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Expert soft sets on nearness approximation space

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Abstract. Expert near soft set concept with near set features added to the set of introduced experts. Features may be restricted in this new set and the basic features of the set can be examined according to the opinions of the relevant people. This will allow us to choose the most suitable object among many objects. This new idea can be illustrated with real-life examples. Here, an expert opinion that can combine expert set and near soft set models facilitates decision making when appropriate. Here, by restricting the objects, the views of all experts can be learned in a single model. In this model, the object with the desired result is obtained with the most optimal selection. In any operation to be made on our model and after, the user can learn the opinions of all experts. So, in this study, we will define the near soft expert set concept.

1. Introduction

The models used for each uncertainty problem are different from each other. For this, different set concepts have been created. With the help of objects and features on these objects, Pawlak [1] first presented the notion of rough set and then Peters [2, 3] presented the concept of near set, in which he examined sets close to each other with these features. Another set, the soft set, was created by Molodtsov [4] and has been studied by many people both in practice and in theory [4–7]. Feng and Li [8], on the other hand, established a new notion by integrating the concepts of soft set and near set. Similarly, Tasbozan [9] combined the concepts of near and soft set. These concepts have been developed and produced in the topology [10, 11]. Engineering, medical science, economics, environment etc. most of the problems in Molodtsov [4] advertised the notion of soft set theory, which is a mathematical means because it has various uncertainties. Later, soft sets and their applications are described by Maji [5]. With this theory especially in medical diagnosis, researchers have used their theories to solve some models. However, when an expert opinion that can combine most of these models is considered, the concept of expert soft set[12] has been reached. This definition was formed by using the common opinions of survey users or experts. In this model, the views of all experts can be seen together. It can use this to find our selections conveniently in the application by restricting objects and properties. With this model, it obtains the most suitable object that has the desired result. So in this article, introducing a near soft expert set concept that we think will be more effective. At last, we give the implementation of this concept to real-life problems in the decision-making period with the help of tables so that it can be seen more clearly.

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2. Preliminary

2.1. Soft Sets, Near Soft Sets, Soft Expert Set

Let $\mathcal{O}$ be an objects set, $\mathcal{F}$ be a set of parameters that define properties on objects and $\mathcal{P}(\mathcal{O})$ denotes the power set of $\mathcal{O}$.

Definition 2.1. *Let $F : B \to \mathcal{P}(\mathcal{O})$ where $B \subseteq \mathcal{F}$, then (F, B) is a soft set (SS) over $\mathcal{O}$ [6].*

Definition 2.2. *Let $NAS = (\mathcal{O}, \mathcal{F}, \sim_{Br}, N_r, \upsilon_{N_r})$ be a nearness approximation space, B be a non-empty subsets of $\mathcal{F}$ and (F, B) be a SS over $\mathcal{O}$. Then*
$N_r*((F,B)) = (N_r*(F(k) = \cup\{x \in \mathcal{O} : [x]_{Br} \subseteq F(k)\}, B))$
and
$N_r^*((F,B)) = (N_r^*(F(k) = \cup\{x \in \mathcal{O} : [x]_{Br} \cap F(k) \neq \emptyset\}, B))$
are lower and upper near approximation operators. The SS $N_r((F,B))$ with

$$Bnd_{N_r(B)}((F,B)) \geqslant 0$$

called a near soft set(NSS) [9].

Definition 2.3. *Let U be an universe set, E be a set of parameters, X a set of experts and O be a set of opinions, $Z = E \times X \times O$ and $A \subseteq Z$. A pair (F, A) is called a soft expert set over U, where F is a mapping given by $F : A \to \mathcal{P}(U)$. For the sake of convenience, let's assume that there are only two views in this study: O, that is $O = \{0 = disagree, 1 = agree\}$ [12].*

3. Near Soft Expert Set

In this section, we introduce the notion of a near soft expert set and will practice by giving an example.

