Invention Of Best Technology In Agriculture Using Intuitionistic Fuzzy Soft Matrices

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Abstract: Soft Matrix theory is a newly emerging mathematical tool to deal with uncertain problems. In this paper, we define IFSM and different types of IFSM with example. Finally we extend our approach in application of these matrices in (Agriculture) decision making problems.

Key words: Addition of IFSM, Complement of IFSM, Fuzzy soft matrix(FSM), Fuzzy soft set(FSS), Inuitionistic fuzzy soft matrix(IFSM), Soft set, Subtraction of intuitionistic fuzzy soft matrix.

1 INTRODUCTION


In 2013, Deli and Cagman [5] introduced intuitionistic fuzzy parameterized soft sets. They have also applied to the problems that contain uncertainties based on intuitionistic fuzzy parameterized soft sets. In 2013, Rajarajeswari and Dhanalakshmi [11] described intuitionistic fuzzy soft matrix with some traditional operations. In 2013, Jailil and Tapan Kumar Roy [6] introduced properties on intuitionistic fuzzy soft matrix. In this paper, we proposed intuitionistic fuzzy soft matrices and defined different types of intuitionistic fuzzy soft matrices and some operations. Finally, We extend our approach in application of these matrices in decision making problems.

2 PRELIMINARIES

In this section, We recall some basic notion of fuzzy soft set theory and fuzzy soft matrices.

2.1 Soft Set [10]

Let U be an initial universe set and E be a set of parameters. Let \( P(U) \) denotes the power Set of U. Let \( A \subseteq E \). A pair \( (F_A,E) \) is called a soft set over U, where \( F_A \) is a mapping given by \( F_A : E \rightarrow P(U) \) Such that \( F_A(e) = \emptyset \) if \( e \notin A \). Here \( F_A \) is called approximate function of the soft set \( (F_A,E) \). The set \( F_A(e) \) is called e- approximate value set which consist of related objects of the parameter eeE. In other words, a soft set over U is a parameterized family of subsets of the universe U.

Example 2.1:

Let \( U=\{u_1,u_2,u_3,u_4\} \) be a set of four shirts and \( E=\{\text{White}(e_1),\text{Blue}(e_2),\text{Green}(e_3)\} \) be a set of parameters. If \( A=\{e_1,e_2\} \subseteq E \). Let \( F_{e_1}(e_1)=\{u_1,u_2,u_3\} \) and \( F_{e_2}(e_2)=\{u_1,u_2,u_3\} \) then we write the soft set \( (F_{e_1},E) =\{(e_1,\{u_1,u_2,u_3\}),(e_2,\{u_1,u_2,u_3\})\} \) over U which describe the “colour of the shirts" Which Mr.C is going to buy. We may represent the soft set in the following form:

<table>
<thead>
<tr>
<th>U</th>
<th>White(e₁)</th>
<th>Blue(e₂)</th>
<th>Green(e₃)</th>
</tr>
</thead>
<tbody>
<tr>
<td>u₁</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>u₂</td>
<td>1</td>
<td>1</td>
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</tr>
<tr>
<td>u₃</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>u₄</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 2.1.1

2.2 Fuzzy soft set [7]

Let U be an initial universe set and E be a set of parameters. Let \( P(U) \) denotes the set of all fuzzy sets of U. Let \( A \subseteq E \). A pair \( (F_A,E) \) is called a fuzzy soft set (FSS) over
U, where $F_A$ is a mapping given by $F_A: E \rightarrow P(U)$ Such that $F_A(e) = \phi$ if $e \notin A$, Where $\phi$ is a null fuzzy set.

**Example 2.2:**
Consider the example 2.1., here we cannot express with only two real numbers 0 and 1, we can characterized it by a membership function instead of crisp number 0 and 1, which associate with each element a real number in the interval [0,1]. Then

$$( F_A, E ) = \{( F_A(e_1) = \{(u_1,0.2),(u_2,0.5),(u_3,0.9),(u_4,0.3)\},$$
$$( F_A(e_2) = \{(u_1,0.3),(u_2,0.4),(u_4,0.7)\}\}$$

is the fuzzy soft set representing the "colour of the shirts" which Mr.C is going to buy. We may represent the fuzzy soft set in the following form:

