Mid Term Examination

CS 513

KDD

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**Solution of Q1:**

1. The given distant function is **incorrect**.

Reason: Because in the distant function we take square root of summation of squares between two points. The proper distant function would be:

A (0,0,0), B (0,1,0), C (0,1,1), D (1,1,1)

The Distance between A and B: D (A, B) = sqrt ((0-0)2+(1-0)2 +(0-0)2)

= sqrt (1)

= 1

The Distance between B and C: D (B, C) = sqrt ((0-0)2+(1-1)2 +(0-1)2)

= sqrt (1)

= 1

The Distance between C and D: D (C, D) = sqrt ((0-1)2+(1-1)2 +(1-1)2)

= sqrt (1)

= 1

The Distance between A and D: D (A, D) = sqrt ((0-1)2+(0-1)2 +(0-1)2)

= sqrt (3)

= 1.73

The Distance between A and C: D (A, C) = sqrt ((0-0)2+(0-1)2 +(0-1)2)

= sqrt (2)

= 1.41

The Distance between B and D: D (B, D) = sqrt ((0-1)2+(1-1)2 +(0-1)2)

= sqrt (2)

= 1.41

This equation follows the three properties that should be true for distance function i.e.

1. **D (x, y) >= 0 and D (x, y) = 0 if x=y**

For our values distance between any two points is greater than zero.

1. **D (x, y) = D (y, x)**

As we are taking the square of distance the value for D (x, y) will always be equal to D (y, x)

1. **D (x, z) <= D (x, y) + D (y, z)**

For our 4 points summation of distance of any two points is always greater than other point which satisfies this property as well.