Definition 3.1. *Let $\mathcal{O}$ be an objects set, E be a set of parameters, K a set of experts and T be a set of opinions, $Z = E \times K \times T$ and $B \subseteq Z$. $\sigma_E = (F, B)_E$ be a soft expert set where F is a mapping given by $F : B \to \mathcal{P}(\mathcal{O})$, where $\mathcal{P}(\mathcal{O})$ denotes the power set of $\mathcal{O}$. Then, for $X \subseteq \mathcal{O}, B \subseteq E$, $K = \{k_i \in K : i = 1, 2, ..., n\}$, $T = \{t_i : i = 0 = disagree$ or $i = 1 = agree\}$,*

$$\begin{aligned} NSE_r*(\sigma_E) &= NSE_r*((F,B)) = NSE_r*(B)(X) \\ &= \cup\{x \in \mathcal{O} : [x]_{Br,k_i} = F(\phi_i, k_i, t_i) \subseteq X\}, \\ NSE_r^*(\sigma_E) &= NSE_r^*((F,B)) = NSE_r^*(B)(X) = \cup\{x \in \mathcal{O} : [x]_{Br,k_i} \cap X \neq \emptyset\} \end{aligned}$$

where all $\phi \in B$, $k_i \in K$ are called the lower and upper near soft expert approximation operators on soft expert sets respectively.

If $Bnd_{NSE_r(B)}((F,B)) \geqslant 0$ then the σ_E soft expert set is called a near soft expert set or σ_E is called a soft expert set on nearness approximation space.

For $B = \{\phi_1(x), \phi_2(x)\}$, $F : B \to \mathcal{P}(\mathcal{O})$,

$$F(\phi_i, k_i, 1) = \{x \in \mathcal{O} : \phi_i(x) \text{ is true}, i = 1, 2\},$$

$$\begin{aligned} \sigma_{NSE}(X) &= (F,B)_{NSE}(X) \\ &= (((\phi_i, k_i, 1)_*, NSE_1*(B)(X)), ((\phi_i, k_i, 1)^*, NSE_1^*(B)(X)), ((\phi_i, k_i, 0)_*, \\ &\quad NSE_0*(B)(X)), ((\phi_i, k_i, 0)^*, NSE_0^*(B)(X))) \end{aligned}$$

is a near soft expert set.

Example 3.2. *Presume a company needs some people for the job and wants to get the opinion of some experts about these people. Let* $\mathcal{O} = \{y_1, y_2, y_3, y_4, y_5\}$*be a five person and* $B = \{\phi_1, \phi_2\} \subseteq \mathcal{F} = \{\phi_1, \phi_2, \phi_3, \phi_4\}$ *be a set of parameters, where* $\phi_1, \phi_2, \phi_3, \phi_4$ *stand for hard working, creative, succesful and well dressed, respectively.* $X = \{y_2, y_{3,} y_5\} \subseteq \{y_1, y_2, y_3, y_4, y_5\}$, $K = \{p, q\}$ *are experts and* $T = \{0 = disagree, 1 = agree\}$ *are opinions.*

For instance, the company has distributed a questionnaire to two experts to make decisions on five persons and we gain the following:

$$\begin{aligned}
F(\phi_1, p, 1) &= \{y_1, y_2, y_4\}, F(\phi_1, q, 1) = \{y_1, y_4, y_5\},\\
F(\phi_2, p, 1) &= \{y_3, y_5\}, F(\phi_2, q, 1) = \{y_1, y_3, y_4, y_5\},\\
F(\phi_3, p, 1) &= \{y_3, y_4, y_5\}, F(\phi_3, q, 1) = \{y_3, y_4, y_5\},\\
F(\phi_4, p, 1) &= \{y_1\}, F(\phi_4, q, 1) = \{y_1, y_4, y_5\}
\end{aligned}$$

and

$$\begin{aligned}
F(\phi_1, p, 0) &= \{y_3\}, F(\phi_1, q, 0) = \{y_2, y_3\},\\
F(\phi_2, p, 0) &= \{y_1, y_2, y_4\}, F(\phi_2, q, 0) = \{y_2\},\\
F(\phi_3, p, 0) &= \{y_1, y_2\}, F(\phi_3, q, 0) = \{y_1, y_2\},\\
F(\phi_4, p, 0) &= \{y_2, y_3, y_4, y_5\}, F(\phi_4, q, 0) = \{y_2, y_3\}.
\end{aligned}$$

