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RELATIONS ON GENERALIZED FUZZY SOFT SETS

MANASH JYOTI BORAH*

Department of Mathematics, Bahona College, Jorhat, Assam-785101, India.

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ABSTRACT

In this paper, some properties of generalized fuzzy soft equivalence relation have been discussed and finally applications of generalized fuzzy soft relation in decision making problem have been shown. Also we present the definition of union and intersection between two generalized fuzzy soft relations.

Keywords: *Fuzzy soft sets, Generalized fuzzy soft set, union, intersection, generalized fuzzy soft relations.*

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1. INTRODUCTION

In real world, the complexity generally arises from uncertainty in the form of ambiguity. Uncertainty may arise due to partial information about the problem, or due to information which is not fully reliable, or due to receipt of information from more than one source. Fuzzy set theory, Rough set theory, Vague set, theory of probability are a mathematical tool to handle the uncertainty arising due to vagueness. In 1965, Zadeh [9] introduced the notion of fuzzy set theory. Later in 1999, Moldstov [7] initiated the novel concept of soft set theory. Maji, Biswas and Roy [5] studied the theory of soft sets initiated by Moldstov [7] in 2003 and put forward definitions of equality of two soft sets , subset and super set of a soft set, complement of a soft set. In 2009 Majumder and Samanta [6] initiated another important part, known as Generalized Fuzzy Soft Set Theory. While generalizing the concept of Fuzzy Soft Sets, Majumder and Samanta [6] considered the same set of parameter. But in 2012, Borah *et.al* [3] considering generalized fuzzy soft sets different sets of parameters. In 2014, Borah [4] introduced generalized fuzzy soft sets in new directions.

In this paper we give the proof of some propositions of soft relation and support them with examples. We also discussed irreflexive, equivalence relation, complement, union, intersection, Identity and some algebraic properties of fuzzy soft relation.

2. PRELIMINARIES

Definition 2.1[7]: A pair (F, E) is called a Soft set over U if and only if F is a mapping of E into the set of all subsets of the set U.

In other words, the soft set is a parameterized family of subsets of the set U. Every set $F(\varepsilon)$, $\varepsilon \in E$, from this family may be considered as the set of ε-approximate elements of the soft set.

Definition 2.2[5]: A pair (F, A) is called a fuzzy soft set over U where $F: A \to \tilde{P}(U)$ is a mapping from A into $\tilde{P}(U)$.

Definition 2.3 [8]: A binary operation $*: [0,1] \times [0,1] \to [0,1]$ is continuous t - norm if * satisfies the following conditions.

(i) * is commutative and associative
(ii) * is continuous
(iii) $a * 1 = a \quad \forall a \in [0,1]$
(iv) $a * b \leq c * d$ whenever $a \leq c, b \leq d$ and $a, b, c, d \in [0,1]$
An example of continuous t - norm is $a * b = ab$.

*Corresponding Author: Manash Jyoti Borah**
Department of Mathematics, Bahona College, Jorhat, Assam-785101, India.

Definition 2.4 [8]: A binary operation $\diamondsuit: [0,1] \times [0,1] \to [0,1]$ is continuous t-conorm if $\diamondsuit$satisfies the following conditions:

(i) $\diamondsuit$ is commutative and associative
(ii) $\diamondsuit$ is continuous
(iii) $a \diamondsuit 0 = a \quad \forall a \in [0,1]$
(iv) $a \diamondsuit b \le c \diamondsuit d$ whenever $a \le c, b \le d$ and $a, b, c, d \in [0,1]$
An example of continuous *t* - conorm is $a * b = a + b - ab$.

