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Selection of the Best School for the Children- A Decision Making Model using Modified Fuzzy Analytic Hierarchy Process

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Abstract: *Decision-making plays a vital role in every walk of life. Selecting a bad as good is more dangerous than rejecting a good as bad. In this paper, the Modified Fuzzy Analytic Hierarchy Process is used to develop a decision making model for choosing the best school for the children.*

Keywords: *Analytic Hierarchy Process (AHP), Fuzzy Analytic Hierarchy Process, Triangular Fuzzy numbers, Pairwise Comparison Method.*

1. Introduction

Decision-making can be regarded as the cognitive process resulting in the selection of a belief or a course of action among several alternative possibilities. It is the process of identifying and choosing alternatives based on the values and preferences of decision maker. People often find it hard to make decisions in a complex, subjective situation with more than a few realistic options. So what we need is a systematic and organized way to evaluate our choices and figure out which one offers the best solution to our problem.

The Modified Fuzzy Analytic Hierarchy Process method is one of the best methodology based on fuzzy analytic hierarchy process to solve the decision making problems. It enables multiple decision makers on evaluation and uses triangular fuzzy scale that includes both positive and negative fuzzy numbers, in order to evaluate hierarchy.

In countries like India, efforts of the parents contribute much for the progress of every individual. Better the academic opportunities provided by the parents, better will be the progress of their children in the future. The academics effort of the parents starts from identifying and admitting their children in the best school. In this research the authors consider the problem of selecting the best school for the children. The researchers already developed another model for the same problem using Extent Analysis Method on Fuzzy Analytic Hierarchy Process and the same was published [6]. Here the authors intended to develop a mathematical model for the same problem using the same data by applying Modified Fuzzy Analytic Hierarchy Process.

2. Basic Definitions

Definition: 1 [3]

A ***Fuzzy Number*** $\tilde{A}$ is a convex, normal fuzzy set $A \subset \mathbb{R}$ whose membership function is at least segmentally continuous and has functional value $\mu_A(x) = 1$ at precisely one element.

Definition: 2 [5]

A ***Triangular Fuzzy Number*** **(**abbreviated as TFN**)** is a special case of fuzzy number. It is defined by a triplet $\tilde{A} = (a, b, c)$. This representation is interpreted as membership function $\mu_{\tilde{A}} : \mathbb{R} \to [0,1]$ as follows:

$$\mu_{\tilde{A}}(x) = \begin{cases} 0 & if \quad x \le a \\ \frac{x-a}{b-a} & if\ a \le x \le b \\ \frac{c-x}{c-b} & if\ b \le x \le c \\ 0 & if \quad x > c \end{cases}$$

Definition: 3 [4]

Algebraic Operations**:** Let $\tilde{A} = (a_1, b_1, c_1)$ and $\tilde{B} = (a_2, b_2, c_2)$ be two triangular fuzzy numbers.

i) Addition of Triangular Fuzzy Numbers ⊕: $\tilde{A} \oplus \tilde{B} = (a_1 + a_2, b_1 + b_2, c_1 + c_2)$

ii) Multiplication of Triangular Fuzzy Numbers ⊗ : $\tilde{A} \otimes \tilde{B} = (a_1 a_2, b_1 b_2, c_1 c_2)$ $a_1 \ge 0, a_2 \ge 0$

$k \otimes \tilde{A} = (ka_1, kb_1, kc_1)$ $k \in \mathbb{R}, k \ge 0$

iii) Division of Triangular Fuzzy Numbers ⊘ : $\tilde{A} \oslash \tilde{B} = \left(\frac{a_1}{c_2}, \frac{b_1}{b_2}, \frac{c_1}{a_2}\right)$ $a_1 > 0, a_2 > 0$

Definition 4 [2]

A ***Triangular Fuzzy Number Matrix*** of order $n \times m$ is defined as $A = \left(\widetilde{a_{ij}}\right)_{n \times m}$ where $\widetilde{a_{ij}}$ is a triangular fuzzy number.

For two Triangular Fuzzy Number Matrices $A = \left(\widetilde{a_{ij}}\right)_{n \times m}$ and $B = \left(\widetilde{b_{ij}}\right)_{n \times m}$ the ***Addition*** $A + B$ is defined as

$$A + B = \left(\widetilde{a_{ij}} \oplus \widetilde{b_{ij}}\right)_{n \times m}$$

3. MODIFIED FUZZY ANALYTIC HIERARCHY PROCESS

Step 1: Structure Hierarchy

To start with, decision makers determine goal, criteria and alternatives of the problem in a hierarchical form. An established hierarchy has to give the whole details of information on the structure so that there should not be lack of fact about the problem.

