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Incomplete Fuzzy Soft Sets in Sanchez's Method of Decision Making

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Abstract - The main aim of this paper is to propose an algorithm of fuzzy soft set-based decision- making problems under incomplete information to obtain the best feasible solution of these problems, here we have considered various parameters related to the solution and applied Sanchez's algorithm to solve the decision making problem under incomplete fuzzy soft environment.

Keywords - Incomplete fuzzy soft sets, Nursing algorithmic, Sanchez's method.

INTRODUCTION

Classical mathematical tools don't seem to be continuously winning in managing complicated issues concerned in uncertainty, in exactitude and uncleanness. In 1999, Molotov [1] initiated the idea of soft sets as a mathematical tool for managing uncertainties, that isn't laid low with the difficulties of existing ways. The soft set mathematics is totally different from ancient tools for managing uncertainties, like fuzzy set mathematics [2] and rough set mathematics [3]; it's free from the inadequacy of the parametrization tools of those theories. Later on, the generalized models of soft sets (hybrid soft sets) appeared apace, and folks became a lot of fascinated by the sensible applications of hybrid soft set theories [4–6], particularly with respect to their applications in decision-making [4,5,7]. Higher cognitive process is taken into account a cognitive-based human action for choosing the simplest different. The call-making in an exceedingly soft atmosphere typically needs decision manufacturers to supply analysis data regarding the factors and also the alternatives with a hybrid soft set. The combos of soft sets with generalized fuzzy sets are typical models of hybrid soft sets. During this direction, Meiji et al. [8,9] extended the idea of soft sets to the fuzzy soft sets. In terms of fuzzy soft set based mostly decision-making ways, Roy and Meiji [10] provided a comparison score-based technique for decision-making in an exceedingly fuzzy soft atmosphere. In Reference [11], a procedure tool referred to as D-score table is introduced, that improves the normal decision-making method supported a fuzzy soft set and proves the convenience once attributes amendment across the choice method. Fen get al. [12] projected Associate in Nursing adjustable approach to a fuzzy soft attack the premise of decision-making by level soft sets. It's price noting that our target isn't to estimate or complete missing information. Instead, we have a tendency to offer suggestions on a way to create appropriate decisions once information or weight perform or lost in fuzzy soft sets. The content of this paper is organized as follows: Section a pair of reviews some elementary notions of fuzzy sets, soft sets and incomplete fuzzy soft sets. Section three presents Associate in Nursing algorithmic program of a Sanchez's technique for finding decision-making issues. Section four shows a decision-making algorithmic program for incomplete fuzzy soft set related to Sanchez's technique. Finally, our discussion is enclosed in Section five and conclusions are enclose in Section six.

PRELIMINARIES

In 1999, Molodtsov [1] initiated the definition of soft sets. Assume that U is the universe set and E is the set of parameters associated with U like, attributes, properties, or characteristics of objects in U. (U, E) will be known as a soft space. The definition of soft sets is presented as follows:

2.1 Definition: A pair (f, S) is termed to be a soft set on U if $S \subseteq E$ and $f: S \to P(U)$.

Videlicet, a soft set in definition, is a parameterized family of subsets of universe set. For s ∈ S, f(s) may be regarded as the set of s−approximate elements of the soft set (f, S).

2.2 Definition: Assume that (U, E) is a soft space. A pair (g, S) is termed to be a fuzzy soft set on U if $S \subseteq E$ and $g: S \to F(U)$. Fuzzy sets on the universe U replace the crisp subsets of U. Thus, each soft set may be regarded as a fuzzy soft set.

A soft set or a fuzzy soft set can be regarded as an information system or an information table. For the soft set, each entry in this table is 1 or 0 decided by whether an object pertains to the range of a parameter or not. For the fuzzy soft set, every entry pertains to the interval [0, 1] and is determined by the membership degree of an object on a parameter. Assume that the domain of every soft set or fuzzy soft set is U = $\{v_1, v_2, \cdots, v_m\}$ and the parameters set is S = $\{s_1, s_2, \cdots, s_n\}$. If there exists incomplete data in the information table of a soft set or fuzzy soft set, respectively, the soft set or fuzzy soft set is termed to be an incomplete soft set or incomplete fuzzy soft set, where the unknown data is represented by "∗". For instance, Tables 1 and 2 represent an incomplete soft set (a, M) and an incomplete fuzzy soft set (b, N), respectively. In Table 1, we know all membership values of objects on parameters exceptv_2 on n_2 and v_3 on n_2. The unknown data are expressed by "$*$" in the information table, namely, $g(n_1)(v_2) = *$ and $g(n_2)(v_3) = *$. Similarly, missing data of fuzzy soft set are v_2 on n_2 and v_3 on n_2 in Table 2, which is $f(n_2)(v_2) = *$ and $f(n_2)(v_3) = *$.

