

FUZZY ANALYSIS ON SINGLE PARENT AND THEIR CHILDREN

A. Praveen Prakash, V. Srimathi, J. Esther Jerlin
Department of Maths, HITS
Chennai - 603 103

Abstract

Single parenthood occurs due to various situations like divorce between the partners, break-up between the partners, death of one partner etc. It is really a challenging one for them in bringing up the children in such a way that they suit to the society. In such condition, both physical and emotional behaviour of the single parent and their children are affected. In this paper, the sufferings of single parents and their effects on children are analysed using fuzzy model called Fuzzy Relational Maps. This fuzzy model is apt for the analysis as two different domains are taken for the study. The sufferings undergone by the single parents are given in domain set and their effects on children growth are given in the range set. The range of uncertainty varied from one person to the another. Hence Fuzzy analysis best suits for this study.

AMS Subject Classification:

Key Words and Phrases: Single parenthood, physical state, emotional state, uncertainty, FRMs.

1 Introduction

Single parent, in present situation has been witnessed high in number. Due to the influence of societal change, the tradition of family and its values of togetherness has got corrupted. As a result, people find content in living alone. But, this state of living may affect a lot in growth of the children. In most cases, the emotional behaviour of children gets severely affected which cannot be compensated by providing any materialistic pleasure. But there are cases that due to single parent condition the growth of children happens to be in productive way than being suppressed by the negative influence. Each family situation and their separation gets varied from one individual to another.

2 Fuzzy Relational Map (FRM)

- FRM works on two different units.
- Single parents and their sufferings are taken in domain space
- Effects of single parenthood on children's growth are taken in range space
- The attributes are collected in such a way that they are disjoint within the space also with the other space
- Both square as well as rectangular matrices can be used for the analysis

3 Determination of Hidden Pattern

- The attributes are collected from the single parents and their children
- The directed graph for the attributes are given by the expert
- Relational Matrix for the directed graph is constructed
- Transpose of the relational matrix is then framed
- The input vector is passed to the matrix and then updated

- The updated vector is then passed to the transpose of the relational vector and then threshold and updated to get the resultant vector
- This procedure is repeated until the fixed pair point is obtained

4 Analysis of the Problem Using FRM Model

According to the opinion given by the experts, ten attributes are taken in the domain space.

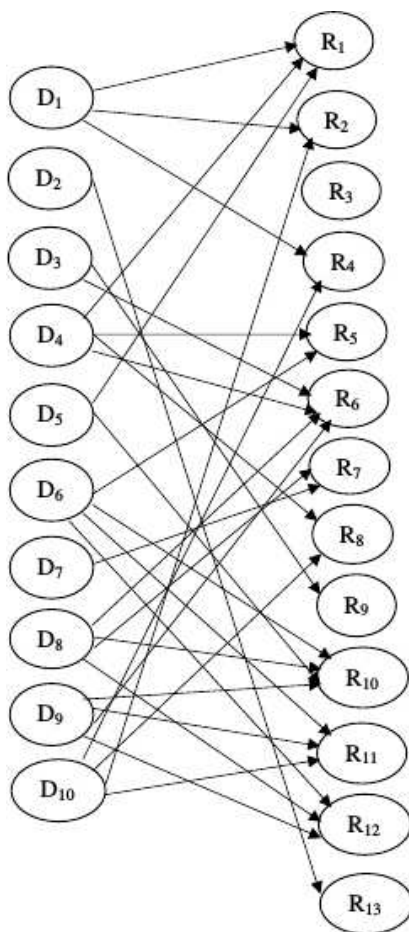
- D_1 - Lack of sufficient income
- D_2 - Societal outlook
- D_3 - Lack of sufficient time to meet the parental care
- D_4 - Mental depression and stress
- D_5 - Feeling insecure
- D_6 - Feeling Lonely
- D_7 - High dependence on third person
- D_8 - Health hazard
- D_9 - Unable to achieve his/her goal in stipulated time
- D_{10} - Move more affectionate and caring to the children

The effects are taken as the attributes in the range space.