Step 2: Make Pairwise Comparisons for Factors

Decision makers are required to compare each factor in the hierarchy. Decision makers use the fuzzy scale shown in Table 1 to compare factors. They use experimental data, perception, background, knowledge, etc. to make comparisons. Because decision makers may have different viewpoints, they can use different linguistic variables in comparisons matrices. The weights (e) are allocated to decision makers on the basis of their knowledge, experience, etc. Suppose that m decision makers exist in the group and the k^{th} decision maker E_k is assigned a decision maker weight e_k, where $e_k \in [0,1]$, $e_1 + \cdots + e_m = 1$.

Table 1. *Triangular fuzzy conversion scale*

Linguistic scale	Triangular fuzzy scale	Triangular fuzzy reciprocal scale
Equally important	(0, 1, 3)	(-3, -1, 0)
Weakly more important	(1, 3, 5)	(-5, -3, -1)
Strongly more important	(3, 5, 7)	(-7, -5, -3)
Very strongly more important	(5, 7, 9)	(-9, -7, -5)
Absolutely more important	(7, 9,9)	(-9, -9, -7)

Step 3: Aggregate individual TFNs to group TFNs

The purpose of this step is to apply an acceptable operator to get a group preference from individual preferences. The aggregation of TFNs scores is performed by applying the fuzzy weighted triangular averaging operator, as defined by (1).

$$\widetilde{a_{ij}} = \widetilde{a_{ij1}} \otimes e_1 \oplus \widetilde{a_{ij2}} \otimes e_2 \oplus \ldots \oplus \widetilde{a_{ijm}} \otimes e_m \tag{1}$$

where $\widetilde{a_{ij}}$ is the aggregated fuzzy score for $A_i - A_j$ comparisons, $i = 1, \ldots, n$; $\widetilde{a_{ij1}}, \widetilde{a_{ij2}}, \ldots, \widetilde{a_{ijm}}$ are corresponding TFN scales assigned by decision makers $E_1, E_2, \ldots, E_m$, respectively. $\otimes$ and $\oplus$ indicates Multiplication of Triangular Fuzzy Numbers and Addition of Triangular Fuzzy Numbers, respectively.

Step 4: Convert negative fuzzy TFNs to positive TFNs.

Since the scores in the classical AHP are based on an exponential importance, we should calculate the corresponding exponential values of negative scores in our method. This conversion is obtained by (2).

$$\widetilde{a_{ij}}^{*} = e^{(\widetilde{a_{ij}}/4)} \tag{2}$$

where

$$\widetilde{a_{ij}} = (l_{ij}, m_{ij}, u_{ij})$$

Step 5: Calculate the priority weights of factors

Consider a triangular fuzzy comparison matrix expressed by

$$\tilde{A} = (\widetilde{a_{ij}}) = \begin{bmatrix} (1,1,1) & (l_{12}, m_{12}, u_{12}) & \cdots & (l_{1n}, m_{1n}, u_{1n}) \\ (l_{21}, m_{21}, u_{21}) & (1,1,1) & \cdots & (l_{2n}, m_{2n}, u_{2n}) \\ \cdots & \cdots & \cdots & \cdots \\ (l_{n1}, m_{n1}, n1) & (l_{n2}, m_{n2}, u_{n2}) & \cdots & (1,1,1) \end{bmatrix}$$

where $\widetilde{a_{ij}} = (l_{ij}, m_{ij}, u_{ij})$ and $\widetilde{a_{ij}}^{-1} = (1/u_{ij}, 1/m_{ij}, 1/l_{ij})$ for $i, j = 1, \ldots, n$ and $i \neq j$. Since the aim is to bring out a simplified fuzzy AHP, complicated normalization formula is not used. A normalized matrix $\widetilde{N}$ can be calculated as follows:

$$\widetilde{N} = [\widetilde{n_{ij}}]_{\mathrm{n\times n}}$$

$$\widetilde{n_{ij}} = \left(\frac{l_{ij}}{u_j^*}, \frac{m_{ij}}{u_j^*}, \frac{u_{ij}}{u_j^*}\right) \tag{3}$$

where

$$u_j^* = \max_i u_{ij}$$

The normalization method clarified above is to preserve the property that the ranges of normalized triangular fuzzy numbers belong to $[0, 1]$.

