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TOPIC

FUZZY SET OPERATIONS

WHAT IS FUZZY SET ?

Fuzzy refers to something that is unclear or vague . Hence, Fuzzy Set is a Set where every key is associated with value, which is between 0 to 1 based on the certainty .This value is often called as degree of membership.

Fuzzy set operations are union, intersection, complement, difference

1. Union :

Consider 2 Fuzzy Sets denoted by A and B, then let's consider Y be the Union of them, then for every member of A and B, Y will be:

degree_of_membership(Y)= max(degree_of_membership(A),degree_of_membership(B))

Example:

The First Fuzzy Set is : {(a, 0.2), (b, 0.3), (c, 0.6), (d ,0.6)}

The Second Fuzzy Set is : {(a, 0.9), (b, 0.9), (c, 0.4), (d, 0.5)}

Fuzzy Set Union is : {(a, 0.9), (b, 0.9), (c, 0.6), (d, 0.6)}

2. Intersection :

Consider 2 Fuzzy Sets denoted by A and B, then let's consider Y be the Intersection of them, then for every member of A and B, Y will be:

degree_of_membership(Y)= min(degree_of_membership(A), degree_of_membership(B))

Example:

The First Fuzzy Set is : {(a, 0.2), (b, 0.3), (c, 0.6), (d ,0.6)}

The Second Fuzzy Set is : {(a, 0.9), (b, 0.9), (c, 0.4), (d, 0.5)}

Fuzzy Set Union is : {(a, 0.2), (b, 0.3), (c, 0.4), (d, 0.5)}

3. Complement :

Consider a Fuzzy Sets denoted by A , then let's consider Y be the Complement of it, then for every member of A , Y will be:

degree_of_membership(Y)= 1 - degree_of_membership(A)

Example:

The First Fuzzy Set is : {(a, 0.2), (b, 0.3), (c, 0.6), (d ,0.6)}

Fuzzy Set Complement is : {(a,0.8), (b,0.7), (c,0.4), (d, 0.4)}

4. Difference :

Consider 2 Fuzzy Sets denoted by A and B, then let's consider Y be the Intersection of them, then for every member of A and B, Y will be:

degree_of_membership(Y)= min(degree_of_membership(A), 1- degree_of_membership(B))

Example:

The First Fuzzy Set is : {(a, 0.2), (b, 0.3), (c, 0.6), (d ,0.6)}

The Second Fuzzy Set is : {(a, 0.9), (b, 0.9), (c, 0.4), (d, 0.5)}

Fuzzy Set Difference is : {(a, 0.1), (b, 0.1), (c, 0.6), (d, 0.5)}

Thank you