Next, we can see that the soft expert set (F, Z) is formed as follows:

$$\begin{aligned}
(F, Z) = \{&((\phi_1, p, 1), \{y_1, y_2, y_4\}), ((\phi_1, q, 1), \{y_1, y_4, y_5\}), ((\phi_2, p, 1), \{y_3, y_5\}),\\
&((\phi_2, q, 1), \{y_1, y_3, y_4, y_5\}), ((\phi_3, p, 1), \{y_3, y_4, y_5\}),\\
&((\phi_3, q, 1), \{y_3, y_4, y_5\}), ((\phi_4, p, 1), \{y_1\}), ((\phi_4, q, 1), \{y_1, y_4, y_5\}),\\
&((\phi_1, p, 0), \{y_3\}), ((\phi_1, q, 0), \{y_2, y_3\}), ((\phi_2, p, 0), \{y_1, y_2, y_4\}),\\
&((\phi_2, q, 0), \{y_2\}), ((\phi_3, p, 0), \{y_1, y_2\}), ((\phi_3, q, 0), \{y_1, y_2\}),\\
&((\phi_4, p, 0), \{y_2, y_3, y_4, y_5\}), ((\phi_4, q, 0), \{y_2, y_3\})\}.
\end{aligned}$$

For expert p;

$$\begin{aligned}
[y1]_{\{\phi_1, p, 1\}} &= \{y_1, y_2, y_4\}, [y3]_{\{\phi_1, p, 0\}} = \{y_3, y_5\},\\
[y3]_{\{\phi_2, p, 1\}} &= \{y_3, y_5\}, [y1]_{\{\phi_2, p, 0\}} = \{y_1, y_2, y_4\}
\end{aligned}$$

and for expert q;

$$\begin{aligned}
[y1]_{\{\phi_1, q, 1\}} &= \{y_1, y_4, y_5\}, [y2]_{\{\phi_1, q, 0\}} = \{y_2, y_3\},\\
[y1]_{\{\phi_2, q, 1\}} &= \{y_1, y_3, y_4, y_5\}, [y2]_{\{\phi_2, q, 0\}} = \{y_2\},\\
[y3]_{\{\phi_2, p, 1\}} &= F(\phi_i, k_i, 1) = \{y_3, y_5\} \subseteq X = \{y_2, y_{3,} y_5\},
\end{aligned}$$

then

$$NSE_1{*}(B)(X) = \{y_3, y_5\}.$$

$$[y3]_{\{\phi_2, p, 1\}} \cap X \neq \emptyset$$

and

$$[y1]_{\{\phi_1, p, 1\}} \cap X \neq \emptyset,$$

then

$$NSE_1^{*}(B)(X) = \mathcal{O}.$$

$$[y_3]_{\{\phi_2,p,0\}} = F(\phi_i, k_i, 0) = \{y_3, y_5\} \subseteq X = \{y_2, y_3, y_5\}$$

and

$$[y_2]_{\{\phi_1,q,0\}} = \{y_2, y_3\} \subseteq X, [y_2]_{\{\phi_2,q,0\}} = \{y_2\} \subseteq X,$$

then

$$NSE_0*(B)(X) = ((\phi_1, p, 0)_*, \{y_3, y_5\}), ((\phi_1, q, 0)_*, \{y_2, y_3\}), ((\phi_2, q, 0)_*, \{y_2\}).$$

$$[y_1]_{\{\phi_2,p,0\}} = \{y_1, y_2, y_4\} \cap X \neq \emptyset,$$

then

$$NSE_0^*(B)(X) = O.$$

Therefore

$$\begin{aligned} \sigma_{NSE} &= (F, B)_{NSE}(X) = ((((\phi_2, p, 1)_*, \{y_3, y_5\}), ((\phi_1, p, 1)^*, O)), \\ &\quad (((\phi_1, p, 0)_*, \{y_3, y_5\}), ((\phi_1, q, 0)_*, \{y_2, y_3\}), ((\phi_2, q, 0)_*, \{y_2\}), ((\phi_2, p, 0)^*, O)) \end{aligned}$$

is a near soft expert set ($NSES$).

We can see that in this example the first expert, p, "agrees" that the "hard working" persons are $\{y_1, y_2, y_4\}$ and the second one, q, "agrees" that the "hard working" persons are $\{y_1, y_4, y_5\}$. Notice that all of them "agree" that persons $\{y_1, y_4\}$ is "hard working ".

