



APPLICATION OF FUZZY SOFT MATRICES IN YOGA ON HEMORRHOID

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ABSTRACT

In this paper, the basic properties of fuzzy soft matrices are described. The fuzzy soft matrices are then defined as a matrix representation of the fuzzy soft sets. The aim of this paper is to define various hyper of matrices in fuzzy soft set theory, as well as to introduce some new operations on these matrices and to discuss all of these definitions and operations using relevant examples. We describe soft matrices and their operations in this paper so that theoretical studies in soft set theory can be conducted. The properties of soft matrices' products are then described. Finally, we built a soft max – min decision-making approach that can be effectively applied to problems with uncertainties.

Key Words : Soft set, fuzzy soft set, Fuzzy Soft Matrices , Fuzzy Soft CM.

I. INTRODUCTION

Molodtsov also defined the principle of "Soft Set Theory," which includes methods for dealing with uncertainties such as parameterizations. Soft set theory researchers have gotten a lot of attention in recent years. Soft set was first incorporated into decision-making problems by Maji Roy and Biswas. By merging soft sets and fuzzy sets, Majumar and Samanta introduced the generalisation of fuzzy sets. Cagman and Enginoglu created a soft max - min decision-making process using soft matrices, which were a matrix representation of the soft sets. Topological fuzzy soft matrix theory and its applications, Cagman and Borah et al. To deal with decision making root on fuzzy soft sets, Maji and Roy introduced a novel issue of object from an approximate multi-observer data.

Yoga has been shown to be effective in the treatment of bowel disorders. Focusing on the mid-section as a first line of protection may be beneficial. Yoga aids in the removal of toxins from the body, resulting in a loose and active feeling in the body after the toxins have been removed. It aids in the restoration of the body's normal equilibrium and provides relief from the pain caused by piles. Because of their hypercritical positions in the body, piles can cause back pain in some people. Yoga can be very beneficial in the treatment of piles and back pain. True vegetarianism is an important part of the yogi lifestyle. Various asanas may be used to treat piles, including those that have a guaranteed outcome, such as sarvangasana, tudasan, and surya namaskar, as well as those that are more difficult, such as shirshasana.

II. PRELIMINARIES

Let W be an first universe value and F be a set of Parameters.

Let $P(W)$ represents the power set of W . Let $X \subseteq F$.

A pair (N_X, F) is called a soft set over W , where N_X is a mapping given by,

$$N_X : X \rightarrow P(W)$$

in other words, a soft set over W is a group of subsets of the universe W . And $X \subseteq F$. A pair (N, X) is referred a fuzzy soft set over W ,

$$\text{where } N: X \rightarrow P(W)$$

is a mapping from X into $P(W)$, where $P(W)$ denotes the collection of all W subsets. Assume that F is the attribute. The array of all fuzzy soft sets on W with attributes from F is called a fuzzy soft class, and it is denoted by the Pair (W, F) .

For two fuzzy sets (N_X, F) and (M_Y, F) over a common universe W , we have $(N_X, F) \subseteq (M_Y, F)$ if $X \subseteq Y$ and for all $e \in X$, $N_X(e)$ is a fuzzy soft subset of $M_Y(e)$, that is (N_X, F) is a fuzzy soft subset of (M_Y, F) denoted by (N_X, F) is defined by $(N_X, F) = (N_X, F)$, Where $N_X : F \rightarrow I^W$ is a mapping given by $N_X(e) \subseteq [N(e)]$, for all $e \in F$. with respect to the parameter denoted by $e \in F$. Let $W = \{w_1, w_2, \dots, w_m\}$ be the universal set and F be the set of parameters given by $F = \{e_1, e_2, \dots, e_n\}$. Then the fuzzy soft set (N_X, F) represent the fuzzy membership function and fuzzy reference function W in the fuzzy set $N_X(e_j)$ so that $\delta_{ij} \tilde{A} = \mu_{ij} \tilde{A} - \gamma_{ij} \tilde{A}$ gives the fuzzy membership value of W .

