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APPLICATION OF TRANSLATES OF VAGUE SETS IN CARIER DECISSION MAKING

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ABSTRACT

Vague set is very useful in providing of a flexible model to elaborate uncertainty and vagueness involved in decision making. In this paper, we reviewed the concept of vague set and apply translates operators on vague set, also proposed its application for carrier determination by using the translate of eulclidence distance method. To measure the each student and each carrier respectively. Its solution is obtained by looking shortest distance between each student and each carrier.

Key words: Vague set, Carrier choice, Carrier determination, Euclidean distance.

INTRODUCTION

An important point in the evaluation of the modern concept of uncertainty was the notation of Zadeh[10] defing by fuzzy set and it has revolutionized the theory of Mathematical Modeling, Decision making etc., in handling the imprecise real life situations Mathematically. It is believed that vague sets[3] will be more useful in decision making, and other areas of mathematical modeling. A fuzzy set t_A of a set X is a mapping from X : $\rightarrow$ [0,1], where as a vague set A of set X is a pair (t_A , f_A), where t_A , f_A are functions from X $\rightarrow$ [0,1] with $t_A(x) + f_A(x) \leq 1$ for all x in X. The algebraic aspects of vague sets were initiated by Biswas[2] by studying the concepts of vague groups, vague normal groups etc., as generalization of the theory of fuzzy groups etc. Further Ramakrishna[6,7] continued the study of vague algebra.

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In this paper, we will discuss the vague translation operators $T_{\alpha+}$ and $T_{\alpha-}$ and reviewed the concept of vague set and apply translate operators on vague set, also proposed its application for carrier determination by using the translates of eulclidence distance Method. To measure the each student and each carrier, respectively. Its solution is obtained by looking shortest distance between each student and each carrier.

Preliminaries

We give here a review of some definitions and results, which are in Gau and Buhere[3], Ramakrishana[6,7] and Biswas[2].

Definition[3] 2.1: A vague set A in the universe of discourse U is a pair (t_A, f_A) where $t_A : X \to [0,1]$, $f_A : X \to [0,1]$ with $t_A(x) + f_A(x) \le 1$ for all x in X. Here t_A is called the membership function and f_A is called non-membership function and also called true membership function, false membership function, respectively.

Definition[4] 2.2: L et X be a non-empty set, let $A = (t_A, f_A)$ be a vague set of X and $\alpha \in [0,1]$. Then

(a) $T_{\alpha+}(A) = (t_{T\alpha+}, f_{T\alpha+})$

where $t_{T\alpha+}(x) = \min \{t_A(x) + \alpha, 1\}$ and $f_{T\alpha+}(x) = \max \{f_A(x) - \alpha, 0\}$

(b) $T_{\alpha-}(A) = (t_{T\alpha-}, f_{T\alpha-})$

where $t_{T\alpha-}(x) = \max \{t_A(x) - \alpha, 0\}$ and $f_{T\alpha-}(X) = \min \{f_A(x) + \alpha, 1\}$

Here, we call $T_{\alpha+}(A)$ is called translate of vague increasing operator and $T_{\alpha-}(A)$ is called translate of vague decreasing operators, respectively.

Remark (2.3)[4]: $T_{\alpha+}(A)$ and $T_{\alpha-}(A)$ are vague sets of X where A is a vague set of X,

Since $0 \le t_{T\alpha+}(x) + f_{T\alpha+}(x) \le 1$ and $0 \le t_{T\alpha-}(x) + f_{T\alpha-}(x) \le 1$

Application of the translate of vague sets in career determination

Providing sufficient information to students for proper carrier guidance is the core. This is a important because lack of proper carrier guidance faced by many students are of great consequence on their carrier option and competence. Therefore, it is very crucial that students be given enough information on carrier choice to enhance sufficient planning, research and proficiency. Among the career determining factors such as academic presentation, awareness, individuality make-up etc. we use vague sets as tool since it incorporates the membership degree (i.e the marks of the questions answered by the student), Non-membership degree (i.e the marks of the questions the student failed).

Let $S = \{x_1, x_2, x_3, x_4\}$ be the set of students and Let D = {Thermal engineering, production engineering, Industrial engineering, Machine design} be the set of careers and decision subjects (DS) = {English, Mathematics, Physics, Chemistry} be the subjects related to careers. We assume the above students sit for examinations (i.e. over 100 marks total) on the above mentioned subjects to determine their career placements and choices.