<table>
<thead>
<tr>
<th>U</th>
<th>White(e₁)</th>
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<th>Green(e₃)</th>
</tr>
</thead>
<tbody>
<tr>
<td>u₁</td>
<td>0.2</td>
<td>0.3</td>
<td>0.0</td>
</tr>
<tr>
<td>u₂</td>
<td>0.5</td>
<td>0.4</td>
<td>0.0</td>
</tr>
<tr>
<td>u₃</td>
<td>0.9</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>u₄</td>
<td>0.3</td>
<td>0.7</td>
<td>0.0</td>
</tr>
</tbody>
</table>

**Table 2.2.2**

**2.3 Fuzzy Soft Matrices (FSM) [4]**
Let $(F_A, E)$ be a fuzzy soft set over $U$. Then a subset of $U \times E$ is uniquely defined by $R_A = \{(u,e) : e \in A, u \in F_A(e)\}$ which is called relation form of $(F_A, E)$. The characteristic function of $R_A$ is written by $\mu_{R_A} : U \times E \rightarrow [0,1]$ where $\mu_{R_A}(u,e) \in [0,1]$ is the membership value of $u \in U$ for each $e \in E$.

If $[\mu_{ij}] = [\mu_{R_A}(u,e)]$, we can define a matrix

$$[\mu_{ij}]_{m \times n} = \begin{bmatrix}
\mu_{11} & \mu_{12} & \cdots & \mu_{1n} \\
\mu_{21} & \mu_{22} & \cdots & \mu_{2n} \\
\vdots  & \vdots  & \ddots & \vdots  \\
\mu_{m1} & \mu_{m2} & \cdots & \mu_{mn}
\end{bmatrix}$$

Which is called an $m \times n$ soft matrix of the soft set $(F_A,E)$ over U. Therefore we can say that a fuzzy soft set $F_A(E)$ is uniquely characterized by the matrix $[\mu_{ij}]_{m \times n}$ and both concepts are interchangeable.

**Example 2.3:**
Assume that $U = \{u_1,u_2,u_3,u_4,u_5\}$ is a universal set and $E = \{e_1,e_2,e_3,e_4\}$ is a set of all parameters.

If $A \subseteq E = \{e_1,e_2,e_3,e_4\}$ and

$$( F_A(e_1) = \{(u_1,0.2),(u_2,0.3),(u_3,0.5),(u_4,0.1),(u_5,0.6)\},$$
$$( F_A(e_2) = \{(u_1,0.5),(u_2,0.6),(u_3,0.7),(u_4,0.3),(u_5,0.1)\},$$
$$( F_A(e_3) = \{(u_1,0.3),(u_2,0.8),(u_3,0.4),(u_4,0.5),(u_5,0.7)\}$$

Then the fuzzy soft set $(F_A, E)$ is a parameterized family $\{F_A(e_1), F_A(e_2), F_A(e_3)\}$ of all fuzzy set over U. Hence the fuzzy soft matrix $[\mu_{ij}]$ can be written as

$$[\mu_{ij}] = \begin{bmatrix}
0.2 & 0.5 & 0.3 & 0.0 \\
0.3 & 0.6 & 0.8 & 0.0 \\
0.5 & 0.7 & 0.4 & 0.0 \\
0.1 & 0.3 & 0.5 & 0.0 \\
0.6 & 0.1 & 0.7 & 0.0 \\
\end{bmatrix}$$

**2.4 Intuitionistic Fuzzy Soft Set (IFSS) [8]**
Let $U$ be an initial universe, $E$ be the set of parameters and $A \subseteq E$. A pair $(F_A, E)$ is called an intuitionistic fuzzy soft set (IFSS) over $U$, where $F_A$ is a mapping given by $F_A : E \rightarrow I^U$, where $I^U$ denotes the collection of all intuitionistic fuzzy subsets of $U$.

**Example 2.4:**
Suppose that $U = \{u_1,u_2,u_3,u_4\}$ be a set of four shirts and $E = \{\text{white}(e_1), \text{blue}(e_2), \text{green}(e_3)\}$ be a set of parameters. If $A = \{e_1,e_2\} \subseteq E$.

