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Fuzzy method for the Course Selection of Course for Intermediate passed out Students

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Abstract

In education field competition is increasing day by day. So to take decision at the time of course selection plays an vital role in making the career of the student. In this paper, we propose a fuzzy method for the counseling of the intermediate passed out students. This method is based on the relations between the courses and students interest for a particular course by intuitionistic fuzzy sets. For this purpose, we develop a hypothetical case study with assigned degree of membership and degree of non-membership based on the relation between the courses and their interest.

Keywords: Fuzzy Set, fuzzy relations, Intuitionistic fuzzy sets (IFS), Career counseling, Course selection

1. Introduction

Career counseling helps the students to know the pros and cons of the different available options for the best suited career advice. Human capabilities are infinite and can never be measured, nor we to judge of, what one can do. Every person has unique characteristic, strength and weakness. In this paper, we propose a mathematical model for the selection of a course for career building based on the set of available career related options. Adlassnig et al.[1], Ahn et al. [2] and Yao et al. [3] elaborated fuzzy relation between sets. For a fixed set X, IFS of A is defined as:

$A = \{< x, \mu_A(x), \nu_A(x) > | \, x \in X\}$

Where $\mu_A(x): X \to [0,1]$ *and* $\nu_A(x): X \to [0,1]$ define the degree of membership and degree of non-membership of the element $x \in X$ to the set A.

For every $x \in X$, $0 \le \mu_A(x) + \nu_A(x) \le 1$ and the amount $\pi_A(x) = 1 - \mu_A(x) - \nu_A(x)$ is called the intuitionistic index or hesitation

index, which may require to membership value, non-membership value or both.
Let A be an IFS of the set X and let R be an IF relation from $X \to Y$, then Max-min-max composition B (Kumar et al., 2001) of IFS X with the IF relation R($X \to Y$) is defined as $B = RoA$
with membership and non-membership function defined as:

$$\mu_B(y) = \max_{x \in X} \{\min [\ \mu_A(x) , \mu_R(x,y)\ ]\} \quad and$$

$$\nu_B(y) = \min_{x \in X} \{\max [\ \nu_A(x) , \nu_R(x,y)\ ]\}$$

Let $S = \{ s_1, s_2, ..., s_m \}$; $I = \{ i_1, i_2, ..., i_n \}$;
$C = \{ c_1, c_2, ..., c_q \}$; be the finite set of students, interest and available courses respectively.
According to Kumar et al. [4, 5], two fuzzy relations (FR), Q and R are defined as:

$$Q = \{< (s,i) , \mu_Q(s,i) , \nu_Q(s,i) >| (s,i) \in S \times I\} \}$$

$$R = \{< (i,c) , \mu_R(i,c) , \nu_R(i,c) >| (i,c) \in I \times C \}$$

Where $\mu_Q(s,i)$ indicate the degree to which the Interest i appears in student s and $\nu_Q(s,i)$ indicate the degree to which the interest i does not appears in student s.
Similarly $\mu_R(i,c)$ indicate the degree to which the interest i confirm the course c and $\nu_R(i,c)$ indicate the degree to which the interest i does not confirms the course c.
The composition T of IFRs R and Q($T = R \circ Q$) describe the state of student s_i in terms of the counseling of course from $S\, to C$ given by membership and non-membership as:

$$\mu_T(s_i, c) = \max_{i \in I} \{\min [\ \mu_Q(s_i, i) , \mu_R(i, c)\ ]\} \quad and$$

$$\nu_T(i_i, c) = \min_{i \in I} \{\max [\ \nu_Q(s_i, i) , \nu_R(i, c)\ ]\}; \quad \forall\ s_i \in S \ and \ c \in C$$

We can estimate the labels of interest of students using the information obtained from the chart of given case study. This information plays a significant role in counseling when many types of interest are presented in students. From Q and R, one may compute new measure of IFR T for which, in general, the diagnostic labels of student p for any course d such that the following is to be satisfied:

(i) $S_T = \mu_T - \nu_T \cdot \pi_T$ is greatest and
(ii) The equality $T = R \circ Q$ is retained.

This new measure of T will translate the higher degrees of association and lower degree of non-association of interests as well as lower degrees of intuitionistic index to the counseling.