And the importance weights of the factors can be calculated as follows:

$$W_i = \frac{\sum_{j=1}^{n} \widetilde{n_{ij}}}{\sum_{k=1}^{n} \sum_{j=1}^{n} \widetilde{n_{kj}}} \qquad k = 1, \ldots, n \tag{4}$$

Step 6: Calculate final weights

In this step the rating of each alternative is multiplied by the weights of the sub-criteria and aggregated to get local weights with respect to each criterion. The local weights are then multiplied by the weights of the criteria and aggregated to get global weights for each alternative.

Step7: Compare the weights using a ranking method

In the last step, we rank the obtained fuzzy numbers. In order to rank the fuzzy numbers, we use the centroid - based distance method [1, 8, 9].

Finally the alternative with highest rank is selected as the best alternative.

4. Application of Modified Fuzzy AHP Method

Consider a decision making problem, of choosing the best school for the children [6] to illustrate the procedure of Modified Fuzzy Analytic Hierarchy Process. The hierarchical structure of this selection problem is shown in Fig 1, where C_1, C_2, C_3, C_4, C_5 are five major criteria for developing a model for the selection of the best school for the children, each involve some sub criteria and A_1 (P.M.G Higher Secondary School, College Road, Palakkad), A_2 (Bharath Matha Higher Secondary School, Chandranagar, Palakkad) and A_3 (Vyasa Vidya Peethom School, Kallekad, Palakkad) are the three alternatives chosen after initial screening.