Let $F_A(e_1) = \{(u_1,0.3,0.7),(u_2,0.8,0.1),(u_3,0.4,0.2),(u_4,0.6,0.0)\}$
$F_A(e_2) = \{(u_1,0.8,0.1),(u_2,0.9,0.1),(u_4,0.4,0.5),(u_4,0.2,0.3)\}$

then we write intuitionistic fuzzy soft set is

$$( F_A, E ) = \{(F_A(e_1) = ((u_1,0.3,0.7),(u_2,0.8,0.1),(u_3,0.4,0.2),(u_4,0.6,0.0))$$
$$F_A(e_2) = ((u_1,0.8,0.1),(u_2,0.9,0.1),(u_3,0.4,0.5),(u_4,0.2,0.3))\}$$

We would represent this intuitionistic fuzzy soft set in matrix form as

$$[\mu_{ij}] = \begin{bmatrix}
(0.3,0.7) & (0.8,0.1) & (0.0,0.0) \\
(0.8,0.1) & (0.9,0.1) & (0.0,0.0) \\
(0.4,0.2) & (0.4,0.5) & (0.0,0.0) \\
(0.6,0.2) & (0.2,0.3) & (0.0,0.0)
\end{bmatrix}$$

**2.5 Intuitionistic Fuzzy Soft Matrices (IFSM) [4]**
Let $U$ be an initial universe, $E$ be the set of parameters and $A \subseteq E$. Let $(F_A, E)$ be an intuitionistic fuzzy soft set (IFSS) over $U$. Then a subset of $U \times E$ is uniquely defined by

$$R_A = \{(u,e) : e \in A, u \in F_A(e)\}$$

Which is called relation form of $(F_A, E)$. The membership and non-membership functions of are written by $\mu_{RA} : U \times E \rightarrow [0,1]$ and $\gamma_{RA} : U \times E \rightarrow [0,1]$ where $\mu_{RA}(u,e) \in [0,1]$ and $\gamma_{RA}(u,e) \in [0,1]$ are the membership value and non-membership value of $u \in U$ for each $e \in E$.

If $[\mu_{ij}, \gamma_{ij}] = ([\mu_{RA}(u_i,e_j), \gamma_{RA}(u_i,e_j)]$ we can define a matrix

$$[\mu_{ij}, \gamma_{ij}]_{m \times n} = \begin{bmatrix}
(\mu_{11},\gamma_{11}) & (\mu_{12},\gamma_{12}) & \cdots & (\mu_{1n},\gamma_{1n}) \\
(\mu_{21},\gamma_{21}) & (\mu_{22},\gamma_{22}) & \cdots & (\mu_{2n},\gamma_{2n}) \\
\vdots & \vdots & \ddots & \vdots  \\
(\mu_{m1},\gamma_{m1}) & (\mu_{m2},\gamma_{m2}) & \cdots & (\mu_{mn},\gamma_{mn})
\end{bmatrix}$$

Which is called an $m \times n$ IFSM of the IFSS $(F_A, E)$ over U. Therefore, we can say that IFSS $(F_A, E)$ is uniquely
characterized by the matrix \( [(\mu_{ij}, \gamma_{ij})]_{mn} \) and both concepts are interchangeable. The set of all \( m \times n \) IFMs will be denoted by \( \text{IFSM}_{mn} \).

Example 2.5:

Let \( U = \{u_1, u_2, u_3, u_4, u_5\} \) is a universal set and \( E = \{e_1, e_2, e_3, e_4\} \) is a set of parameters. If \( A = (e_1, e_2, e_3) \subseteq E \) and
\[
\bar{F}_A(e_1) = [(0.1, 0.3, 0.5), (0.2, 0.6, 0.4)], \bar{F}_A(e_2) = [(0.6, 0.4, 0.2), (0.0, 0.0, 0.0)], \bar{F}_A(e_3) = [(0.0, 0.0, 0.0), (0.6, 0.4, 0.2)]
\]

Then the IF set \( \bar{F}_A(E) \) is a parameterized family \( \{\bar{F}_A(e_1), \bar{F}_A(e_2), \bar{F}_A(e_3)\} \) of all IF sets over \( U \).