Definition 3.1: The E. Szmidt. Euclidean formula for the career determination can be defined by –

$$\text{E. D.} = T_{\alpha+}(A_i, P_i) = \frac{1}{2n}\sum_{i=1}^{n}\left[\left(t_{Ai}(x_i) -, t_{Pi}(x_i)\right)^2 + \left(f_{Ai}(x_i) -, f_{Pi}(x_i)\right)^2\right]^{1/2}$$

For $i = 1, 2, 3, 4, 5 \ldots .n$.

Where $t_{Ai}(x_i)$, $t_{Pi}(x_i)$ represents the membership values having who scored marks in the subjects.

And $f_{Ai}(x_i)$, $f_{Pi}(x_i)$ represents the non-membership values having who not scored marks in the subjects.

The following Table 1 shows students and related subjects.

Table 1

	English	**Mathematics**	**Physics**	**Chemistry**
X_1	$(x_1, 0.7, 0.3)$	$(x_1, 0.5, 0.1)$	$(x_1, 0.4, 0.0)$	$(x_1, 0.6, 0.2)$
X_2	$(x_2, 0.5, 0.1)$	$(x_2, 0.6, 0.1)$	$(x_2, 0.4, 0.0)$	$(x_2, 0.5, 0.1)$
X_3	$(x_3, 0.6, 0.2)$	$(x_3, 0.5, 0.1)$	$(x_3, 0.5, 0.1)$	$(x_3, 0.8, 0.0)$
X_4	$(x_4, 0.7, 0.3)$	$(x_4, 0.8, 0.2)$	$(x_4, 0.5, 0.1)$	$(x_4, 0.7, 0.1)$

Translate operators on the student related subjects.

From the above Table (3.2), we can take as vague sets of the student related subjects.

Let $P_1 = \{(x_1, 0.7, 0.3), (x_1, 0.5, 0.1), (x_1, 0.4, 0.0), (x_1, 0.6, 0.2)\}$

$P_2 = \{(x_2, 0.5, 0.1), (x_2, 0.6, 0.1), (x_2, 0.4, 0.0), (x_2, 0.5, 0.1)\}$

$P_3 = \{(x_3, 0.6, 0.2), (x_3, 0.5, 0.1), (x_3, 0.5, 0.1), (x_3, 0.8, 0.0)\}$

$P_4 = \{(x_4, 0.7, 0.3), (x_4, 0.8, 0.2), (x_4, 0.5, 0.1), (x_4, 0.7, 0.1)\}$

Now we can find translate of P_1, P_2, P_3 and P_4, respectively.

$t_{T\alpha+}(x_1) = \min\{0.7 + 0.1, 1\} = 0.8$ and $f_{T\alpha+}(x_1) = \max\{0.3\text{-}0.1, 0\} = 0.2$

$t_{T\alpha+}(x_1) = \min\{0.5 + 0.1, 1\} = 0.6$ and $f_{T\alpha+}(x_1) = \max\{0.1\text{-}0.1, 0\} = 0.0$

$t_{T\alpha+}(x_1) = \min\{0.4 + 0.1, 1\} = 0.5$ and $f_{T\alpha+}(x_1) = \max\{0.0\text{-}0.1, 0\} = 0$

$t_{T\alpha+}(x_1) = \min\{0.6 + 0.1, 1\} = 0.7$ and $f_{T\alpha+}(x_1) = \max\{0.2\text{-}0.1, 0\} = 0.1$

$T_{\alpha+}(P_1) = \{(x_1, 0.8, 0.2), (x_1, 0.6, 0.0), (x_1, 0.5, 0.0), (x_1, 0.7, 0.1)\}$

Similarly we can find the translate of the following values

$T_{\alpha+}(P_2) = \{(x_2, 0.6, 0.0), (x_2, 0.7, 0.0), (x_2, 0.5, 0.0), (x_2, 0.6, 0.0)\}$

$T_{\alpha+}(P_3) = \{(x_3, 0.7, 0.1), (x_3, 0.6, 0.0), (x_3, 0.6, 0.0), (x_3, 0.9, 0.0)\}$

$T_{\alpha+}(P_4) = \{(x_4, 0.8, 0.2), (x_4, 0.9, 0.1), (x_4, 0.6, 0.0), (x_4, 0.8, 0.0)\}$

