The parents are uneducated and the students have no way to clear the doubts.
S_5– Media attraction

Another expert, a student of engineering college gives the following relation between the domain (Teachers) and range (Students) attributes and we represent it as a relational matrix called as

$$TS = \begin{array}{c} \\ T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \\ T_7 \end{array} \begin{array}{c} \begin{array}{ccccc} S_1 & S_2 & S_3 & S_4 & S_5 \end{array} \\ \begin{bmatrix} 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \end{bmatrix} \end{array}$$

In Linked FRM, the relation between the College Managements and the Students attributes are combined and the resultant connected matrix is given below

$$CT \text{ o } TS = \begin{array}{c} \\ C_1 \\ C_2 \\ C_3 \\ C_4 \\ C_5 \\ C_6 \\ C_7 \\ C_8 \end{array} \begin{array}{c} \begin{array}{ccccc} S_1 & S_2 & S_3 & S_4 & S_5 \end{array} \\ \begin{bmatrix} 1 & 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 \\ 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 0 \end{bmatrix} \end{array}$$

Steps:

Let C_1= (1 0 0 0 0 0 0 0)

(1 0 0 0 0 0 0 0)M = (1 1 0 0 0)

Now, (1 1 0 0 0)M^T= (2 2 0 0 1 0 1 1)

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≈(1 1 0 0 1 0 1 1)

(0 1 0 0 0 0 0 0)M = (1 1 0 1 0)

Now, (1 1 0 1 0)M^T= (2 2 1 1 2 0 2 1)

≈(1 1 1 1 1 0 1 1)

(0 0 1 0 0 0 0 0)M = (0 0 0 1 1)

Now, (01 0 0 1 1)M^T= (0 2 2 1 1 0 10)

≈(0 1 1 1 1 0 1 0)

(0 0 0 1 0 0 0 0)M = (0 0 0 1 0)

Now, (0 0 0 1 0)M^T= (0 1 1 1 1 0 1 0)

≈(0 1 1 1 1 0 1 0)

(0 0 0 0 1 0 0 0)M = (1 0 0 1 0)

Now, (1 0 0 1 0)M^T= (1 2 1 1 2 0 2 1)

≈(1 1 1 1 1 0 1 1)

(0 0 0 0 0 1 0 0)M = (0 0 1 0 0)

Now, (0 0 1 0 0)M^T= (0 0 0 0 0 1 0 1)

≈(0 0 0 0 0 1 0 1)

(0 0 0 0 0 0 1 0)M = (1 0 0 1 0)

Now, (1 0 0 1 0)M^T= (1 2 1 1 2 0 2 1)

≈(1 1 1 1 1 0 1 1)

(0 0 0 0 0 0 0 1)M = (1 0 1 0 0)

Now, (1 0 1 0 0)M^T= (1 1 0 0 1 1 1 2)

≈(1 1 0 0 1 1 1 1)

Let C_2= (1 1 1 1 1 0 1 1)

(1 1 1 1 1 0 1 1) M = (5 2 1 5 1)

= (1 1 1 1 1)

(1 1 1 1 1)M^T= (2 2 2 1 2 1 2 2)

≈(1 1 1 1 1 1 1 1).

Therefore, the limit point corresponding to C_2 (1 1 1 1 1 0 1 1), (1 1 0 1 0) high lights the attributes C_1,C_2,C_3,C_4,C_5,C_7,C_8. and S_1,S_2,S_4 which creates more stress among students and teachers.

V. CONCLUSION

Most of the engineering students who joined with lots dreams were disappointed a lot. The managements should look after the needs of both the students and teachers and they must fullfil their needs. We suggest some of the remedial measures for controlling the stress in students and teachers. Encourage each students to gain knowledge from outside the booksManagement has to think of students future and give more importance to improve students standardsEncourage major departments to develop advising guidelines and provide training for teaching faculties.The Teacher Students ratio must be maintained.

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