If there is almost equal values for different counseling in T is obtained, we consider the case for which intuitionistic index is least.

2. Case Study.

To see the application of the method, let us frame a hypothetical case study:

Let $S = \{ s_1, s_2, s_3, s_4, s_5, s_6 \}$ be the set of students and $I = \{ I_1, I_2, I_3, I_4, I_5 \}$ be the set of available interests of students.

Suppose the IFR $Q(S \to I)$ is given by (hypothetically):

Q	I_1		I_2		I_3		I_4		I_5	
Students	μ_Q	ν_Q	μ_Q	ν_Q	μ_Q	ν_Q	μ_Q	ν_Q	μ_Q	ν_Q
S_1	0.8	0.1	0.6	0.1	0.2	0.8	0.6	0.1	0.1	0.6
S_2	0.0	0.8	0.4	0.4	0.6	0.1	0.1	0.7	0.1	0.8
S_3	0.8	0.1	0.8	0.1	0.0	0.6	0.2	0.7	0.0	0.5
S_4	0.6	0.1	0.5	0.4	0.3	0.4	0.7	0.2	0.3	0.4
S_5	0.6	0.1	0.2	0.8	0.6	0.1	0.1	0.6	0.8	0.1
S_6	0.2	0.8	0.6	0.1	0.1	0.6	0.8	0.1	0.6	0.1

Let $C = \{Engineering, Medical, Arts, Journalism, Management\}$ be the set of options available for further study.

Suppose the IFR $R(I \to C)$ is given by (hypothetically):

R	*Engineering*		*Medical*		*Arts*		*Journalism*		*Managment*	
Interest	μ_R	ν_R	μ_R	ν_R	μ_R	ν_R	μ_R	ν_R	μ_R	ν_R
I_1	0.4	0.0	0.7	0.0	0.3	0.3	0.1	0.7	0.1	0.8
I_2	0.3	0.5	0.2	0.6	0.6	0.1	0.2	0.4	0.0	0.8
I_3	0.1	0.7	0.0	0.9	0.2	0.7	0.8	0.0	0.2	0.8
I_4	0.4	0.3	0.7	0.0	0.2	0.6	0.2	0.7	0.2	0.8
I_5	0.1	0.7	0.1	0.8	0.1	0.9	0.2	0.7	0.8	0.1

The Composition $T = R \circ Q$ is follows as:

T	*Engineering*		*Medical*		*Arts*		*Journalism*		*Managment*	
Students	μ_T	ν_T	μ_T	ν_T	μ_T	ν_T	μ_T	ν_T	μ_T	ν_T
S_1	0.4	0.1	0.7	0.1	0.6	0.1	0.2	0.4	0.2	0.6
S_2	0.3	0.3	0.2	0.6	0.4	0.4	0.6	0.4	0.2	0.8
S_3	0.4	0.1	0.7	0.1	0.6	0.1	0.2	0.4	0.2	0.5
S_4	0.4	0.1	0.7	0.1	0.5	0.3	0.3	0.4	0.3	0.4
S_5	0.4	0.1	0.6	0.1	0.3	0.3	0.2	0.1	0.2	0.1
S_6	0.4	0.3	0.7	0.1	0.6	0.1	0.2	0.4	0.6	0.1

Now, we calculate S_T :

S_T	*Engineering*	*Medical*	*Arts*	*Journalism*	*Managment*
S_1	0.35	0.68	0.57	0.04	0.08
S_2	0.18	0.08	0.32	0.6	0.2
S_3	0.35	0.68	0.57	0.04	0.05
S_4	0.35	0.68	0.44	0.18	0.18
S_5	0.35	0.57	0.18	0.13	0.13
S_6	0.31	0.68	0.57	0.04	0.57

From the table, we conclude that student $s_1, s_3, s_4, s_5 \, and \, s_6$ are suitable for *Medical* and student s_2 is suitable for *Arts* for the pursuing of their study.

3. Conclusion.

In this paper, we use generalized concept of fuzzy set theory. A study for counseling the intermediate passed out students has been made with IFS theory. IFS method is an efficient tool for decision making problem.

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