The following table shows on the student careers placement subjects

Table 2

	English	**Mathematics**	**Physics**	**Chemistry**
Thermal engineering	$(x_1, 0.5, 0.1)$	$(x_1, 0.7, 0.3)$	$(x_1, 0.6, 0.2)$	$(x_1, 0.8, 0.3)$
Production engineering	$(x_2, 0.7, 0.1)$	$(x_2, 0.7, 0.3)$	$(x_2, 0.5, 0.4)$	$(x_2, 0.7, 0.3)$
Industrial engineering	$(x_3, 0.5, 0.3)$	$(x_3, 0.6, 0.2)$	$(x_3, 0.7, 0.3)$	$(x_3, 0.4, 0.0)$
Machine design	$(x_4, 0.5, 0.3)$	$(x_4, 0.6, 0.1)$	$(x_4, 0.7, 0.2)$	$(x_4, 0.4, 0.3)$

Translate operators on the students' career placement subjects

From the above Table (3.4), we can take as vague sets of the student related subjects are –

Let $A_1 = \{(x_1, 0.5, 0.1), (x_1, 0.7, 0.3), (x_1, 0.6, 0.2), (x_1, 0.8, 0.2)\}$

$A_2 = \{(x_2, 0.7, 0.1), (x_2, 0.7, 0.3), (x_1, 0.6, 0.2), (x_2, 0.7, 0.3)\}$

$A_3 = \{(x_3, 0.5, 0.3), (x_3, 0.6, 0.2), (x_3, 0.7, 0.3), (x_3, 0.4, 0.0\}$

$A_4 = \{(x_4, 0.5, 0.3), (x_4, 0.6, 0.2), (x_4, 0.7, 0.3), (x_4, 0.4, 0.0)\}$

Translate of the student career subject's values by using the definition (2.2).

$t_{T\alpha+}(x_1) = \min\{0.5 + 0.1\ ,1\} = 0.6$ and $f_{T\alpha+}(x_1) = \max\ \{0.1\text{-}0.1, 0\} = 0.0$

$t_{T\alpha+}(x_1) = \min\{0.7 + 0.1\ ,1\} = 0.8$ and $f_{T\alpha+}(x_1) = \max\ \{0.3\text{-}0.1, 0\} = 0.2$

$t_{T\alpha+}(x_1) = \min\{0.6 + 0.1\ ,1\} = 0.7$ and $f_{T\alpha+}(x_1) = \max\ \{0.2\text{-}0.1, 0\} = 0.1$

$t_{T\alpha+}(x_1) = \min\{0.8 + 0.1\ ,1\} = 0.9$ and $f_{T\alpha+}(x_1) = \max\ \{0.2\text{-}0.1, 0\} = 0.1$

$T_{\alpha+}(A_1) = \{(x_1, 0.6, 0.0), (x_1, 0.8, 0.2), (x_1, 0.7, 0.1), (x_1, 0.9, 0.1)\}$

Similarly we can find the following values

$T_{\alpha+}(A_2) = \{(x_2, 0.8, 0), (x_2, 0.8, 0.2), (x_2, 0.7, 0.2), (x_2, 0.8, 0.2)\}$

$T_{\alpha+}(A_3) = \{(x_3, 0.6, 0.2), (x_3, 0.7, 0.1), (x_3, 0.8, 0.2), (x_3, 0.5, 0.0)\}$

$T_{\alpha+}(A_4) = \{(x_4, 0.6, 0.2), (x_4, 0.7, 0.1), (x_4, 0.8, 0.2), (x_4, 0.5, 0.0)\}$

Translate operators of the Euclidean distance for Student career Determination.

The Szmidt. E Euclidean formula for the career determination method (3.1) is given by –

$$\text{E.D of (TEG)} = T_{\alpha+}(A_1, P_1) = \frac{1}{2n}.[(t_{A1}(x_1)\ \text{-},\ t_{P1}(x_1))^2 + (f_{A1}(x_1)\text{-}\ f_{P1}(x)]^{1/2}$$

$$= \frac{1}{2}[(0.8\text{-}0.6)^2 + (0.2\text{-}0.0)^2]^{1/2} = \frac{1}{2}[(0.2)^2 + (0.2)]^{1/2} = 0.1415$$

$$\text{E.D of (PDE)} = (T_{\alpha+}(A_1, P_1)) = \frac{1}{2}[(0.8\text{-}0.6)^2 + (0.2\text{-}0.1)^2]^{1/2}$$

$$= \frac{1}{2}[(0.2)^2 + (0.1)^2]^{1/2} = 0.0707$$

E.D of (IDE) $= T_{\alpha+} (A_1, P_1) = \frac{1}{2} [(0.7\text{-}0.3)^2 + (0.1\text{-}0.0)^2]^{1/2}$

$= \frac{1}{2} [(0.4)^2 + (0.1)^2]^{1/2} = 0.207$

E.D of (MDE) $= T_{\alpha+} (A_1, P_1) = \frac{1}{2} [(0.9\text{-}0.7)^2 + (0.1\text{-}0.1)^2]^{1/2}$