TABLE 1

INCOMPLETE SOFT SET (A, M)

	m_1	m_2	m_3	m_4	m_5	m_6
v_1	1	1	0	0	0	0
v_2	$*$	0	1	0	1	0
v_3	1	$*$	1	0	0	1
v_4	0	0	0	1	0	1

TABLE 2

INCOMPLETE FUZZY SOFT SET (B, N).

	n_1	n_2	n_3	n_4	n_5	n_6
v_1	0.9	0.4	0.5	0.4	0.8	0.8
v_2	0.8	$*$	0.5	0.7	0.6	0.3
v_3	0.4	$*$	0.9	0.9	0.5	0.9
v_4	0.9	0.8	0.9	0.4	0.7	0.5

Algorithm for incomplete fuzzy soft set-based Sanchez's method of decision making

Step 1 Consider the incomplete fuzzy soft set (F, E) where $u \in U$ and $e \in E$.

Step 2 Input the performance evaluation of bikes by different counselling agencies as matrix.

Step 3 Find the average of the corresponding entries of all the matrices in step 2.

Step 4 Multiply the weightage of different bikes to the corresponding entries of each row to get the comprehensive decision matrix.

Step 5 By every vector $\alpha = (\alpha_1, \alpha_2, \alpha_3, \dots \dots \alpha_w) \in \{0,1\}$. We construct $b \times e$ matrix.

Step 6 For every U_i, let nU_iregarded as the number of vectors $\alpha = (\alpha_1, \alpha_2, \alpha_3, \dots \dots \alpha_w) \in \{0,1\}^w$for which object U_i maximizes the choice value at p_α.Let OU_i=$\frac{nU_i}{2^w}$. Define $\frac{OU_i}{O}$for dominated alternative.

Step 7 The optimal decision is to choose u_i satisfying $OU_i = max_{i=1,2,3,\dots s}\, OU_i$. So taking the highest choice value.

NUMERICAL EXAMPLE

Suppose that Mr. X is interested to buy a bike from among the set of bikes $U = \{b_1, b_2, b_3, b_4, b_5, b_6\}$ on the basis of the set E = $\{e_1$= expensive bikes, e_2=cubic capacity, e_3= fuel efficiency, e_4= style, e_5= features, e_6= service$\}$ of selection criteria called the parameters and suppose Mr. X is going to buy the bike on his own preference weightage to the selection criteria. Now, to get the recent market information, that is, the performance evaluation matrix we construct the fuzzy soft sets, $(F_1, E), (F_2, E), (F_3, E), (F_4, E), (F_5, E), (F_6, E)$ over the universe U, where F_1, F_2, F_3, F_4, F_5, $F_6$are mappings from E to I^u(where I^u the set of all fuzzy subsets of U) given by the counselling agencies.

Suppose $F_1(e_1) = \{(b_1, 0.7), (b_2,*), (b_3, 0.5), (b_4, 0.4), (b_5, 0.8), (b_6, 0.9)\}$

$$F_1(e_2) = \{(b_1, 0.7), (b_2, 0.8), (b_3,*), (b_4, 0.9), (b_5, 0.5), (b_6, 0.4)\},$$

$$F_1(e_3) = (b_1, 0.5), (b_2, 0.5), (b_3, 0.5), (b_4, 0.6), (b_5, 0.7), (b_6, 0.8)\},$$

$$F_1(e_4) = \{(b_1, 0.5), (b_2, 0.6), (b_3, 0.7), (b_4, 0.8), (b_5, 0.5), (b_6, 0.4)\},$$

$$F_1(e_5) = (b_1, 0.4), (b_2, 0.5), (b_3, 0.6), (b_4,*), (b_5, 0.4), (b_6, 0.5)\},$$

$$F_1(e_6) = \{(b_1, 0.4), (b_2, 0.4), (b_3, 0.5), (b_4, 0.6), (b_5, 0.2), (b_6, 0.1)\},$$

Then the fuzzy soft set (F_1, E) is a parameterized family of all fuzzy sets over U and gives a collection of approximate descriptions of the recent market information by the counselling agencies.