III. ALGORITHM

1. Input the fuzzy soft matrices (N_X, F) and (M_Y, F) Also write the fuzzy soft matrices $\tilde{X}$ and $\tilde{Y}$ proportionate to (N_X, F) and (M_Y, F) respectively.
2. Write the fuzzy soft matrices $(N_X, F)^\circ$ and $(M_Y, F)^\circ$. Also write the fuzzy soft matrices $\tilde{X}^\circ$ and $\tilde{Y}^\circ$ comparable to $(N_X, F)^\circ$ and $(M_Y, F)^\circ$ respectively.

$$3. \text{Workout } \tilde{X} - \tilde{Y} \text{ and } MV(\tilde{X} - \tilde{Y}).$$

$$4. \text{Workout } \tilde{X}^\circ - \tilde{Y}^\circ \text{ and } MV(\tilde{X}^\circ - \tilde{Y}^\circ).$$

$$5. \text{To find the score matrix } S = ((\tilde{X} - \tilde{Y}), (\tilde{X}^\circ - \tilde{Y}^\circ)).$$

6. Compute the total score S_i for each w_i in W .
7. Determine $S_k = \max(S_i)$.
8. If S_k has more than one value, then go to step (1) and come again reassessing the parameters.

IV. CASE STUDY

Consider 3 Patients Saritha, Balan, Velu, Vijaya are denoted by the set $P = \{\text{Saritha, Balan, Velu, Vijaya}\}$ and the set of symptoms $S = \{\text{Painless, bleeding, itching or irritation, painful lump, swelling around your anus}\}$. Let the set of disease $D = \{\text{Internal}$

Hemorrhoids, Prolapsed Hemorrhoids, External hemorrhoids, Thrombosed hemorrhoids} Yoga therapy for Hemorrhoids yoga therapy (PILES). Yoga is beneficial to either treat to prevent hemorrhoids. It can both alleviate the discomfort and help prevent it from forming Hemorrhoids, also known as piles, are swellings that develop from the lining of the anus and lower rectum.

Table 4.1. Diseases and symptoms of hemorrhoid patients

Patient	Disease				Symptoms			
	d_1	d_2	d_3	d_4	s_1	s_2	s_3	s_4
P_1	0.6	0.8	0.5	0.3	0.8	0.2	0.9	0.7
P_2	0.9	0.7	0.4	0.7	0.9	0.4	0.7	0.6
P_3	0.6	0.7	0.6	0.3	0.6	0.5	0.6	0.5
P_4	0.8	0.2	0.4	0.5	0.3	0.7	0.2	0.3

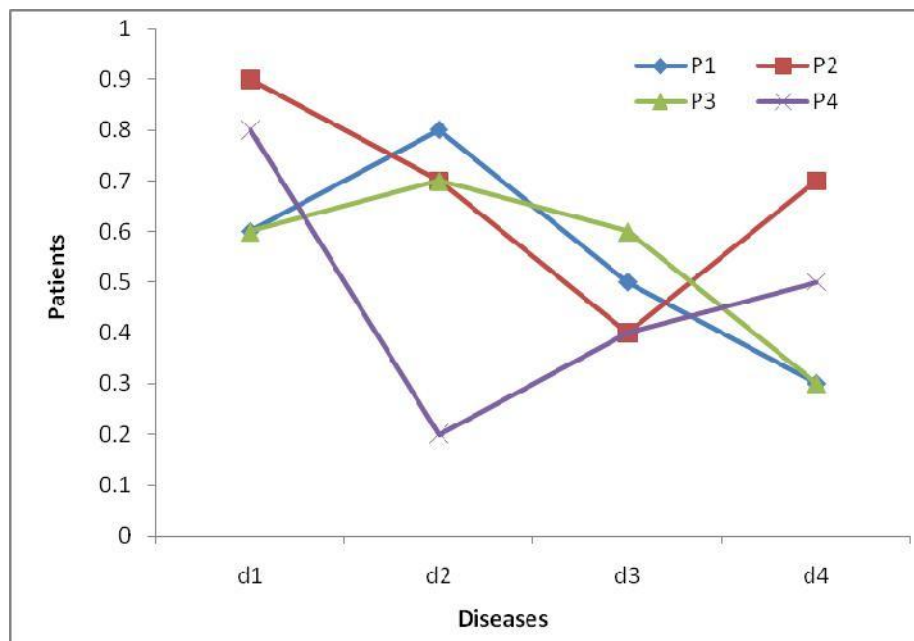


Fig.4.1. Patients and diseases with Hemorrhoid.