Definition 2.5 [5]: For two fuzzy soft sets (*F*, *A*) and (*G*, *B*) in a fuzzy soft class (*U*, *E*), we say that (*F*, *A*) is a fuzzy soft subset of (*G*, *B*) if

(i) $A \subseteq B$
(ii) For all $\varepsilon \in A$, $F(\varepsilon) \subseteq G(\varepsilon)$ and is written as $(F, A) \tilde{\subseteq} (G, B)$

Definition2. 6[5]: Union of two fuzzy soft sets (*F*, *A*) and (*G*, *B*) in a fuzzy soft class (*U*, *E*) is a fuzzy soft set (*H*, *C*) where $C = A \cup B$ and $\forall \varepsilon \in C$,

$$H(\varepsilon) = \begin{cases} F(\varepsilon), & \text{if } \varepsilon \in A - B \\ G(\varepsilon), & \text{if } \varepsilon \in B - A \\ F(\varepsilon) \cup G(\varepsilon), & \text{if } \varepsilon \in A \cap B \end{cases}$$

and is written as $(F, A) \tilde{\cup} (G, B) = (H, C)$.

Definition 2.7 [5]: The complement of a fuzzy soft set (*F*, *A*) is denoted by $(F, A)^c$ and is defined by $(F, A)^c = (F^c, \neg A)$ where $F^c: \neg A \to \tilde{P}(U)$ is a mapping given by $F^c(\sigma) = (F(-\sigma))^c$ for all $\sigma \in \neg A$

Definition 2.8 [6]: Let F_μ be a GFSS over (*U*, *E*). Then the complement of F_μ, denoted by $F_\mu{}^c$ and is defined by $F_\mu{}^c = G_\delta$, where $\delta(e) = \mu^c(e)$ and $G(e) = F^c(e)$, $\forall e \in E$.

Definition 2.9 [3]: Let $X = \{x_1, x_2, x_3, \ldots\ldots\ldots, x_n\}$ be the universal set of elements and $E = \{e_1, e_2, e_3, \ldots\ldots, e_m\}$ be the set of parameters. Let $A \subseteq E$ and $F: A \to I^U$ and λ be a fuzzy subset of *A* i.e. $\lambda: A \to I = [0,1]$, where I^U is the collection of all fuzzy subsets of *U*. Let $F: A \to I^U \times I$ be a function defined as follows:
$F_\lambda{}^A(e) = (F(e), \lambda(e))$, where $F(e) \in I^U$ .Then $F_\lambda{}^A$ is called a generalized fuzzy soft set (GFSS) over (*U*, *E*).

Here for each parameter $e_i, F_\lambda{}^A(e_i)$ indicates not only degree of belongingness of the elements of *U* in $F(e_i)$ but also degree of preference of such belongingness which is represented by $\lambda(e_i)$.

Definition 2.10[4]: The union of two GFSS $F_\lambda{}^A$ and $G_\mu{}^B$ over (*U*, *E*) is denoted by $F_\lambda{}^A \tilde{\cup} G_\mu{}^B$ and defined by GFSS $H_\delta{}^{A\cup B}: A \cup B \to I^U \times I$ such that for each $e \in A \cup B$ and $A, B \subseteq E$

$$\text{Where } H_\delta{}^{A\cup B}(e) = \begin{cases} (F(e), \lambda(e)), & \text{if } e \in A - B \\ (G(e), \mu(e)), & \text{if } e \in B - A \\ (F(e) \Diamond G(e), \lambda(e) * \mu(e)), & \text{if } e \in A \cap B \end{cases}$$

Definition 2.11[4]: The intersection of two GFSS $F_\lambda{}^A$ and $G_\mu{}^B$ over (*U*, *E*) is denoted by $F_\lambda{}^A \tilde{\cap} G_\mu{}^B$ and defined by GFSS $K_\delta{}^{A\cap B}: A \cap B \to I^U \times I$ such that for each $e \in A \cap B$ and $A, B \subseteq E$ $K_\delta{}^{A\cap B}(e) = (K(e), \delta(e))$,
Wh ere $K(e) = F(e) * G(e), \delta(e) = \lambda(e) \Diamond \mu(e)$. In order to avoid degenerate case, we assume here that $A \cap B \ne \varphi$.