Similarly suppose the soft sets $(F_2, E), (F_3, E), (F_4, E), (F_5, E), and\ (F_6, E)$

Where $F_2(e_1) = \{(b_1, 0.2), (b_2,*), (b_3, 0.6), (b_4, 0.5), (b_5, 0.4), (b_6, 0.3)\}$,

$$F_2(e_2) = (b_1, 0.5), (b_2, 0.4), (b_3,*), (b_4, 0.6), (b_5, 0.3), (b_6, 0.2)\},$$

$F_2(e_3) = \{(b_1, 0.3), (b_2, 0.4), (b_3, 0.5), (b_4, 0.5), (b_5, 0.3), (b_6, 0.2)\},$

$F_2(e_4) = \{(b_1, 0.2), (b_2, 0.4), (b_3, 0.5), (b_4, 0.5), (b_5, 0.2), (b_6, 0.1)\},$

$F_2(e_5) = (b_1, 0.4), (b_2, 0.3), (b_3, 0.2), (b_4,*), (b_5, 0.3), (b_6, 0.2)\},$

$F_2(e_6) = \{(b_1, 0.2), (b_2, 0.4), (b_3, 0.1), (b_4, 0.5), (b_5, 0.2), (b_6, 0.2)\},$

$F_3(e_1) = \{(b_1, 0.4), (b_2,*), (b_3, 0.4), (b_4, 0.6), (b_5, 0.2), (b_6, 0.5)\}$

$F_3(e_2) = \{(b_1, 0.2), (b_2, 0.2), (b_3,*), (b_4, 0.5), (b_5, 0.4), (b_6, 0.4)\}$

$F_3(e_3) = \{(b_1, 0.4), (b_2, 0.5), (b_3, 0.4), (b_4, 0.4), (b_5, 0.2), (b_6, 0.3)\}$

$F_3(e_4) = \{(b_1, 0.2), (b_2, 0.5), (b_3, 0.3), (b_4, 0.6), (b_5, 0.5), (b_6, 0.4)\}$

$F_3(e_5) = \{(b_1, 0.3), (b_2, 0.4), (b_3, 0.6), (b_4,*), (b_5, 0.5), (b_6, 0.2)\}$

$F_3(e_6) = \{(b_1, 0.2), (b_2, 0.3), (b_3, 0.5), (b_4, 0.4), (b_5, 0.1), (b_6, 0.2)\}$

$F_4(e_1) = \{(b_1, 0.4), (b_2,*), (b_3, 0.5), (b_4, 0.6), (b_5, 0.3), (b_6, 0.2)\}$

$F_4(e_2) = \{(b_1, 0.3), (b_2, 0.4), (b_3,*), (b_4, 0.5), (b_5, 0.4), (b_6, 0.2)\}$

$F_4(e_3) = \{(b_1, 0.3), (b_2, 0.4), (b_3, 0.4), (b_4, 0.3), (b_5, 0.3), (b_6, 0.2)\}$

$F_4(e_4) = \{(b_1, 0.2), (b_2, 0.3), (b_3, 0.5), (b_4, 0.4), (b_5, 0.1), (b_6, 0.1)\}$

$F_4(e_5) = \{(b_1, 0.4), (b_2, 0.4), (b_3, 0.3), (b_4,*), (b_5, 0.1), (b_6, 0.2)\}$

$F_4(e_6) = \{(b_1, 0.3), (b_2, 0.3), (b_3, 0.6), (b_4, 0.6), (b_5, 0.2), (b_6, 0.1)\}$

$F_5(e_1) = \{(b_1, 0.6), (b_2,*), (b_3, 0.5), (b_4, 0.7), (b_5, 0.3), (b_6, 0.2)\}$

$F_5(e_2) = \{(b_1, 0.2), (b_2, 0.2), (b_3,*), (b_4, 0.7), (b_5, 0.6), (b_6, 0.5)\}$

$F_5(e_3) = \{(b_1, 0.6), (b_2, 0.5), (b_3, 0.4), (b_4, 0.6), (b_5, 0.7), (b_6, 0.2)\}$

$F_5(e_4) = \{(b_1, 0.6), (b_2, 0.6), (b_3, 0.7), (b_4, 0.8), (b_5, 0.5), (b_6, 0.1)\}$