Definition 3.3. *Let $(F, A)_{NSE}$ and $(G, B)_{NSE}$ be a NSES over O, if*

1. $A \subseteq B$,
2. $F(\phi) \subseteq G(\phi)$, $\forall \phi \in B$,
3. *For $N_*(\sigma) = NSE_r*((F, A))(X)$ of a set $(F, A)_{NSE}$ and $N_*(\mu) = NSE_r*((G, B))(X)$ of a set $(G, B)_{NSE}$, $N_*(\sigma) \subseteq N_*(\mu)$*

then $NSE_r*((F, A))$ is a near soft expert subset of $NSE_r*((G, B))$ and denoted by $NSE_r*((F, A)) \subseteq NSE_r*((G, B))$.

Definition 3.4. *If $NSE_r*((F, A))$ is a near soft expert subset of $NSE_r*((G, B))$ and $NSE_r*((G, B))$ is a near soft expert subset of $NSE_r*((F, A))$ then $NSE_r*((F, A))$ and $NSE_r*((G, B))$ are equal near soft expert sets over O.*

Definition 3.5. *Let E be a set of parameters and K be a set of experts. The NOT set of $Z = E \times K \times T$denoted by $1Z$, is defined by $1Z = \{(1e_j, k_i, o_l), \forall i, j, l\}$ where $1e_j$ is not e_j.*

Definition 3.6. *The complement of a near soft expert set $(F, A)_{NSE}$ is denoted by $(F, A)^c_{NSE}$ and is defined by $(F, A)^c_{NSE} = (F^c, 1A)$ where $F^c : 1A \to P(U)$ is a mapping given by $Fc(\phi) = O - F(1(\phi))$.*

Definition 3.7. *An agree-near soft expert set $(F, A)_{1\,NSE}$ over O is a near soft expert subset of $(F, A)_{NSE}$ defined as follows:*

$$(F, A)_{1\,NSE} = \{F_1(\phi) : \phi \in E \times\ K \times\ \{1\}\}.$$

Definition 3.8. *A disagree-near soft expert set $(F, A)_{0\,NSE}$ over O is a near soft expert subset of $(F, A)_{NSE}$ defined as follows:*

$$(F, A)_{0\,NSE} = \{F_0(\phi) : \phi \in E \times\ K \times\ \{0\}\}.$$

Definition 3.9. *If $(F, A)_{NSE}$ is a near soft expert set over O, then*

$$\begin{aligned} ((F, A)^c)^c_{NSE} &= (F, A)_{NSE}, \\ (F, A)^c_{1\,NSE} &= (F, A)_{0\,NSE}, \\ (F, A)^c_{0\,NSE} &= (F, A)_{1\,NSE}. \end{aligned}$$

The proof is straightforward.

Definition 3.10. *The union of two near soft expert sets* $(F,A)_{NSE}$ *and* $(G,B)_{NSE}$ *over* O *denoted by* $(F,A)_{NSE} \cup (G,B)_{NSE}$ *, is the near soft expert set* $(H,C)_{NSE}$ *where* $C = A \cup B$*, and for all* $\phi \in C$

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

$$(H,C)_{NSE} = \begin{cases} (F,A)_{NSE}, \text{ if } \phi \in A - B \\ (G,B)_{NSE}, \text{ if } \phi \in B - A \\ (F,A)_{NSE} \cup (G,B)_{NSE}, \text{ if } \phi \in B \cap A \end{cases}$$

and also $NSE_{r^*}((F,A)) \neq \emptyset, NSE_{r^*}((G,B)) \neq \emptyset, NSE_{r^*}((H,C)) \neq \emptyset$.

Definition 3.11. *The intersection of two near soft expert sets* $(F,A)_{NSE}$ *and* $(G,B)_{NSE}$ *over* O *denoted by* $(F,A)_{NSE} \cap (G,B)_{NSE}$ *, is the near soft expert set* $(H,C)_{NSE}$ *where* $C = A \cup B$*, and for all* $\phi \in C$

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

$$(H,C)_{NSE} = \begin{cases} (F,A)_{NSE}, \text{ if } \phi \in A - B \\ (G,B)_{NSE}, \text{ if } \phi \in B - A \\ (F,A)_{NSE} \cap (G,B)_{NSE}, \text{ if } \phi \in B \cap A \end{cases}$$

and also $NSE_{r^*}((F,A)) \neq \emptyset, NSE_{r^*}((G,B)) \neq \emptyset, NSE_{r^*}((H,C)) \neq \emptyset$.