Hence IFSM \( [(\mu_{ij}, \gamma_{ij})] \) can be written as
\[
[(\mu_{ij}, \gamma_{ij})] =
\begin{bmatrix}
(0.5,0.4) & (0.3,0.5) & (0.6,0.2) & (0.0,0.0) \\
(0.8,0.1) & (0.4,0.6) & (1.0,0.0) & (0.0,0.0) \\
(0.7,0.2) & (0.1,0.8) & (0.9,0.1) & (0.0,0.0) \\
(0.2,0.6) & (0.3,0.7) & (0.6,0.4) & (0.0,0.0)
\end{bmatrix}
\]

2.6 Complement of Intuitionistic Fuzzy Soft Matrices

Let \( \bar{A} = [(\mu_{ij}^A, \gamma_{ij}^A)] \in \text{IFSM}_{mn} \). Then complement of \( \bar{A} \) denoted by \( \bar{A}^c \) is defined as \( \bar{A}^c = [(\mu_{ij}^{\bar{A}^c}, \gamma_{ij}^{\bar{A}^c})] \) for all i and j.

Example 2.6:

Consider the example 2.5,
\[
\bar{A}^c = [(\mu_{ij}^{\bar{A}^c}, \gamma_{ij}^{\bar{A}^c})] =
\begin{bmatrix}
(0.4,0.5) & (0.5,0.3) & (0.2,0.6) & (0.0,0.0) \\
(0.1,0.8) & (0.6,0.4) & (0.0,0.1) & (0.0,0.0) \\
(0.2,0.7) & (0.8,0.1) & (1.0,0.1) & (0.0,0.0) \\
(0.6,0.2) & (0.7,0.3) & (0.4,0.6) & (0.0,0.0)
\end{bmatrix}
\]

2.7 Addition of Intuitionistic Fuzzy Soft Matrices

If \( \bar{A} = [(\mu_{ij}^A, \gamma_{ij}^A)] \in \text{IFSM}_{mn} \) and \( \bar{B} = [(\mu_{ij}^B, \gamma_{ij}^B)] \in \text{IFSM}_{mn} \) then \( \bar{C} = [(\mu_{ij}^C, \gamma_{ij}^C)] \in \text{IFSM}_{mn} \). We define \( \bar{A}+\bar{B} \), addition of \( \bar{A} \) and \( \bar{B} \) as \( \bar{A}+\bar{B} = \bar{C} = (\max(\mu_{ij}^A, \mu_{ij}^B), \min(\gamma_{ij}^A, \gamma_{ij}^B)) \) for all i and j.

2.8 Subtraction of Intuitionistic Fuzzy Soft Matrices

If \( \bar{A} = [(\mu_{ij}^A, \gamma_{ij}^A)] \in \text{IFSM}_{mn} \) and \( \bar{B} = [(\mu_{ij}^B, \gamma_{ij}^B)] \in \text{IFSM}_{mn} \) then \( \bar{C} = [(\mu_{ij}^C, \gamma_{ij}^C)] \in \text{IFSM}_{mn} \). We define \( \bar{A} - \bar{B} \), subtraction of \( \bar{A} \) and \( \bar{B} \) as \( \bar{A}-\bar{B} = \bar{C} = (\min(\mu_{ij}^A, \mu_{ij}^B), \max(\gamma_{ij}^A, \gamma_{ij}^B)) \) for all i and j.

3 Intuitionistic Fuzzy Soft Matrix Theory

3.1 Value Matrix

Let \( \bar{A} = [(\mu_{ij}^A, \gamma_{ij}^A)] \in \text{IFSM}_{mn} \). Then \( \bar{A} \) is said to be value of intuitionistic fuzzy soft matrix denoted by \( V(\bar{A}) \) and is defined as \( V(\bar{A}) = [(\mu_{ij}^A - \gamma_{ij}^A)] \) if \( i = 1, 2, 3, \ldots, m \) and \( j = 1, 2, 3, \ldots, n \) for all i and j.

3.2 Score Matrix

If \( \bar{A} = [(\mu_{ij}^A, \gamma_{ij}^A)] \in \text{IFSM}_{mn} \), \( \bar{B} = [(\mu_{ij}^B, \gamma_{ij}^B)] \in \text{IFSM}_{mn} \). Then \( \bar{A} \) and \( \bar{B} \) is said to be intuitionistic fuzzy soft score matrix denoted by \( S(\bar{A}, \bar{B}) \) and is defined as \( S(\bar{A}, \bar{B}) = V(\bar{A}) - V(\bar{B}) \).