$= \frac{1}{2} [(0.2)^2 + (0.0)^2]^{1/2} = 0.1$

E.D of (TEG) $= T_{\alpha+} (A_2, P_2) = \frac{1}{2} [(0.8\text{-}0.6)^2 + (0.2\text{-}0.0)^2]^{1/2}$

$= \frac{1}{2} [(0.2)^2 + (-0.2)^2]^{1/2} = 0.1119$

E.D of (PDE) $= T_{\alpha+} (A_2, P_2) = \frac{1}{2} [(0.4\text{-}0.5)^2 + (0.3\text{-}0.4)^2]^{1/2}$

$= \frac{1}{2} [(-\ 0.1)^2 + (-0.1)^2]^{1/2} = 0.012$

E.D of (MDE) $= T_{\alpha+} (A_2, P_2) = \frac{1}{2} [(0.4\text{-}0.5)^2 + (0.2\text{-}0.0)^2]^{1/2}$

$= \frac{1}{2} [(0.2)^2 + (0.1)^2]^{1/2} = 0.05$

E.D of (MDE) $= T_{\alpha+} (A_2, P_2) = \frac{1}{2} [(0.8\text{-}0.6)^2 + (0.2\text{-}0.0)^2]^{1/2}$

$= \frac{1}{2} [(0.2)^2 + (0.2)^2]^{1/2} = 0.0049$

E.D of (TEG) $= (T_{\alpha+} (A_3, P_3)) = \frac{1}{2} [(0.6\text{-}0.7)^2 + (0.2\text{-}0.1)^2]^{1/2}$

$= \frac{1}{2} [(0.1)^2 + (0.1)^2]^{1/2} = 0.0707$

E.D of (PDE) = $T_{\alpha+}(A_3, P_3) = \frac{1}{2}[(0.7\text{-}0.4)^2 + (0.1\text{-}0.0)^2]^{1/2}$

$= 0.1119$

E.D of (IDE) $= T_{\alpha+}(A_3, P_3) = \frac{1}{2}[(0.8\text{-}0.6)^2 + (0.2\text{-}0.0)^2]^{1/2}$

$= \frac{1}{2}[(0.04)^2 + (0.04)^2]^{1/2} = 0.1415$

E.D of (MDE) $= T_{\alpha+}(A_3, P_3) = \frac{1}{2}[(0.5\text{-}0.9)^2 + (0.0\text{-}0.1)^2]^{1/2}$

$= \frac{1}{2}[(0.04)^2 + (0.0)^2]^{1/2} = 0.2062$

E.D of (TEG) $= T_{\alpha+}(A_4, P_4) = \frac{1}{2}[(0.6\text{-}0.7)^2 + (0.2\text{-}0.2)^2]^{1/2}$

$= \frac{1}{2}[(0.1)^2 + 0]^{1/2} = 0.05$

E.D of (PDE) $= T_{\alpha+}(A_4, P_4) = \frac{1}{2}[(0.7\text{-}0.9)^2 + (0.1\text{-}0.1)^2]^{1/2}$

$= \frac{1}{2}[(0.04)^2 + 0.0]^{1/2} = 0.02$

E.D of (IDE) $= T_{\alpha+}(A_4, P_4) = \frac{1}{2}[(0.8\text{-}0.6)^2 + (0.1\text{-}0.0)^2]^{1/2}$

$= \frac{1}{2}[(0.2)^2 + (0.1)^2]^{1/2} = 0.1119$

E.D of (MDE) $= (T_{\alpha+}(A_4, P_4) = \frac{1}{2}[(0.8\text{-}0.5)^2 + (0.2\text{-}0)^2]^{1/2}$

$= \frac{1}{2}[(0.09) + (0.04)^2]^{1/2} = 0.1802$

Carrier grading values by using Szmidt. E. Euclidean distance method

Table

	Thermal engineering	Production engineering	Industrial engineering	Machine design
X_1	0.1415	**0.0707**	0.2070	0.1000
X_2	0.1119	0. 0120	0.0500	**0.0049**
X_3	**0.0707**	0.1119	0.1415	0.2062
X_4	0.0500	**0.0200**	0.1119	0.1802

The above table shows the shortest distance gives the best career determination.

1. Student (x_1) is to read production engineering for his best career determination.
2. Student (x_2) is to read machine design engineering for his best career determination.
3. Student (x_3) is to read thermal engineering for his best career determination.
4. Student (x_4) is to read production engineering for his best career determination's.

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