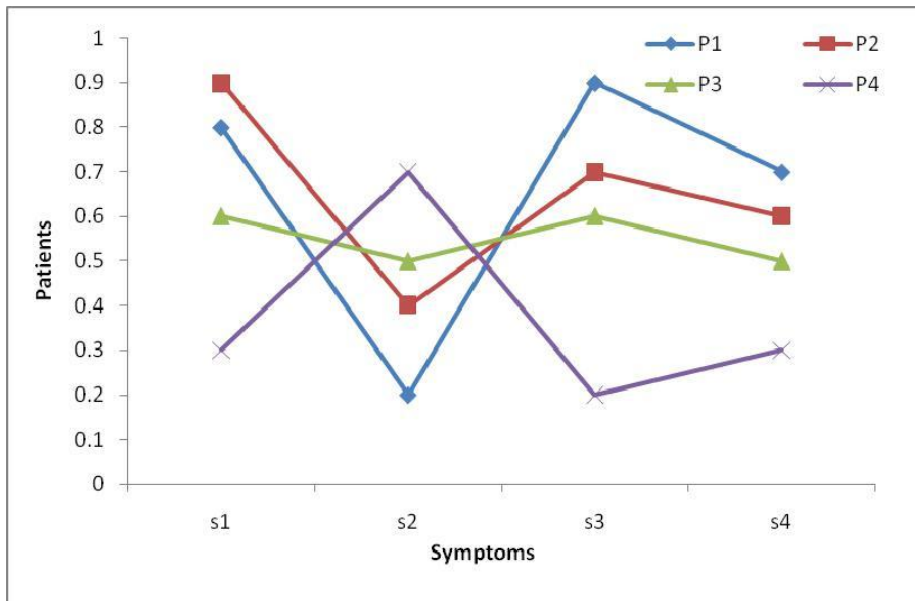


Fig.4.2. Patients and symptoms of Hemorrhoid

Step 1

$$(N_X, F) = (N_X, e_1) = \{(w_1, 0.6, 0.0), (w_2, 0.8, 0.0), (w_3, 0.5, 0.0), (w_4, 0.3, 0.0)\}$$

$$(N_X, e_2) = \{(w_1, 0.9, 0.0), (w_2, 0.7, 0.0), (w_3, 0.4, 0.0), (w_4, 0.7, 0.0)\}$$

$$(N_X, e_3) = \{(w_1, 0.6, 0.0), (w_2, 0.8, 0.0), (w_3, 0.6, 0.0), (w_4, 0.3, 0.0)\}$$

$$(N_X, e_4) = \{(w_1, 0.8, 0.0), (w_2, 0.2, 0.0), (w_3, 0.4, 0.0), (w_4, 0.5, 0.0)\}$$

$$(M_Y, F) = (M_Y, e_1) = \{(w_1, 0.8, 0.0), (w_2, 0.9, 0.0), (w_3, 0.6, 0.0), (w_4, 0.3, 0.0)\}$$

$$(M_Y, e_2) = \{(w_1, 0.2, 0.0), (w_2, 0.4, 0.0), (w_3, 0.5, 0.0), (w_4, 0.7, 0.0)\}$$

$$(M_Y, e_3) = \{(w_1, 0.9, 0.0), (w_2, 0.7, 0.0), (w_3, 0.6, 0.0), (w_4, 0.2, 0.0)\}$$

$$(M_Y, e_4) = \{(w_1, 0.7, 0.0), (w_2, 0.6, 0.0), (w_3, 0.5, 0.0), (w_4, 0.3, 0.0)\}$$

Step 2

$$\sim_x = \begin{matrix} & \begin{matrix} d_1 & d_2 & d_3 & d_4 \end{matrix} \\ \begin{matrix} P_1 \\ P_2 \\ P_3 \\ P_4 \end{matrix} & \begin{pmatrix} (1, 0.6) & (1, 0.8) & (1, 0.5) & (1, 0.3) \\ (1, 0.9) & (1, 0.7) & (1, 0.4) & (1, 0.7) \\ (1, 0.6) & (1, 0.8) & (1, 0.6) & (1, 0.3) \\ (1, 0.8) & (1, 0.2) & (1, 0.4) & (1, 0.5) \end{pmatrix} \end{matrix}$$

$$\tilde{Y} = \begin{pmatrix} (1, 0.8) & (1, 0.9) & (1, 0.6) & (1, 0.3) \\ (1, 0.2) & (1, 0.4) & (1, 0.5) & (1, 0.7) \\ (1, 0.9) & (1, 0.7) & (1, 0.6) & (1, 0.2) \\ (1, 0.7) & (1, 0.6) & (1, 0.5) & (1, 0.3) \end{pmatrix}$$

Step 3

$$\tilde{X}^{\circ} - \tilde{Y}^{\circ} = \begin{pmatrix} (0.6, 0.0) & (0.8, 0.0) & (0.5, 0.0) & (0.3, 0.0) \\ (0.2, 0.0) & (0.4, 0.0) & (0.4, 0.0) & (0.7, 0.0) \\ (0.6, 0.0) & (0.7, 0.0) & (0.6, 0.0) & (0.2, 0.0) \\ (0.7, 0.0) & (0.2, 0.0) & (0.4, 0.0) & (0.3, 0.0) \end{pmatrix}$$