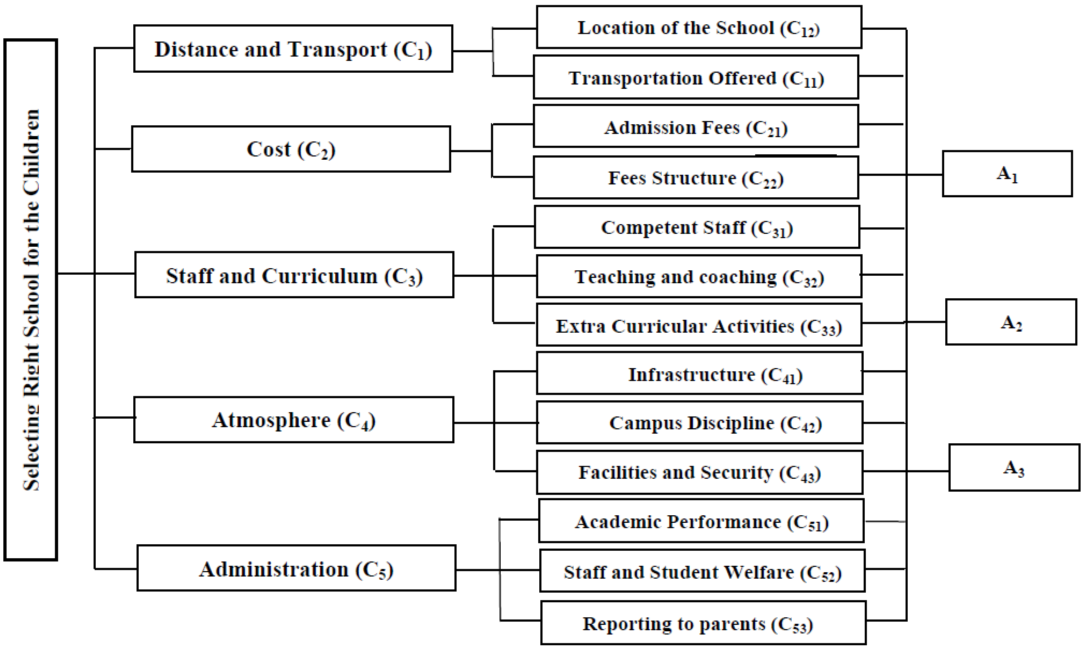

Figure 1. *The hierarchy of selecting the best school for the children*

After building the hierarchy, the pairwise comparison of the importance of one criterion over the others, one sub criterion over the others and one alternative over the others were estimated with the help of a pre-tested questionnaire. A sample of 100 parents in Palakkad city was selected by adopting convenient sampling technique and the questionnaire was administered to the parents. The data collected were edited and tabulated for further analysis. Five point scaling technique (Equally Important, Weakly More Important, Strongly More Important, Very Strongly More Important, Absolutely More Important) was adopted to assess the degree of importance of one criterion, sub criterion, or alternative over another. Using Triangular Fuzzy Conversion Scale given in Table 1, the pairwise comparison matrices (Triangular Fuzzy Number Matrices $A_i, i = 1, \dots 100$) for 100 respondents are constructed. Here in this method we assign same weights for all the 100 decision makers, i.e. $e_i = 0.01, i = 1, \dots 100$. The aggregated fuzzy comparison matrix with respect to the goal (Table 2) is constructed by applying the fuzzy weighted triangular averaging operator given in (1).

$$\begin{array}{c} \\ C_1 \\ C_2 \\ C_3 \\ C_4 \\ C_5 \end{array}
\begin{array}{c}
\begin{array}{ccccc} C_1 & C_2 & C_3 & C_4 & C_5 \end{array} \\
\begin{pmatrix}
(1,1,1) & (3.6,5.28,6.7) & (1.01,2.42,4.42) & (1.21,2.7,4.7) & (3.31,5.06,6.78) \\
(-6.7,-5.28,-3.6) & (1,1,1) & (1.49,3.22,5.18) & (1.97,3.66,5.5) & (3.76,5.6,7.16) \\
(-4.42,-2.42,-1.01) & (-5.18,-3.22,-1.49) & (1,1,1) & (1.99,3.52,5.44) & (4.62,6.5,8.02) \\
(-4.7,-2.7,-1.21) & (-5.5,-3.66,-1.97) & (-5.44,-3.52,-1.99) & (1,1,1) & (4.92,6.86,8.28) \\
(-6.78,-5.06,-3.31) & (-7.16,-5.6,-3.76) & (-8.02,-6.5,-4.62) & (-8.28,-6.86,-4.92) & (1,1,1)
\end{pmatrix}
\end{array}$$

Table 2. *Aggregated Fuzzy Comparison Matrix with respect to the goal*

Then the comparison matrix which include negative fuzzy numbers were converted to positive fuzzy numbers by using (2). Table 2 was converted as follows:

$\widetilde{a_{12}}^* = e^{(\widetilde{a_{12}}/4)} = e^{((3.6,5.28,6.7)/4)} = (2.46,3.743,5.339)$

Other $\widetilde{a_{ij}}^*$ values of Table 2 were given in Table 3.

$$\begin{array}{c} \\ C_1 \\ C_2 \\ C_3 \\ C_4 \\ C_5 \end{array} \begin{array}{c} \begin{array}{ccccc} C_1 & C_2 & C_3 & C_4 & C_5 \end{array} \\ \begin{pmatrix} (1,1,1) & (2.46,3.743,5.339) & (1.287,1.831,3.019) & (1.353,1.964,3.238) & (2.288,3.543,5.447) \\ (0.187,0.267,0.407) & (1,1,1) & (1.451,2.237,3.651) & (1.636,2.497,3.955) & (2.56,4.055,5.989) \\ (0.331,0.546,0.777) & (0.274,0.447,0.689) & (1,1,1) & (1.645,2.411,3.896) & (3.174,5.078,7.426) \\ (0.309,0.509,0.739) & (0.253,0.401,0.611) & (0.257,0.415,0.608) & (1,1,1) & (3.421,5.557,7.925) \\ (0.184,0.282,0.437) & (0.167,0.247,0.391) & (0.135,0.197,0.315) & (0.126,0.18,0.292) & (1,1,1) \end{pmatrix} \end{array}$$

Table 3. *Fuzzy Evaluation Matrix with respect to the goal*

This converted matrix was normalized by using (3) as follows:

$a_{12} = (2.46,3.743,5.339)/5.339 = (0.461,0.701,1)$

Similarly other normalized a_{ij} values of Table 3 were also calculated (Table 4).