3.3 Total Score

If \( \bar{A} = [(\mu_{ij}^A, \gamma_{ij}^A)] \in \text{IFSM}_{mn} \), \( \bar{B} = [(\mu_{ij}^B, \gamma_{ij}^B)] \in \text{IFSM}_{mn} \). Let the corresponding value matrix be \( V(\bar{A}), V(\bar{B}) \) and their score matrix is \( S(\bar{A}, \bar{B}) \). Then the total score for each \( u_k \) in U is
\[
S_i = \sum_{j=1}^{n}(V(\bar{A}) - V(\bar{B})) = \sum_{j=1}^{n}((\mu_{ij}^A - \gamma_{ij}^A) - (\mu_{ij}^B - \gamma_{ij}^B)).
\]

Methodology:

Suppose U is a set of farmers producing quality of paddy to be selected as the best farmer for the healthier yields produced to the human existence without affecting their health. This will be Scientifically selected and tested by the experts in Agriculture according to the natural manures, Chemical fertilizers, pesticides used by the farmers. Let E is a set of parameters related to the yield cultivated by the farmers from the fields, for good health. We construct IFSS(\( \bar{F}_A,E \)) over U represent the selection of farmers by the expert in Agricultural field Y. Where \( \bar{A} \) is a mapping \( \bar{A}:E \rightarrow I \), \( \bar{B} \) is the collection of all intuitionistic fuzzy subsets of U. We further construct another IFSS (\( \bar{G}_E,E \)) over U represent the selection of farmers by the expert in Agricultural field Y. Where \( \bar{G}_E \) is a mapping \( \bar{G}_E:E \rightarrow I \), \( \bar{B} \) is the collection of all intuitionistic fuzzy subsets of U. The matrices \( \bar{A} \) and \( \bar{B} \) corresponding to the intuitionistic fuzzy soft sets (\( \bar{F}_A,E \)) and (\( \bar{G}_E,E \)) are constructed. We compute the complements (\( \bar{F}_A,E \)) and (\( \bar{G}_E,E \)) and their matrices \( \bar{A}^c \) and \( \bar{B}^c \) respectively. Then compute \( \bar{A}+\bar{B} \) which is the maximum membership of farmers who will be selected by the scientist as Judges. Further compute \( \bar{A}+\bar{B} \) which is the maximum membership of non selection of farmers by the scientist as Judges. Using definition(3.1) compute \( V(\bar{A}+\bar{B}), V(\bar{A}^c+\bar{B}^c) \) and \( S(\bar{A}+\bar{B},\bar{A}^c+\bar{B}^c) \) and the total score secured \( S_i \) for each farmer in U. Finally \( S_k = \max(S_i) \), then we conclude that the farmer \( u_k \) has been selected by the judges. If \( S_k \) has more than one value occurs and by investigating this process repeatedly by reassessing the parameters.

4 ALGORITHM

Step 1: Input the intuitionistic fuzzy soft set (\( \bar{F}_A,E \)) and obtain the intuitionistic fuzzy soft matrices \( \bar{A},\bar{B} \) corresponding to (\( \bar{F}_A,E \)) and (\( \bar{G}_E,E \)) respectively.

Step 2: Write the intuitionistic fuzzy soft complement sets (\( \bar{F}_A,E \)) and (\( \bar{G}_E,E \)) and obtain the intuitionistic fuzzy soft matrices \( \bar{A}^c,\bar{B}^c \) corresponding to (\( \bar{F}_A,E \)) and (\( \bar{G}_E,E \)) respectively.

Step 3: Compute (\( \bar{A}+\bar{B} \), (\( \bar{A}^c+\bar{B}^c \)), (\( V(\bar{A}+\bar{B}) \), (\( V(\bar{A}^c+\bar{B}^c) \)) and \( S(\bar{A}+\bar{B},\bar{A}^c+\bar{B}^c) \).

Step 4: Compute the total score \( S_i \) for each \( u_i \) in U.
Step 5: Find $S_k = \max(S_k)$, then we conclude the best farmer $u_k$ has the maximum value, since $u_k$ produced healthy and Quality of paddy.

Step 6: If $S_k$ has more than one value, then go to step (1) so as to repeat the process by reassessing the parameter for selecting the best farmer.