- R_1 - Lopsided development of child
- R_2 - Feeling of deprivation by other parents
- R_3 - Feeling of depression
- R_4 - Thought for more self-discipline
- R_5 - Backward in studies and aims
- R_6 - Lack of self-discipline
- R_7 - Smart in leadership qualities

- R_8 - Bothered on societal outlook as they grow
- R_9 - More obedient towards the single parent
- R_{10} - More disobedient towards the single parent
- R_{11} - High in expectation
- R_{12} - Relied more on third person
- R_{13} - Absence of full parental care

The relational directed graph is given below



Corresponding to the relational directed graph the relational matrix

is given below

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

(i) Consider the first attribute from the domain space (i.e) “Lack of sufficient income” to be in on state and other attributes in off state.

$$X_1 = (1\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0)$$

$$\begin{aligned} X_1 E &\longrightarrow (1\ 1\ 0\ 1\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0) = Y_1 \\ Y_1 E^T &\longrightarrow (1\ 0\ 0\ 1\ 1\ 0\ 0\ 0\ 0\ 1) = X_2 \\ X_2 E &\longrightarrow (1\ 1\ 0\ 1\ 1\ 1\ 0\ 1\ 0\ 1\ 0\ 0\ 0) = Y_2 \\ Y_2 E^T &\longrightarrow (1\ 0\ 1\ 1\ 1\ 1\ 0\ 1\ 1\ 1) = X_3 \\ X_3 E &\longrightarrow (1\ 1\ 0\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 0) = Y_3 \\ Y_3 E^T &\longrightarrow (1\ 0\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1) = X_4 \\ X_4 E &\longrightarrow (1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 0) = Y_4 \\ Y_4 E^T &\longrightarrow (1\ 0\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1) = X_5 \\ X_5 E &\longrightarrow (1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 0) = Y_5 = Y_4 \end{aligned}$$

(ii) Consider the first node in range set “Lopsided development of child” as on state and other as off state.

$$Y_1 = (1\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0)$$

$$\begin{aligned} Y_1 E^T &\longrightarrow (1\ 0\ 0\ 1\ 1\ 0\ 0\ 0\ 0\ 0) = X_1 \\ X_1 E &\longrightarrow (1\ 1\ 0\ 1\ 1\ 1\ 0\ 1\ 0\ 1\ 0\ 0\ 0) = Y_2 \\ Y_2 E^T &\longrightarrow (1\ 0\ 1\ 1\ 1\ 1\ 0\ 1\ 1\ 1) = X_2 \\ X_2 E &\longrightarrow (1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 0) = Y_3 \\ Y_3 E^T &\longrightarrow (1\ 0\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1) = X_3 \\ X_3 E &\longrightarrow (1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 0) = Y_4 \\ Y_4 E^T &\longrightarrow (1\ 0\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1) = X_4 = X_3 \end{aligned}$$

where \longrightarrow denotes threshold

5 Conclusion

- (i) When the first attribute from the domain space (i.e) “Lack of sufficient income” is kept in on state, the following pair $(1\ 0\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1)$, $(1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 0)$ clearly tells that the attribute “Absence of full parental care” comes to the off state in the range space.
- (ii) When the first node “Lopsided development of child” from the range space in on state, the following pair $\{(1\ 0\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1)\}$, $(1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 0)\}$ clearly tells that “Societal outlook” in the domain space comes to the off state in the domain space.

Similarly, the same procedure is carried to every node in the domain space and the range space until we obtain the fixed pair.

References

- [1] B. Kosko, *Neural Networks and Fuzzy System*, Prentice Hall of India (1997).
- [2] W.B. Vasantha Kandasamy, Florentin Smarandache, K. Ilanthenral, Elementary Fuzzy Matrix Theory and Fuzzy Models for Social Scientists, <https://arxiv.org/pdf/math/0702144> (2007).
- [3] A. Praveen Prakash, J. Esther Jerlin, J. Bennilo Fernandes, A Study on the Causes for failures in mathematics by Engineering Students Using CFRM Model, www.iaeng.org/publication/WCE2014/WCE2014_pp29-33.pdf (2014).
- [4] Motti Haimi, Aaron Lerner, The Impact of Parental Separation and Divorce on the Health Status of Children, and the Ways to Improve it, *Journal of Clinical & Medical Genomics*, **4**(1) (2016), 1-7.
- [5] Susan Golombok, Single Mothers by Choice: Mother - Child Relationships and Children’s Psychological Adjustment, *Journal of Family Psychology*, **30**(4) (2016), 409-418.