$$\begin{array}{c} \\ C_1 \\ C_2 \\ C_3 \\ C_4 \\ C_5 \end{array} \begin{array}{c} \begin{array}{ccccc} C_1 & C_2 & C_3 & C_4 & C_5 \end{array} \\ \begin{pmatrix} (1,1,1) & (0.461,0.701,1) & (0.426,0.607,1) & (0.418,0.607,1) & (0.42,0.651,1) \\ (0.461,0.657,1) & (1,1,1) & (0.398,0.613,1) & (0.414,0.631,1) & (0.427,0.677,1) \\ (0.426,0.703,1) & (0.398,0.649,1) & (1,1,1) & (0.422,0.619,1) & (0.427,0.684,1) \\ (0.418,0.689,1) & (0.414,0.655,1) & (0.422,0.682,1) & (1,1,1) & (0.432,0.701,1) \\ (0.42,0.646,1) & (0.427,0.631,1) & (0.427,0.625,1) & (0.432,0.616,1) & (1,1,1) \end{pmatrix} \end{array}$$

Table 4. *Normalized Fuzzy Evaluation Matrix with respect to the goal*

The important weights of each criteria were obtained by using (4). Thus

the weight of the criteria C_1 is calculated as $W_1 = (0.109,0.198,0.371)$

the weight of the criteria C_2 is calculated as $W_2 = (0.108,0.198,0.371)$

the weight of the criteria C_3 is calculated as $W_3 = (0.107,0.203,0.371)$

the weight of the criteria C_4 is calculated as $W_4 = (0.107,0.207,0.371)$

the weight of the criteria C_5 is calculated as $W_5 = (0.108,0.195,0.371)$

In a similar manner the normalized comparison matrices for sub criteria with respect to each criteria are constructed, as shown below

$$\begin{array}{c} \\ C_{11} \\ C_{12} \end{array} \begin{array}{c} \begin{array}{cc} C_{11} & C_{12} \end{array} \\ \begin{pmatrix} (1,1,1) & (0.421,0.631,1) \\ (0.421,0.667,1) & (1,1,1) \end{pmatrix} \end{array}$$

Table 5.*Sub-criteria matrix with respect to C_1*

The important weights of the sub criterias with respect to the criteria C_1 are as follows:

the weight of the sub criteria C_{11} is calculated as $W_{11} = (0.355,0.495,0.704)$

the weight of the sub criteria C_{12} is calculated as $W_{12} = (0.355,0.505,0.704)$

$$\begin{array}{c} \\ C_{21} \\ C_{22} \end{array} \begin{array}{c} \begin{array}{cc} C_{21} & C_{22} \end{array} \\ \begin{pmatrix} (1,1,1) & (0.433,0.622,1) \\ (0.433,0.696,1) & (1,1,1) \end{pmatrix} \end{array}$$

Table 6.*Sub-criteria matrix with respect to C_2*

The important weights of the sub criterias with respect to the criteria C_2 are as follows:

the weight of the sub criteria C_{21} is calculated as $W_{21} = (0.358,0.489,0.698)$

the weight of the sub criteria C_{22} is calculated as $W_{22} = (0.358,0.511,0.698)$

$$\begin{array}{cc} & \begin{array}{ccc} C_{31} & C_{32} & C_{33} \end{array} \\ \begin{array}{c} C_{31} \\ C_{32} \\ C_{33} \end{array} & \begin{bmatrix} (1,1,1) & (0.458,0.619,1) & (0.427,0.634,1) \\ (0.458,0.741,1) & (1,1,1) & (0.484,0.791,1) \\ (0.427,0.674,1) & (0.484,0.613,1) & (1,1,1) \end{bmatrix} \end{array}$$

Table 7.*Sub-criteria matrix with respect to C_3*

The important weights of the sub criterias with respect to the criteria C_3 are as follows:

the weight of the sub criteria C_{31} is calculated as $W_{31} = (0.209,0.319,0.523)$

the weight of the sub criteria C_{32} is calculated as $W_{32} = (0.216,0.358,0.523)$

the weight of the sub criteria C_{33} is calculated as $W_{33} = (0.212,0.323,0.523)$

$$\begin{array}{cc} & \begin{array}{ccc} C_{41} & C_{42} & C_{43} \end{array} \\ \begin{array}{c} C_{41} \\ C_{42} \\ C_{43} \end{array} & \begin{bmatrix} (1,1,1) & (0.458,0.619,1) & (0.461,0.607,1) \\ (0.458,0.741,1) & (1,1,1) & (0.468,0.616,1) \\ (0.472,0.779,1) & (0.465,0.76,1) & (1,1,1) \end{bmatrix} \end{array}$$