3. MAIN RESULTS

Definition 3.1: Let $F_\lambda{}^A, G_\mu{}^B$ be a GFSS over (*U*, *E*). Then generalized fuzzy soft relation (in short GFSR) *R* from $F_\lambda{}^A$ to $G_\mu{}^B$ is a function $R: A \times B \to I^U \times I$ defined by
$R(e_a, e_b) \subseteq F_\lambda{}^A(e_a) \tilde{\cap} G_\mu{}^B(e_b), \forall (e_a, e_b) \in A \times B.$

Definition 3.2: If R is a GFSR from $F_\lambda{}^A$ to $G_\mu{}^B$ then R^{-1} is defined as $R^{-1}(e_a,e_b) = R(e_b,e_a), \forall (e_a,e_b) \in A \times B$

Definition 3.3: Let *R* and *S* be two generalized fuzzy soft relations from $F_\lambda{}^A$ to $G_\mu{}^B$ and $G_\mu{}^B$ to $H_\delta{}^C$ respectively. Then the composition $\circ$ of *R* and *S* is defined by
$(R \circ S)(e_a,e_c) = R(e_a,e_b) \tilde{\bigcap} S(e_b,e_c)$

Definition 3.4: A generalized fuzzy soft relation R on $F_\lambda{}^A$ is said to be generalized fuzzy soft reflexive relation if $R(e_a,e_b) \subseteq R(e_a,e_a)$ and $R(e_b,e_a) \subseteq R(e_a,e_a), \forall e_a, e_b \in A$

Definition 3.5: A generalized fuzzy soft relation R on $F_\lambda{}^A$ is said to be generalized fuzzy soft symmetric relation if $R(e_a,e_b) = R(e_b,e_a), \forall e_a, e_b \in A$

Definition 3.6: A generalized fuzzy soft relation R on $F_\lambda{}^A$ is said to be generalized fuzzy soft transitive relation if $R \circ R \subseteq R$

Definition 3.7: A generalized fuzzy soft relation R on $F_\lambda{}^A$ is said to be generalized fuzzy soft irraflexive relation if $R(e_a,e_b) \not\subset R(e_a,e_a)$ and $R(e_b,e_a) \not\subset R(e_a,e_a), \forall e_a, e_b \in A$

Definition 3.8: A generalized fuzzy soft relation R on $F_\lambda{}^A$ is said to be generalized fuzzy soft equivalence relation if it is reflexive, symmetric and transitive.

Proposition 3.1: If a generalized fuzzy soft relation R is reflexive then R^{-1} is also reflexive.

Proof: $R^{-1}(e_a,e_b) = R(e_b,e_a) \subseteq R(e_a,e_a) = R^{-1}(e_a,e_a)$
And $R^{-1}(e_b,e_a) = R(e_a,e_b) \subseteq R(e_a,e_a) = R^{-1}(e_a,e_a)$
Hence R^{-1} is reflexive.

Proposition 3.2: A generalized fuzzy soft relation R is Symmetric if and only if $R = R^{-1}$.

Proof: Let R is symmetric, then
$R^{-1}(e_a,e_b) = R(e_b,e_a) = R(e_a,e_b)$
$So, \quad R = R^{-1}$

Conversely, let $R = R^{-1}$ then
$R(e_a,e_b) = R^{-1}(e_a,e_b) = R(e_b,e_a)$

So R is Symmetric.

Proposition 3.3: A generalized fuzzy soft relation R is Symmetric if and only if the R^{-1} is symmetric.

Proof: Let R is symmetric, then
$R^{-1}(e_a,e_b) = R(e_b,e_a) = R(e_a,e_b) = R^{-1}(e_b,e_a)$

So R is Symmetric.

Conversely, let R^{-1} is symmetric. Then
$R^{-1}(e_a,e_b) = (R^{-1})^{-1}(e_a,e_b) = R^{-1}(e_b,e_a) = R^{-1}(e_a,e_b) = R(e_a,e_b)$

So R is Symmetric.

