Course outline How does an NPTEL online course work? Assignment 0 Week 1 - Introduction: Fuzzy Sets, Logic and Systems & Applications Week 2 - Nomenclature Terms and Set Theoretic Operations used in Fuzzy Sets Week 3 - Set Theoretic Operations and Fuzzy Set Properties Week 4 - Fuzzy Set Properties and Distance between Fuzzy Sets Week 5 - Arithmetic Operations on Fuzzy Numbers, Complement, Tnorm and S-norm for Fuzzy Sets Week 6 - Parmeterized T-Norms, Parameterized S-Norms, Fuzzy Relation and its Operations Week 7 - Projection, Cylindrical Extension and **Properties of Fuzzy Relation** Lecture 31: Projection of Lecture 32: Cylindrical O Lecture 33: Properties of O Lecture 34: Properties of Lecture 35: Extension Solution for Assignment - 7 Week 8 - Composition of **Fuzzy Relations and Its** Properties, Fuzzy Tolerance and Equivalence Relations Week 9 - Linguistic Hedges, Negation/ Complement, Connectives, Concentration, Dilation, and Some Examples on Composite Linguistic Terms Let A and B be two crisp sets as given below with the universe of discourse X={1,2,3} and Y={1,2}, respectively. $A=\{1,2,3\}$ Week 10 - Contrast $B=\{1,2\}$ Intensification of Fuzzy Sets, Find out a relation set Q(A,B) such that "the first element is greater than or equal to the second element" for A×B. Orthogonality of Fuzzy Sets, Fuzzy Rules, Fuzzy $Q(A,B)=\{(1,1),(2,1),(2,2),(3,1),(3,2)\}$ Reasoning, and Fuzzy

6) Let us consider two fuzzy sets A and B with the universe of discourse X and Y, respectively defined as

Let A and B be two fuzzy sets with universe of discourse X and Y, respectively are given as below.

Let R be a relation named as "Approachability" and S be a relation named as "Familiarity" defined in the space X×Y. The membership function values of these

1 point

1 point

1 point

1 point

1 point

 $Q(A,B)=\{(1,1),(1,1),(1,2),(3,1),(3,2)\}$

Q(A,B)={(2,1),(1,2),(2,1),(3,2)}

Q(A,B)={(2,1),(1,2),(3,1),(3,2)}

 $Q(A,B) \! = \! \{(1,1),(2,1),(2,2),(3,1),(3,2)\}$

 $A(x) = 0.1/x_1 + 0.3/x_2 + 0.9/x_3$

 $B(y) = 0.8/y_1 + 0.5/y_2 + 0.2/y_3$

Find out the Projection of fuzzy relation R on A.

 $R_{\rm A}(x) = 0.1/x_1 + 0.3/x_2 + 0.8/x_3$

 $R_{\rm A}(x) = 0.2/x_1 + 0.4/x_2 + 0.5/x_3$

 $R_{\rm A}(x) = 0.3/x_1 + 0.4/x_2 + 0.8/x_3$

 $R_{\rm A}(x) = 0.2/x_1 + 0.4/x_2 + 1.0/x_3$

 $R_{\rm A}(x) = 0.1/x_1 + 0.3/x_2 + 0.8/x_3$

Union of Fuzzy Relations

Intersection of Fuzzy Relations

Complement of a Fuzzy Relation

7) What are the different operations of fuzzy relations?

relations are represented in fuzzy matrix given as below.

Jaipur

0.9

Jaipur

0.4

0.5

Kanpur

0.5

0.3

Kanpur Jaipur

Kanpur Jaipur

0.50.3

Kanpur

0.5

0

0.3

No, the answer is incorrect.

Kanpur

0.5

0.8

0.3

Jaipur

0.5

0.5

Kanpur Jaipur

Kerala Goa Delhi

Shimla

Shimla

0.3

8.0

0.1

Shimla

10) Let there be a projection of a fuzzy relation R i.e. $R_A(x)$ given as,

0.9 0.9 0.9

 y_2 y_3

0.8 0.8 0.8

 y_1 y_2 y_3

 x_3 [1.0 1.0 1.0]

 $y_1 = y_2 = y_3$

0.9 0.9 0.9

 $x_3 = [0.7 \quad 0.7 \quad 0.7]$

 $C(R_A) = \begin{matrix} x_1 \\ x_2 \end{matrix} \begin{bmatrix} 0.1 & 0.1 & 0.1 \\ 0.8 & 0.8 & 0.8 \end{bmatrix}$

No, the answer is incorrect.

 $C(R_A) = \begin{pmatrix} x_1 \\ x_2 \end{pmatrix} \begin{bmatrix} 0.8 & 0.8 & 0.8 \\ 0.9 & 0.9 & 0.9 \end{bmatrix}$

Accepted Answers:

Score: 0

 x_3 [1.0 1.0 1.0]

 x_3 [0.7 0.7 0.7]

Find out the Cylindrical extension of R_A in the direction of fuzzy set B i.e. $C(R_A)$.

0.3 0.2

0.1

Kanpur Jaipur

0.5

0.5

No, the answer is incorrect.

Kanpur Jaipur

 $R_A(x) = 0.8/x_1 + 0.9/x_2 + 0.7/x_3$

 $C(R_A) = \frac{x_1}{x_2}$

0.1

0.4

0.4

Accepted Answers:

0.2

0.1

-0

Kerala

Delhi

Score: 0

Kerala

Goa Delhi 0.1

0.4

Shimla

0.70.5

0.7

For fuzzy relations R and S defined in Q. 8, find out the intersection of the fuzzy relations R and S.

Accepted Answers:

8.0

0.5

0.8

Jaipur

0.9

0.5

0.1

0.1

0.4

Find out the union of the fuzzy relations R and S.

Shimla

0.7 0.2

Shimla

0.5

0.7

Jaipur

Shimla

0.70.5

0.7

Shimla 0.3

0.2

0.1

Shimla

0.7

0.5

0.7

Shimla 0.7

1.0

0.7

No, the answer is incorrect.

Accepted Answers:

All of the above

Accepted Answers: All of the above

A={Kanpur, Jaipur, Shimla}

Kanpur

0.5

Kanpur

0.1

Kerala

Delhi

Kerala

Goa

Delhi

Kerala

Goa

Delhi

Kerala

Goa

Delhi

Score: 0

Kerala

Goa

Delhi

B={Kerala, Goa,Delhi}

Kerala

Goa

Delhi

No, the answer is incorrect.

Score: 0

Score: 0

No, the answer is incorrect.

Accepted Answers:

Score: 0

Inference System

Week 11 - Fuzzy Inference

Week 12 - Fuzzy Inference

System: Larsen Fuzzy Model, Tsukamoto Fuzzy Model, and

System: Mamdani Fuzzy

Model and Examples

TSK Fuzzy Model

Text Transcripts

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