3.1. Application of Near Soft Expert Sets

In this part, we will use the notion of near soft expert and we form an application of near soft expert set theory in a problem.

Example 3.12. *Presume a company needs some people for the job and for these people the opinions of experts are wanted. Let* $O = \{y_1, y_2, y_3, y_4, y_5\}$ *be a five person and* $B = \{\phi_1, \phi_2\} \subseteq \mathcal{F} = \{\phi_1, \phi_2, \phi_3, \phi_4\}$ *be a set of parameters, where* $\phi_1, \phi_2, \phi_3, \phi_4$ *stand for hard working, creative, successful and well dressed, respectively.* $X = \{y_2, y_{3,}y_5\} \subseteq \{y_1, y_2, y_3, y_4, y_5\}$, $K = \{p, q\}$ *are experts and* $T = \{0 = disagree, 1 = agree\}$ *are opinions.*

Suppose that the company has distributed a questionnaire to two experts to make decisions on five persons and we get the following:

$$\begin{aligned} F(\phi_1, p, 1) &= \{y_1, y_2, y_4\}, F(\phi_1, q, 1) = \{y_1, y_4, y_5\}, \\ F(\phi_2, p, 1) &= \{y_3, y_5\}, F(\phi_2, q, 1) = \{y_1, y_3, y_4, y_5\}, \\ F(\phi_3, p, 1) &= \{y_3, y_4, y_5\}, F(\phi_3, q, 1) = \{y_3, y_4, y_5\}, \\ F(\phi_4, p, 1) &= \{y_1\}, F(\phi_4, q, 1) = \{y_1, y_4, y_5\} \end{aligned}$$

and

$$\begin{aligned} F(\phi_1, p, 0) &= \{y_3\}, F(\phi_1, q, 0) = \{y_2, y_3\}, \\ F(\phi_2, p, 0) &= \{y_1, y_2, y_4\}, F(\phi_2, q, 0) = \{y_2\}, \\ F(\phi_3, p, 0) &= \{y_1, y_2\}, F(\phi_3, q, 0) = \{y_1, y_2\}, \\ F(\phi_4, p, 0) &= \{y_2, y_3, y_4, y_5\}, F(\phi_4, q, 0) = \{y_2, y_3\}. \end{aligned}$$

Now, suppose that we want to select a person with respect to $B = \{\phi_1, \phi_2\} \subseteq \mathcal{F} = \{\phi_1, \phi_2, \phi_3, \phi_4\}$. We will construct table given by;

	y_1	y_2	y_3	y_4	y_5
(ϕ_1, p)	1	1	0	1	0
(ϕ_2, p)	0	0	1	0	1
(ϕ_3, p)	0	0	1	1	1
(ϕ_4, p)	1	0	0	0	0
(ϕ_1, q)	1	0	0	1	1
(ϕ_2, q)	1	0	1	1	1
(ϕ_3, q)	0	0	1	1	1
(ϕ_4, q)	1	0	0	1	1

For $X = \{y_2, y_{3,} y_5\}$ and $B = \{\phi_1, \phi_2\}$, we will construct table: where

$$[y_3]_{\{\phi_2, p, 1\}} = F(\phi_i, k_i, 1) = \{y_3, y_5\} \subseteq X = \{y_2, y_{3,} y_5\}.$$

For expert p;

$$\begin{aligned}
[y_1]_{\{\phi_1, p, 1\}} &= \{y_1, y_2, y_4\}, [y_3]_{\{\phi_1, p, 0\}} = \{y_3, y_5\}, \\
[y_3]_{\{\phi_2, p, 1\}} &= \{y_3, y_5\}, [y_1]_{\{\phi_2, p, 0\}} = \{y_1, y_2, y_4\}
\end{aligned}$$

and for expert q;

$$\begin{aligned}
[y_1]_{\{\phi_1, q, 1\}} &= \{y_1, y_4, y_5\}, [y_2]_{\{\phi_1, q, 0\}} = \{y_2, y_3\}, \\
[y_1]_{\{\phi_2, q, 1\}} &= \{y_1, y_3, y_4, y_5\}, [y_2]_{\{\phi_2, q, 0\}} = \{y_2\}, \\
[y_3]_{\{\phi_2, p, 1\}} &= F(\phi_i, k_i, 1) = \{y_3, y_5\} \subseteq X = \{y_2, y_{3,} y_5\},
\end{aligned}$$