$F_5(e_5) = \{(b_1, 0.5), (b_2, 0.8), (b_3, 0.7), (b_4,*), (b_5, 0.5), (b_6, 0.3)\}$

$F_5(e_6) = \{(b_1, 0.5), (b_2, 0.6), (b_3, 0.7), (b_4, 0.2), (b_5, 0.1), (b_6, 0.3)\}$

$F_6(e_1) = \{(b_1, 0.7), (b_2,*), (b_3, 0.7), (b_4, 0.8), (b_5, 0.6), (b_6, 0.5)\}$

$F_6(e_2) = \{(b_1, 0.2), (b_2, 0.3), (b_3,*), (b_4, 0.3), (b_5, 0.2), (b_6, 0.1)\}$

$F_6(e_3) = \{(b_1, 0.1), (b_2, 0.2), (b_3, 0.3), (b_4, 0.2), (b_5, 0.2), (b_6, 0.3)\}$

$F_6(e_4) = \{(b_1, 0.1), (b_2, 0.1), (b_3, 0.2), (b_4, 0.2), (b_5, 0.3), (b_6, 0.2)\}$

$F_6(e_5) = \{(b_1, 0.1), (b_2, 0.4), (b_3, 0.5), (b_4,*), (b_5, 0.1), (b_6, 0.3)\}$

$F_6(e_6) = \{(b_1, 0.4), (b_2, 0.4), (b_3, 0.5), (b_4, 0.6), (b_5, 0.1), (b_6, 0.1)\}$

Now the matrix representation of the above six fuzzy soft sets

$$(F_1, E) = \{(e_1, F_1(e_1)), (e_2, F_1(e_2)), (e_3, F_1(e_3)), (e_4, F_1(e_4)), (e_5, F_1(e_5)), (e_6, F_1(e_6))\}$$

$$(F_2, E) = \{(e_1, F_2(e_1)), (e_2, F_2(e_2)), (e_3, F_2(e_3)), (e_4, F_2(e_4)), (e_5, F_2(e_5)), (e_6, F_2(e_6))\}$$

$$(F_3, E) = \{(e_1, F_3(e_1)), (e_2, F_3(e_2)), (e_3, F_3(e_3)), (e_4, F_3(e_4)), (e_5, F_3(e_5)), (e_6, F_3(e_6))\}$$

$$(F_4, E) = \{(e_1, F_4(e_1)), (e_2, F_4(e_2)), (e_3, F_4(e_3)), (e_4, F_4(e_4)), (e_5, F_4(e_5)), (e_6, F_4(e_6))\}$$

$$(F_5, E) = \{(e_1, F_5(e_1)), (e_2, F_5(e_2)), (e_3, F_5(e_3)), (e_4, F_5(e_4)), (e_5, F_5(e_5)), (e_6, F_5(e_6))\}$$

$$(F_6, E) = \{(e_1, F_6(e_1)), (e_2, F_6(e_2)), (e_3, F_6(e_3)), (e_4, F_6(e_4)), (e_5, F_6(e_5)), (e_6, F_6(e_6))\}$$

$$(F_1,E)=\begin{pmatrix}0.7 & * & 0.5 & 0.4 & 0.8 & 0.9\\ 0.7 & 0.8 & * & 0.9 & 0.5 & 0.4\\ 0.5 & 0.5 & 0.5 & 0.6 & 0.7 & 0.8\\ 0.5 & 0.6 & 0.7 & 0.8 & 0.5 & 0.4\\ 0.4 & 0.5 & 0.6 & * & 0.4 & 0.5\\ 0.4 & 0.4 & 0.5 & 0.6 & 0.2 & 0.1\end{pmatrix}$$

$$(F_2,E)=\begin{pmatrix}0.2 & * & 0.6 & 0.5 & 0.4 & 0.3\\ 0.5 & 0.4 & * & 0.6 & 0.3 & 0.2\\ 0.3 & 0.4 & 0.5 & 0.5 & 0.3 & 0.2\\ 0.2 & 0.4 & 0.5 & 0.5 & 0.2 & 0.1\\ 0.4 & 0.3 & 0.2 & * & 0.3 & 0.2\\ 0.2 & 0.4 & 0.1 & 0.5 & 0.2 & 0.2\end{pmatrix}$$