5 echnology in a Decision Making Problem

Let $(\tilde{F}_A, E)$ and $(\tilde{G}_B, E)$ be two intuitionistic fuzzy soft set representing the selection of four farmers from the universal set $U = \{u_1, u_2, u_3, u_4\}$ by the experts X and Y. Let $E = \{e_1, e_2, e_3\}$ be the set of parameters which stand for different types of manures like, natural manure, chemical fertilizer and pesticides will be taken to identify the best farmer by testing the paddy which will be considered for good health to human race.

$$(\tilde{F}_A, E) = \{(\tilde{F}_A, (e_1), (u_1, 0.8, 0.2), (u_2, 0.5, 0.4), (u_3, 0.6, 0.1), (u_4, 0.6, 0.3))\}$$

$$(\tilde{F}_A, (e_2), (u_1, 0.7, 0.2), (u_2, 0.4, 0.6), (u_3, 0.2, 0.6), (u_4, 0.8, 0.1))$$

$$(\tilde{F}_A, (e_3), (u_1, 0.6, 0.4), (u_2, 0.7, 0.3), (u_3, 0.7, 0.1), (u_4, 0.4, 0.3))$$

$$(\tilde{G}_B, E) = \{(\tilde{G}_B, (e_1), (u_1, 0.7, 0.3), (u_2, 0.6, 0.3), (u_3, 0.4, 0.5), (u_4, 0.7, 0.1))\}$$

$$(\tilde{G}_B, (e_2), (u_1, 0.6, 0.4), (u_2, 0.7, 0.2), (u_3, 0.9, 0.1), (u_4, 0.4, 0.6))$$

$$(\tilde{G}_B, (e_3), (u_1, 0.5, 0.3), (u_2, 0.8, 0.2), (u_3, 0.5, 0.5), (u_4, 0.3, 0.7))$$

These two intuitionistic fuzzy soft sets are represented by the following intuitionistic fuzzy soft matrices respectively.

$$\tilde{A} = \begin{bmatrix}
0.8, 0.2 & 0.7, 0.2 & 0.6, 0.4 \\
0.5, 0.4 & 0.4, 0.6 & 0.7, 0.3 \\
0.6, 0.1 & 0.2, 0.6 & 0.7, 0.1 \\
0.6, 0.3 & 0.8, 0.1 & 0.4, 0.3
\end{bmatrix}$$

$$\tilde{B} = \begin{bmatrix}
0.7, 0.3 & 0.6, 0.4 & 0.5, 0.3 \\
0.6, 0.3 & 0.7, 0.2 & 0.8, 0.2 \\
0.4, 0.5 & 0.9, 0.1 & 0.5, 0.5 \\
0.7, 0.1 & 0.4, 0.6 & 0.3, 0.7
\end{bmatrix}$$

Then the intuitionistic fuzzy soft complement matrices are

$$\tilde{A}^o = \begin{bmatrix}
0.4, 0.5 & 0.6, 0.4 & 0.3, 0.7 \\
0.1, 0.6 & 0.6, 0.2 & 0.1, 0.7 \\
0.3, 0.6 & 0.1, 0.8 & 0.3, 0.4
\end{bmatrix}$$

$$\tilde{B}^o = \begin{bmatrix}
0.3, 0.7 & 0.4, 0.6 & 0.3, 0.5 \\
0.5, 0.4 & 0.6, 0.2 & 0.5, 0.5 \\
0.1, 0.7 & 0.6, 0.4 & 0.7, 0.3
\end{bmatrix}$$

Calculate the score matrix $S((\tilde{A} + \tilde{B}), ((\tilde{A} + \tilde{B})^o))$ and total score for the best former who produced Quality of paddy.
We know that $S_1$ has the maximum value and the farmer who has used natural manure has the maximum yield. Thus we conclude that from both the scientific experts opinion farmer $u_1$ is selected as best one.

6 Conclusion

In this paper, we have proposed the concept of intuitionistic fuzzy soft matrix and applied various new technologies on the matrices. Finally a new efficient solution procedure has been developed to solve intuitionistic fuzzy soft set based on real life decision making problems, which will contain more than one decision and to study whether the technology put forth in this paper may emerge a noteworthy result in this field.

REFERENCES