Proposition: 3.4. If a generalized fuzzy soft relation R is transitive then R^{-1} is also transitive.

Proof:

$$R^{-1}(e_a,e_b)=R(e_b,e_a)\supseteq(R\circ R)(e_b,e_a)=R(e_b,e_c)\cap R(e_c,e_a)=R(e_c,e_a)\bigcap R(e_b,e_c)$$
$$=R^{-1}(e_a,e_c)\bigcap R^{-1}(e_c,e_b)=(R^{-1}\circ R^{-1})(e_a,e_b)$$

Therefore $R^{-1}\circ R^{-1}\subseteq R^{-1}$.

Proposition 3.5: If a generalized fuzzy soft relation R is transitive then $R\circ R$ is also transitive.

$$(R\circ R)(e_a,e_b)=R(e_a,e_c)\bigcap R(e_c,e_b)\supseteq(R\circ R)(e_a,e_c)\cap(R\circ R)(e_c,e_b)=(R\circ R\circ R\circ R)(e_a,e_c)$$
$$(R\circ R)(e_a,e_b)=R(e_a,e_c)\bigcap R(e_c,e_b)\supseteq(R\circ R)(e_a,e_c)\cap(R\circ R)(e_c,e_b)=(R\circ R\circ R\circ R)(e_a,e_c)$$

Therefore $R\circ R\circ R\circ R\subseteq R\circ R$.

Proposition 3.6: If R and S are on symmetric generalized fuzzy soft relation $F_\lambda{}^A$ then $R\circ S$ is symmetric on $F_\lambda{}^A$ and then if and only if $R\circ S=S\circ R$.

Proof: Since R and S are symmetric. Therefore $R^{-1}=R, S^{-1}=S$.

Now

$(R\circ S)^{-1}=S^{-1}\circ R^{-1}$. So $R\circ S$ is symmetric.

Conversely,

$(R\circ S)^{-1}=S^{-1}\circ R^{-1}=S\circ R=R\circ S$.

Hence $R\circ S$ is symmetric.

Proposition 3.7: If R is symmetric and transitive generalized fuzzy soft relation then R is reflexive.

Proof:

$R(e_a,e_a)\supseteq(R\circ R)(e_a,e_a)$, Since R is transitive.

$$=R(e_a,e_b)\bigcap R(e_b,e_a)=R(e_a,e_b)\cap R(e_a,e_b)=R(e_a,e_b)$$

Similarly, $R(e_a,e_a)\supseteq R(e_b,e_a)$

Hence the proof.

Proposition: 3.8: If *S* be a generalized fuzzy soft equivalence relation on $F_\lambda{}^A$ then $S\circ S$ is also equivalence relation.

Proof: Since *S* is a generalized fuzzy soft equivalence relation therefore *S* is reflexive, symmetric and transitive.

Now

$(S\circ S)(e_a,e_b)\subseteq S(e_a,e_a)$

$\therefore$ $S\circ S$ is reflexive.

Again

$(S\circ S)(e_a,e_b)=S(e_a,e_c)\tilde{\bigcap}S(e_c,e_b)=S(e_c,e_b)\tilde{\cap}S(e_a,e_c)$ since S is symmetric

$=S(e_b,e_c)\tilde{\bigcap}S(e_c,e_a)=(S\circ S)(e_b,e_a)$

$\therefore S\circ S$ is symmetric.

$(S\circ S)(e_a,e_b)=S(e_a,e_c)\tilde{\bigcap}S(e_c,e_b)\supseteq(S\circ S)(e_a,e_c)\tilde{\cap}(S\circ S)(e_c,e_b)$ since S is symmetric

$$=(S\circ S\circ S\circ S)(e_a,e_b)$$

$\therefore S\circ S\circ S\circ S\subseteq S\circ S$

$\therefore S\circ S$ is transitive.