$$(F_3,E)=\begin{pmatrix}0.4 & * & 0.4 & 0.6 & 0.2 & 0.5\\ 0.2 & 0.2 & * & 0.5 & 0.4 & 0.4\\ 0.4 & 0.5 & 0.1 & 0.4 & 0.2 & 0.3\\ 0.2 & 0.5 & 0.3 & 0.6 & 0.5 & 0.4\\ 0.3 & 0.4 & 0.6 & * & 0.5 & 0.2\\ 0.2 & 0.3 & 0.5 & 0.4 & 0.1 & 0.2\end{pmatrix}$$

$$(F_4,E)=\begin{pmatrix}0.4 & * & 0.5 & 0.6 & 0.3 & 0.2\\ 0.3 & 0.4 & * & 0.5 & 0.4 & 0.2\\ 0.3 & 0.4 & 0.4 & 0.3 & 0.3 & 0.2\\ 0.2 & 0.3 & 0.5 & 0.4 & 0.1 & 0.1\\ 0.4 & 0.4 & 0.3 & * & 0.1 & 0.2\\ 0.3 & 0.3 & 0.6 & 0.6 & 0.2 & 0.1\end{pmatrix}$$

$$(F_5,E)=\begin{pmatrix}0.4 & * & 0.5 & 0.6 & 0.3 & 0.2\\ 0.3 & 0.4 & * & 0.5 & 0.4 & 0.2\\ 0.3 & 0.4 & 0.4 & 0.3 & 0.3 & 0.2\\ 0.2 & 0.3 & 0.5 & 0.4 & 0.1 & 0.1\\ 0.4 & 0.4 & 0.3 & * & 0.1 & 0.2\\ 0.3 & 0.3 & 0.6 & 0.6 & 0.2 & 0.1\end{pmatrix}$$

$$(F_6,E)=\begin{pmatrix}0.7 & * & 0.7 & 0.8 & 0.6 & 0.5\\ 0.2 & 0.3 & * & 0.3 & 0.2 & 0.1\\ 0.1 & 0.2 & 0.3 & 0.2 & 0.2 & 0.3\\ 0.1 & 0.1 & 0.2 & 0.2 & 0.3 & 0.2\\ 0.1 & 0.4 & 0.5 & * & 0.1 & 0.3\\ 0.4 & 0.4 & 0.5 & 0.6 & 0.1 & 0.1\end{pmatrix}$$

Then by taking the average of the above six fuzzy soft sets, we get the performance evaluation matrix as follows:

$$R=\begin{pmatrix}0.5 & * & 0.533 & 0.6 & 0.433 & 0.433\\ 0.35 & 0.383 & * & 0.583 & 0.4 & 0.3\\ 0.366 & 0.416 & 0.366 & 0.433 & 0.4 & 0.333\\ 0.3 & 0.416 & 0.483 & 0.55 & 0.35 & 0.216\\ 0.35 & 0.466 & 0.483 & * & 0.316 & 0.283\\ 0.333 & 0.4 & 0.483 & 0.483 & 0.15 & 0.166\end{pmatrix}$$

Hence

$$R^T=\begin{pmatrix}0.5 & 0.35 & 0.366 & 0.3 & 0.35 & 0.333\\ * & 0.383 & 0.416 & 0.416 & 0.466 & 0.4\\ 0.533 & * & 0.366 & 0.483 & 0.483 & 0.483\\ 0.6 & 0.583 & 0.433 & 0.55 & * & 0.483\\ 0.433 & 0.4 & 0.4 & 0.35 & 0.316 & 0.15\\ 0.433 & 0.3 & 0.333 & 0.216 & 0.203 & 0.166\end{pmatrix}$$

Next, suppose that the preference weightage of Mr. X to the different selection criteria is given by the following table:

$$W=\begin{pmatrix}e_1 e_2 e_3 e_4 e_5 e_6\\ 0.2\ 0.1\ 0.2\ 0.2\ 0.1\ 0.2\end{pmatrix}\ such\ that\ \sum_{i=1}^{6} w_i \le 1$$