Step 4

$$\tilde{X}^{\circ} - \tilde{Y}^{\circ} = \begin{pmatrix} (1, 0.8) & (1, 0.9) & (1, 0.6) & (1, 0.3) \\ (1, 0.9) & (1, 0.7) & (1, 0.5) & (1, 0.7) \\ (1, 0.9) & (1, 0.8) & (1, 0.6) & (1, 0.3) \\ (1, 0.8) & (1, 0.6) & (1, 0.5) & (1, 0.5) \end{pmatrix}$$

$$MV(\tilde{X}^{\circ} - \tilde{Y}^{\circ}) = \begin{pmatrix} 0.2 & 0.1 & 0.4 & 0.7 \\ 0.1 & 0.3 & 0.5 & 0.3 \\ 0.4 & 0.2 & 0.4 & 0.7 \\ 0.2 & 0.4 & 0.5 & 0.5 \end{pmatrix}$$

$$\tilde{X} = \begin{matrix} & \begin{matrix} u_1 & u_2 & u_3 & u_4 \end{matrix} \\ \begin{matrix} P_1 \\ P_2 \\ P_3 \\ P_4 \end{matrix} & \begin{pmatrix} (0.6, 0.0) & (0.8, 0.0) & (0.5, 0.0) & (0.3, 0.0) \\ (0.9, 0.0) & (0.7, 0.0) & (0.4, 0.0) & (0.7, 0.0) \\ (0.6, 0.0) & (0.7, 0.0) & (0.6, 0.0) & (0.3, 0.0) \\ (0.8, 0.0) & (0.2, 0.0) & (0.4, 0.0) & (0.5, 0.0) \end{pmatrix} \end{matrix}$$

$$\tilde{Y} = \begin{matrix} & \begin{matrix} P_1 & P_2 & P_3 & P_4 \end{matrix} \\ \begin{matrix} S_1 \\ S_2 \\ S_3 \\ S_4 \end{matrix} & \begin{pmatrix} (0.8, 0.0) & (0.9, 0.0) & (0.6, 0.0) & (0.3, 0.0) \\ (0.2, 0.0) & (0.4, 0.0) & (0.5, 0.0) & (0.7, 0.0) \\ (0.9, 0.0) & (0.7, 0.0) & (0.6, 0.0) & (0.2, 0.0) \\ (0.7, 0.0) & (0.6, 0.0) & (0.5, 0.0) & (0.3, 0.0) \end{pmatrix} \end{matrix}$$

Step 5

$$\tilde{SMV}(\tilde{X} - \tilde{Y}) - \tilde{MV}(\tilde{X}^\circ - \tilde{Y}^\circ)$$

$$\begin{pmatrix} 0.6 & 0.8 & 0.5 & 0.3 \\ 0.2 & 0.4 & 0.4 & 0.7 \\ 0.6 & 0.7 & 0.6 & 0.2 \\ 0.7 & 0.2 & 0.4 & 0.3 \end{pmatrix} - \begin{pmatrix} 0.2 & 0.1 & 0.4 & 0.7 \\ 0.1 & 0.3 & 0.5 & 0.3 \\ 0.4 & 0.2 & 0.4 & 0.7 \\ 0.2 & 0.4 & 0.5 & 0.5 \end{pmatrix}$$

Step 6

Total Score

$$\begin{matrix} S_1 \\ S_2 \\ S_3 \\ S_4 \end{matrix} \begin{pmatrix} 0.6 \\ 0.5 \\ 0.4 \\ 0 \end{pmatrix}$$

CONCLUSION

We see that, Patient S1 is in greater pain than the others. We introduce new operations for working with fuzzy soft matrices. We obtained new results on fuzzy soft matrices using these

operations. Finally, using the algorithm introduced in this chapter, a problem based on decision making theory is solved. Hemorrhoids may be aggravated by a stressful lifestyle and a lack of exercise. Hemorrhoids may be treated or prevented with yoga. It has the ability to relieve pain as well as help prevent it from occurring. When passing faeces, avoid straining and holding your breath, as this will put more pressure on the veins in your lower rectum. Try not to sit in the toilet for too long. To keep the stool moist, drink plenty of water. Consume fiber-rich fruits, vegetables, and foods. This aids in the relief of constipation and the removal of toxins from the body.

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