then

$$NSE_1{*}(B)(X) = \{y_3, y_5\}.$$

$$[y_3]_{\{\phi_2, p, 1\}} \cap X \neq \emptyset$$

and

$$[y_1]_{\{\phi_1, p, 1\}} \cap X \neq \emptyset,$$

then

$$NSE_1^*(B)(X) = O.$$

$$[y_3]_{\{\phi_2, p, 0\}} = F(\phi_i, k_i, 0) = \{y_3, y_5\} \subseteq X = \{y_2, y_{3,} y_5\}$$

and

$$[y_2]_{\{\phi_1, q, 0\}} = \{y_2, y_3\} \subseteq X, [y_2]_{\{\phi_2, q, 0\}} = \{y_2\} \subseteq X,$$

then

$$NSE_0{*}(B)(X) = ((\phi_1, p, 0)_*, \{y_3, y_5\}), ((\phi_1, q, 0)_*, \{y_2, y_3\}), ((\phi_2, q, 0)_*, \{y_2\}).$$

$$[y_1]_{\{\phi_2, p, 0\}} = \{y_1, y_2, y_4\} \cap X \neq \emptyset,$$

then

$$NSE_0^*(B)(X) = O.$$

Therefore

$$\begin{aligned}\sigma_{NSE} \quad = \quad & (F,B)_{NSE}(X) = ((((\phi_2, p, 1)_*, \{y_3, y_5\}), ((\phi_1, p, 1)^*, O)),\\ & (((\phi_1, p, 0)_*, \{y_3, y_5\}), ((\phi_1, q, 0)_*, \{y_2, y_3\}), ((\phi_2, q, 0)_*, \{y_2\}), ((\phi_2, p, 0)^*, O))\end{aligned}$$

is a near soft expert set ($NSES$).

Let's show the agree equivalence class, which is in X in the agree near soft expert set, with 1.

agree	$[y_1]$	$[y_2]$	$[y_3]$	$[y_4]$	$[y_5]$
(ϕ_1, p)	0	0	0	0	0
(ϕ_2, p)	0	0	1	0	1
(ϕ_3, p)	0	0	0	0	0
(ϕ_4, p)	0	0	0	0	0
(ϕ_1, q)	0	0	0	0	0
(ϕ_2, q)	0	0	0	0	0
(ϕ_3, q)	0	0	0	0	0
(ϕ_4, q)	0	0	0	0	0
$c_j = \sum[y_j]$	0	0	1	0	1

Let's show the disagree equivalence class, which is in X in the disagree near soft expert set, with 1.

disagree	$[y_1]$	$[y_2]$	$[y_3]$	$[y_4]$	$[y_5]$
(ϕ_1, p)	0	0	1	0	1
(ϕ_2, p)	0	0	0	0	0
(ϕ_3, p)	0	0	0	0	0
(ϕ_4, p)	0	0	0	0	0
(ϕ_1, q)	0	1	1	0	0
(ϕ_2, q)	0	1	0	0	0
(ϕ_3, q)	0	0	0	0	0
(ϕ_4, q)	0	1	1	0	0
$p_j = \sum[y_j]$	0	3	3	0	1

If we combine algorithm to make an optimal choice object we need $c_j = \sum[y_j]$ for agree $NSES$, $p_j = \sum[y_j]$ for disagree $NSES$ and $s_j = c_j - p_j$.Then find m , for which $s_m = \max s_j$. If m has more than one value, any of these can be selected.Now we get the following table;

decision	y_2	y_3	y_5
c_j	0	1	1
p_j	3	3	1
$s_j = c_j - p_j$	-3	-2	0

Then $\max s_j = y_5$ is the optimal person for ϕ_1 and ϕ_2 features.

4. Conclusions

In order to find the one with the properties we want among the many objects given in this study, we reached the notion of near soft sets, which we obtained that have properties near to each other, with a bipolar approach. The concept of bipolar near soft set enabled us to see more clearly what we want, namely the practice of choosing the best products. It reduced the features so we could choose what we needed. We aim to obtain similar examples according to the definitions we will find in future studies.

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