Thus, to get the comprehensive decision matrix D for Mr. X, we multiply R^T by the preference weightage matrix and get matrix D as follows:

$$D = \begin{pmatrix} 0.1 & 0.035 & 0.073 & 0.06 & 0.035 & 0.066 \\ 0.2* & 0.038 & 0.083 & 0.083 & 0.046 & 0.08 \\ 0.106 & 0.1* & 0.073 & 0.096 & 0.048 & 0.096 \\ 0.12 & 0.058 & 0.086 & 0.11 & 0.1* & 0.096 \\ 0.086 & 0.04 & 0.08 & 0.07 & 0.031 & 0.03 \\ 0.086 & 0.03 & 0.066 & 0.043 & 0.020 & 0.033 \end{pmatrix}$$

We get w = 3 and list the cells with value $*$ as ((b_2,e_1),(b_3,e_2),(b_4,e_5)). For every $\alpha \in \{0,1\}^{w} = \{\alpha_1 = (0,0,0), \alpha_2 = (1,0,0), \alpha_3 = (0,1,0), \alpha_4 = (0,0,1), \alpha_5 = (1,1,0), \alpha_6 = (1,0,1), \alpha_7 = (0,1,1), \alpha_8 = (1,1,1)\}$, we construct 6 × 6 matrices Pα in Tables 3-10, that is $P_{\alpha_1}, P_{\alpha_2}, P_{\alpha_3}, P_{\alpha_4}, P_{\alpha_5}, P_{\alpha_6}, P_{\alpha_7}, P_{\alpha_8}$. Merely, we get the choice values of the bikes in all of Tables 3-10.

TABLE 3

P_{A_1} MATRIX

$$\begin{matrix} & e_1 & e_2 & e_3 & e_4 & e_5 & e_6 & c_i \\ b_1 & 0.1 & 0.035 & 0.073 & 0.06 & 0.035 & 0.066 & 0.369 \\ b_2 & 0 & 0.038 & 0.083 & 0.083 & 0.046 & 0.08 & 0.33 \\ b_3 & 0.106 & 0 & 0.073 & 0.096 & 0.048 & 0.096 & 0.419 \\ b_4 & 0.12 & 0.0583 & 0.086 & 0.11 & 0 & 0.096 & 0.47 \\ b_5 & 0.086 & 0.04 & 0.08 & 0.07 & 0.031 & 0.03 & 0.337 \\ b_6 & 0.086 & 0.03 & 0.066 & 0.043 & 0.020 & 0.033 & 0.278 \end{matrix}$$

TABLE 4

$P_{A_2}\ matrix$

$$\begin{matrix} & e_1 & e_2 & e_3 & e_4 & e_5 & e_6 & c_i \\ b_1 & 0.1 & 0.035 & 0.073 & 0.06 & 0.035 & 0.066 & 0.369 \\ b_2 & 0.2 & 0.038 & 0.083 & 0.083 & 0.046 & 0.08 & 0.33 \\ b_3 & 0.106 & 0 & 0.073 & 0.096 & 0.048 & 0.096 & 0.419 \\ b_4 & 0.12 & 0.058 & 0.086 & 0.11 & 0 & 0.096 & 0.47 \\ b_5 & 0.086 & 0.04 & 0.08 & 0.07 & 0.031 & 0.03 & 0.337 \\ b_6 & 0.086 & 0.03 & 0.066 & 0.043 & 0.020 & 0.033 & 0.278 \end{matrix}$$

TABLE 5

$P_{A_3}\ matrix$

$$\begin{matrix} & e_1 & e_2 & e_3 & e_4 & e_5 & e_6 & c_i \\ b_1 & 0.1 & 0.035 & 0.073 & 0.06 & 0.035 & 0.066 & 0.369 \\ b_2 & 0 & 0.038 & 0.083 & 0.083 & 0.046 & 0.08 & 0.33 \\ b_3 & 0.106 & 0.1 & 0.073 & 0.096 & 0.048 & 0.096 & 0.419 \\ b_4 & 0.12 & 0.058 & 0.086 & 0.11 & 0 & 0.096 & 0.47 \\ b_5 & 0.086 & 0.04 & 0.08 & 0.07 & 0.031 & 0.03 & 0.337 \\ b_6 & 0.086 & 0.03 & 0.066 & 0.043 & 0.020 & 0.033 & 0.278 \end{matrix}$$