Hence $S\circ S$ is equivalent relation.

Proposition: 3.9: If S be a generalized fuzzy soft equivalence relation on $F_{\lambda}{}^{A}$ then S^{-1} is also equivalence relation.

Proof:

$S^{-1}(e_a,e_b)=S(e_b,e_a)\subseteq S(e_a,e_a)=S^{-1}(e_a,e_a),$ since S is reflexive

$S^{-1}(e_b,e_a)=S(e_a,e_b)\subseteq S(e_a,e_a)=S^{-1}(e_a,e_a),$

S^{-1} is reflexive

$S^{-1}(e_a,e_b)=S(e_b,e_a)=S(e_a,e_b)=S^{-1}(e_b,e_a),$ since S is symmetric

S^{-1} is symmetric.

$$\begin{aligned} S^{-1}(e_a,e_b)=S(e_b,e_a) &\supseteq (S\circ S)(e_b,e_a)=S(e_b,e_c)\tilde{\cap}S(e_c,e_a)\\ &=S(e_c,e_b)\tilde{\bigcap}S(e_a,e_c)=S^{-1}(e_b,e_c)\tilde{\cap}S^{-1}(e_c,e_a)\\ &=(S^{-1}\circ S^{-1})(e_a,e_b)\end{aligned}$$

$S^{-1}\circ S^{-1}\subseteq S^{-1}$

$\therefore S^{-1}$ is transitive

Thus S^{-1} is equivalence relation.

Definition 3.9: Let R and S be two generalized fuzzy soft relations from A to B. Then $R\le S$ is defined as follows

$$R(e_a,e_b)\le S(e_a,e_b)\Leftrightarrow (F_R(e_a,e_b)\le G_S(e_a,e_b),\lambda_R(e_a,e_b)\ge \mu_S(e_a,e_b))\ ,\forall(e_a,e_b)\in A\times B$$

Definition 3.10: Let R be a generalized fuzzy soft relation from A to B. Then complement of R is denoted by R^C and it is defined as follows

$$R^C(e_a,e_b)=(F_R{}^C(e_a,e_b),\lambda_R{}^C(e_a,e_b))\ ,\forall(e_a,e_b)\in A\times B$$

Definition 3.11: Let R and S be two generalized fuzzy soft relations from A to B. Then $R\bigcup S, R\bigcap S$ are defined as follows

$$(R\tilde{\bigcup}S)(e_a,e_b)=(F_R(e_a,e_b)\Diamond G_S(e_a,e_b),\lambda_R(e_a,e_b)*\mu_S(e_a,e_b))$$

$$(R\tilde{\cap}S)(e_a,e_b)=(F_R(e_a,e_b)*G_S(e_a,e_b),\lambda_R(e_a,e_b)\Diamond\mu_S(e_a,e_b))\ ,\forall(e_a,e_b)\in A\times B$$

Proposition 3.10: Let R and S be two elements of GFSR $(A\times B)$

(i) $R\le R\tilde{\bigcup}S, P\le R\tilde{\bigcup}S$

(ii) $R\ge R\tilde{\bigcap}S, P\ge R\tilde{\bigcap}S$

(iii) $R\le S\Rightarrow R^{-1}\le S^{-1}$

(iv) $(R\bigcap S)^{-1}=R^{-1}\bigcap S^{-1}$

(v) $(R\bigcup S)^{-1}=R^{-1}\bigcup S^{-1}$

Proof:

(i) We have

$$(R\tilde{\bigcup}S)(e_a,e_b)=(F_R(e_a,e_b)\Diamond G_S(e_a,e_b),\lambda_R(e_a,e_b)*\mu_S(e_a,e_b))$$