Table 8.*Sub-criteria matrix with respect to C_4*

The important weights of the sub criterias with respect to the criteria C_4 are as follows:

the weight of the sub criteria C_{41} is calculated as $W_{41} = (0.213,0.313,0.519)$

the weight of the sub criteria C_{42} is calculated as $W_{42} = (0.214,0.331,0.519)$

the weight of the sub criteria C_{43} is calculated as $W_{43} = (0.215,0.357,0.519)$

$$\begin{array}{cc} & \begin{array}{ccc} C_{51} & C_{52} & C_{53} \end{array} \\ \begin{array}{c} C_{51} \\ C_{52} \\ C_{53} \end{array} & \begin{bmatrix} (1,1,1) & (0.452,0.613,1) & (0.411,0.607,1) \\ (0.452,0.737,1) & (1,1,1) & (0.418,0.616,1) \\ (0.411,0.677,1) & (0.418,0.679,1) & (1,1,1) \end{bmatrix} \end{array}$$

Table 9.*Sub-criteria matrix with respect to C_5*

The important weights of the sub criterias with respect to the criteria C_5 are as follows:

the weight of the sub criteria C_{51} is calculated as $W_{51} = (0.207,0.433,0.539)$

the weight of the sub criteria C_{52} is calculated as $W_{52} = (0.208,0.433,0.539)$

the weight of the sub criteria C_{53} is calculated as $W_{53} = (0.203,0.433,0.539)$

In the next step of the decision procedure, the alternatives under each sub criteria are compared and the normalized comparison matrices for the alternatives under each sub criteria are constructed. Some of them are shown below.

$$\begin{array}{cc} & \begin{array}{ccc} A_{1} & A_{2} & A_{3} \end{array} \\ \begin{array}{c} A_{1} \\ A_{2} \\ A_{3} \end{array} & \begin{bmatrix} (1,1,1) & (0.3734,0.6096,1) & (0.3791,0.6096,1) \\ (0.3734,0.6126,1) & (1,1,1) & (0.4232,0.625,1) \\ (0.3791,0.6219,1) & (0.4232,0.6771,1) & (1,1,1) \end{bmatrix} \end{array}$$

Table 10.*Alternative matrix with respect to C_{11}*

The important weights of the alternative with respect to the sub criteria C_{11} are as follows:

the weight of the alternative A_1 is calculated as $W_{A_1 11} = (0.1947, 0.3285, 0.5606)$

the weight of the alternative A_2 is calculated as $W_{A_2 11} = (0.1996, 0.3312, 0.5606)$

the weight of the alternative A_3 is calculated as $W_{A_3 11} = (0.2003, 0.3403, 0.5606)$

Using similar calculations, the weight vectors of the alternatives with respect to each sub criteria are also calculated and synthesized. The results are shown in Table 11.

Table 11. *Obtained Results*

Criteria C_1					
Weight	(0.109,0.198,0.371)				
Sub criteria	C_{11}	C_{12}			
Weight	(0.355,0.495,0.704)	(0.355,0.505,0.704)			
Alternative	Alternative weight			Local weight	Alternative priority weight with respect to C_1
A_1	(0.1947,0.3285,0.5606)	(0.2003,0.3284,0.5509)		(0.143, 0.3397, 0.7825)	(0.0156, 0.0673, 0.2903)
A_2	(0.1996,0.3312,0.5606)	(0.2024,0.3323,0.5509)		(0.1427, 0.3318, 0.7825)	(0.016, 0.0657, 0.2903)
A_3	(0.2003,0.3403,0.5606)	(0.2024,0.3392,0.5509)		(0.1402, 0.3284, 0.7825)	(0.0153, 0.065, 0.2903)
Criteria C_2					
Weight	(0.108,0.198,0.371)				
Sub criteria	C_{21}	C_{22}			
Weight	(0.358,0.489,0.698)	(0.358,0.511,0.698)			
Alternative	Alternative weight			Local weight	Alternative priority weight with respect to C_2
A_1	(0.2009,0.3336,0.5566)	(0.2009,0.3313,0.5542)		(0.1438,0.3324,0.7753)	(0.0155, 0.0658, 0.2877)
A_2	(0.1982,0.3264,0.5566)	(0.1996,0.3259,0.5542)		(0.1424, 0.3261, 0.7753)	(0.015, 0.0646, 0.2877)
A_3	(0.1997,0.34,0.5566)	(0.201,0.3428,0.5542)		(0.1435, 0.3414, 0.7753)	(0.0155, 0.0676, 0.2877)
Criteria C_3					
Weight	(0.107,0.203,0.371)				
Sub criteria	C_{31}	C_{32}	C_{33}		
Weight	(0.209,0.319,0.523)	(0.216,0.358,0.523)	(0.212,0.323,0.523)		
Alternative	Alternative weight			Local weight	Alternative priority weight