TABLE 6

$P_{A_4} matrix$

$$\begin{matrix} & e_1 & e_2 & e_3 & e_4 & e_5 & e_6 & c_i \\ b_1 & 0.1 & 0.035 & 0.073 & 0.06 & 0.035 & 0.066 & 0.369 \\ b_2 & 0 & 0.038 & 0.083 & 0.083 & 0.046 & 0.08 & 0.33 \\ b_3 & 0.106 & 0 & 0.073 & 0.096 & 0.048 & 0.096 & 0.419 \\ b_4 & 0.12 & 0.058 & 0.086 & 0.11 & 0.1 & 0.096 & 0.47 \\ b_5 & 0.086 & 0.04 & 0.08 & 0.07 & 0.031 & 0.03 & 0.337 \\ b_6 & 0.086 & 0.03 & 0.066 & 0.043 & 0.020 & 0.033 & 0.278 \end{matrix}$$

TABLE 7

P_{A_5} MATRIX

	e_1	e_2	e_3	e_4	e_5	e_6	c_i
b_1	0.1	0.035	0.073	0.06	0.035	0.066	0.369
b_2	0.2	0.038	0.083	0.083	0.046	0.08	0.33
b_3	0.106	0.1	0.073	0.096	0.048	0.096	0.419
b_4	0.12	0.058	0.086	0.11	0	0.096	0.47
b_5	0.086	0.04	0.08	0.07	0.031	0.03	0.337
b_6	0.086	0.03	0.066	0.043	0.020	0.033	0.278

TABLE 8

P_{A_6} *matrix*

	e_1	e_2	e_3	e_4	e_5	e_6	c_i
b_1	0.1	0.035	0.073	0.06	0.035	0.066	0.369
b_2	0.2	0.038	0.083	0.083	0.046	0.08	0.33
b_3	0.106	0	0.073	0.096	0.048	0.096	0.419
b_4	0.12	0.058	0.086	0.11	0.1	0.096	0.47
b_5	0.086	0.04	0.08	0.07	0.031	0.03	0.337
b_6	0.086	0.03	0.066	0.043	0.020	0.033	0.278

TABLE 9

P_{A_7}*matrix*

	e_1	e_2	e_3	e_4	e_5	e_6	c_i
b_1	0.1	0.035	0.073	0.06	0.035	0.066	0.369
b_2	0	0.038	0.083	0.083	0.046	0.08	0.33
b_3	0.106	0.1	0.073	0.096	0.048	0.096	0.519
b_4	0.12	0.058	0.086	0.11	0.1	0.096	0.57
b_5	0.086	0.04	0.08	0.07	0.031	0.03	0.337
b_6	0.086	0.03	0.066	0.043	0.020	0.033	0.278

TABLE 10

P_{A_8}*matrix*

	e_1	e_2	e_3	e_4	e_5	e_6	c_i
b_1	0.1	0.035	0.073	0.06	0.035	0.066	0.369
b_2	0.2	0.038	0.083	0.083	0.046	0.08	0.53
b_3	0.106	0.1	0.073	0.096	0.048	0.096	0.519
b_4	0.12	0.058	0.086	0.11	0.1	0.096	0.57
b_5	0.086	0.04	0.08	0.07	0.031	0.03	0.337
b_6	0.086	0.03	0.066	0.043	0.020	0.033	0.278

Appropriately, to the part of the table in which have the highest choice value we notice that,b_1,b_5,b_6 has no highest choice values. So $O_{b_1}, O_{b_5}, O_{b_6} = 0$

b_2 has the highest choice value 0.53 at $P_{\alpha_2}, P_{\alpha_5}, P_{\alpha_6}, P_{\alpha_8}$ is $n_{b4} = 4/2^3$

b_3 has the highest choice value 0.519 at$P_{\alpha_3}, P_{\alpha_5}, P_{\alpha_7}, P_{\alpha_8}$ is $n_{b3}=4/2^3$

b_4 has the highest choice value 0.51 at$P_{\alpha_4}, P_{\alpha_6}, P_{\alpha_7}, P_{\alpha_8}$ is $n_{b4}=4/2^3$

The dominated objects are denoted by $O_{b_1}, O_{b_5}, O_{b_6} = 0$.

It is clear that the highest choice value is O_{b_4} and so the optimal decision is to select b_4

Since choice value of b_4 = 0.57 has the highest choice value in four tables that is nb_4=4.

Hence, Mr. X can take the decision to buy the bike b_4.

CONCLUSION

We have put in the notion of incomplete fuzzy soft sets in Sanchez's method of decision making. A case study has been taken to disclose the clarity of the technique. In this views, some basic concept and features are reviewed and also, an algorithm is given to handle incomplete fuzzy soft set based decision making problem.

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