By definition of t-norm and t-co norm

$$F_R(e_a,e_b)\Diamond G_S(e_a,e_b)\ge F_R(e_a,e_b)$$

$$\lambda_R(e_a,e_b)*\mu_S(e_a,e_b)\le \lambda_R(e_a,e_b)$$

Therefore, by definition of $\le$

$$(R\tilde{\bigcup}S)(e_a,e_b)\ge R(e_a,e_b)$$

Hence

$$R\le R\tilde{\bigcup}S$$

(ii) similar to (i)

(iii) $R(e_a,e_b)\le S(e_a,e_b)\Rightarrow (F_R(e_a,e_b)\le G_S(e_a,e_b),\lambda_R(e_a,e_b)\ge \mu_S(e_a,e_b))$

$\Rightarrow (F_{R^{-1}}(e_b,e_a)\le G_{S^{-1}}(e_b,e_a),\lambda_{R^{-1}}(e_b,e_a)\ge \mu_{S^{-1}}(e_b,e_a))$

$\Rightarrow R^{-1}(e_b,e_a)\le S^{-1}(e_b,e_a)\Rightarrow R^{-1}\le S^{-1}$

HENCE $R\le S\Rightarrow R^{-1}\le S^{-1}$

(iv) $(R\,\tilde{\cap}\,S)^{-1}(e_a,e_b)=(R\,\tilde{\bigcap}\,S)(e_b,e_a)=(F_R(e_b,e_a)*G_S(e_b,e_a),\lambda_R(e_b,e_a)\Diamond\mu_S(e_b,e_a))$

$=(F_{R^{-1}}(e_a,e_b)*G_{S^{-1}}(e_a,e_b),\lambda_{R^{-1}}(e_a,e_b)\Diamond\mu_{S^{-1}}(e_a,e_b))$

$=(R^{-1}\,\tilde{\bigcap}\,S^{-1})(e_a,e_b)$

Hence

$(R\bigcap S)^{-1}=R^{-1}\bigcap S^{-1}$.

(v) Similar to (iv).

Proposition 4.11: Let P, R and S be three elements of GFSR $(A\times B)$

(i) If $R\le S$ then $R\circ P\le S\circ P$

(ii) If $R\le S$ then $R\circ R\le S\circ S$

Proof:

(i) $R(e_a,e_b)\le S(e_a,e_b)\Rightarrow (F_R(e_a,e_b)\le G_S(e_a,e_b),\lambda_R(e_a,e_b)\ge \mu_S(e_a,e_b))$

$\Rightarrow (F_R(e_a,e_b)*H_P(e_b,e_c)\le G_S(e_a,e_b)*H_P(e_b,e_c),\lambda_R(e_a,e_b)\Diamond\delta_P(e_b,e_c)\ge \mu_S(e_a,e_b)\Diamond\delta_P(e_a,e_b))$

$\Rightarrow R(e_a,e_b)\,\tilde{\bigcap}\,P(e_b,e_c)\le S(e_a,e_b)\,\tilde{\bigcap}\,P(e_b,e_c)$

$\Rightarrow (R\circ P)(e_a,e_c)\le (S\circ P)(e_a,e_c)\Rightarrow R\circ P\le S\circ P$

HENCE $R\le S$ then $R\circ P\le S\circ P$

(ii) Similar to (i).

Definition 3.12: A generalized fuzzy soft relation is said to be a generalized Identity fuzzy soft relation, denoted by Δ_I, if

$\Delta_I(e)=\left(F(e),I(e)\right)$ Where $F(e)=\bar{1},I(e)=0,\forall e\in A\subseteq E$

It is clear from our definition that the generalized fuzzy soft absolute set is also not unique in our way, it would depend upon the set of parameters under consideration.

Proposition 3.12:

(i) $\Delta_I={\Delta_I}^{-1}$

(ii) $R\circ\Delta_I=\Delta_I\circ R=R$

Proof:

(i) It is obvious.