					with respect to C_3
A_1	(0.1997,0.3365,0.5597)	(0.1963,0.3345,0.5689)	(0.2035,0.329,0.552)	(0.1273, 0.3334, 0.879)	(0.0136, 0.0677, 0.3261)
A_2	(0.1982,0.3299,0.5597)	(0.1959,0.3248,0.5689)	(0.2027,0.3427,0.552)	(0.1267, 0.3358, 0.879)	(0.014, 0.0682, 0.3261)
A_3	(0.1977,0.3336,0.5597)	(0.1937,0.3306,0.5689)	(0.1977,0.3283,0.552)	(0.1251, 0.3308, 0.879)	(0.0134, 0.0672, 0.3261)
Criteria C_4					
Weight	(0.107,0.207,0.371)				
Sub criteria	C_{41}	C_{42}	C_{43}		
Weight	(0.213,0.313,0.519)	(0.214,0.331,0.519)	(0.215,0.357,0.519)		
Alternative	Alternative weight			Local weight	Alternative priority weight with respect to C_4
A_1	(0.1978,0.3375,0.5661)	(0.2,0.3385,0.5622)	(0.1978,0.3372,0.5648)	(0.1275, 0.3381, 0.8787)	(0.0136, 0.07, 0.326)
A_2	(0.1973,0.3328,0.5661)	(0.1989,0.3324,0.5622)	(0.1975,0.3337,0.5648)	(0.1271, 0.3333, 0.8787)	(0.014, 0.069, 0.326)
A_3	(0.1938,0.3296,0.5661)	(0.194,0.3291,0.5622)	(0.1948,0.3291,0.5648)	(0.1247, 0.3296, 0.8787)	(0.0133, 0.0682, 0.326)
Criteria C_5					
Weight	(0.108,0.195,0.371)				
Sub criteria	C_{51}	C_{52}	C_{53}		
Weight	(0.203,0.433,0.539)	(0.208,0.433,0.539)	(0.207,0.433,0.539)		
Alternative	Alternative weight			Local weight	Alternative priority weight with respect to C_5
A_1	(0.2015,0.3322,0.5582)	(0.2009,0.3358,0.5578)	(0.2008,0.3386,0.5554)	(0.1243, 0.4359, 0.9009)	(0.0134, 0.085, 0.3342)
A_2	(0.1992,0.338,0.5582)	(0.2007,0.3377,0.5578)	(0.2006,0.3322,0.5554)	(0.1237, 0.4364, 0.9009,)	(0.013, 0.0851, 0.3342)
A_3	(0.1964,0.3299,0.5582)	(0.196,0.3266,0.5578)	(0.1988,0.3292,0.5554)	(0.1218,0.4268,0.9009)	(0.0132, 0.0832, 0.3342)

Global Weight		
A_1	A_2	A_3
(0.0718, 0.3557, 1.5643)	**(0.071, 0.3525, 1.5643)**	**(0.0707, 0.3512, 1.5643)**

After obtaining Fuzzy important weights, the last step was performed, and the fuzzy weights are ranked using centroid-based distance method. The obtained results are shown in Table 12.Based on this method alternative 1(P.M.G Higher Secondary School, College Road, Palakkad) is found to be the best school.

Table 12. *Ranking of the Alternatives*

Alternatives	$x_0(\widetilde{A})$	$y_0(\widetilde{A})$	$R(\widetilde{A})$
A_1	0.6639	0.3333	0.743
A_2	0.663	0.3333	0.742
A_3	0.6621	0.3333	0.741

5. Conclusion

It is the basic responsibility of every parent to identify and admit their children in the best school available in their area. In this paper Modified Fuzzy Analytic Hierarchy Process Method is applied to solve the problem of selecting the best school for the children. This methodology includes simple mathematical calculations, and it yields triangular fuzzy numbers of alternatives' weights. This proposed methodology can handle the problems effectively and with efficiency. It is interesting to observe that the result obtained under the Modified Fuzzy Analytic Hierarchy Process is same as that of the Extent Analysis Method on Fuzzy Analytic Hierarchy Process [6].

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