(ii) $(R\circ\Delta_I)(e_a,e_c)$

$=R(e_a,e_b)\,\tilde{\bigcap}\,\Delta_I(e_b,e_c)$

$=(F_R(e_a,e_b)*1,\lambda_R(e_a,e_b)\Diamond 0)$

$=(F_R(e_a,e_b),\lambda_R(e_a,e_b))$

$=R(e_a,e_c)$

$R\circ\Delta_I=R$

Similarly we prove that

$R\circ\Delta_I=\Delta_I\circ R=R$.

4. AN APPLICATION OF GENERALIZED FUZZY SOFT RELATION IN A DECISION MAKING PROBLEM

In this section, we present an application of generalized fuzzy soft relation in a candidate's selection of an interview.

4.1: Algorithm:

Step-1: Construct the generalized fuzzy soft sets for each set of parameters.

Step-2: Construct the generalized fuzzy soft relation.

Step-3: Compute $F(e) * \lambda(e)$

Step-4: Compute the total Score of each Candidate.

Step-5: Find the lowest Score.

Suppose $U = \{c_1, c_2, c_3, c_4, c_5\}$ be the five candidates appearing in an interview and $E = \{e_1(\text{enterprising}), e_2(\text{confident}), e_3(\text{wiling to take risk})\}$ be the set of parameters. Suppose two experts X and Y take interview of the five candidates and they consider different set of parameters and the following generalized fuzzy soft sets are constructed accordingly,

$$F_\lambda{}^A(e_1) = (\{C_1/0.3, C_2/0.7, C_3/0.5, C_4/0.2, C_5/0.1\}, 0.6),$$
$$F_\lambda{}^A(e_2) = (\{C_1/0.8, C_2/0.3, C_3/0.1, C_4/0.9, C_5/0.6\}, 0.2)$$

And

$$G_\mu{}^B(e_1) = (\{C_1/0.4, C_2/0.2, C_3/0.3, C_4/0.7, C_5/0.3\}, 0.4),$$
$$G_\mu{}^B(e_3) = (\{C_1/0.6, C_2/0.4, C_3/0.3, C_4/0.4, C_5/0.6\}, 0.7)$$

Now, the following generalized fuzzy soft relations are constructing

$$R_\delta{}^{A\cap B}(e_1, e_1) = \left(\{C_1/0.12, C_2/0.14, C_3/0.15, C_4/0.14, C_5/0.03\}, 0.76\right)$$
$$R_\delta{}^{A\cap B}(e_1, e_3) = \left(\{C_1/0.18, C_2/0.28, C_3/0.15, C_4/0.08, C_5/0.06\}, 0.88\right).$$
$$R_\delta{}^{A\cap B}(e_2, e_1) = \left(\{C_1/0.32, C_2/0.06, C_3/0.03, C_4/0.63, C_5/0.18\}, 0.52\right)$$
$$R_\delta{}^{A\cap B}(e_2, e_3) = \left(\{C_1/0.48, C_2/0.12, C_3/0.03, C_4/0.36, C_5/0.36\}, 0.76\right)$$

	c_1	c_2	c_3	c_4	c_5
(e_1, e_1)	0.0912	0.1064	0.114	0.1064	0.0228
(e_1, e_3)	0.1584	0.2464	0.132	0.0704	0.0528
(e_2, e_1)	0.1664	0.0312	0.0156	0.3276	0.0936
(e_2, e_3)	0.3648	0.0912	0.0228	0.2736	0.2736

Table-1

Candidates	Total Score
c_1	0.7808
c_2	0.4752
c_3	0.2844
c_4	0.778
c_5	0.4428

Table-2

It is clear that the lowest score 0.2844, scored by c_3 and the decision is in favor of selecting c_3.

5. CONCLUSION

In this paper we discussed the fuzzy soft set and extend the concept of relation in fuzzy soft set theory. We also establish some properties of fuzzy soft relation such as symmetric, transitive, reflexive, irreflexive, equivalence etc. Also we present the definition of union and intersection between two fuzzy soft sets with a new approach.

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