Machine, Data, Learning: Quiz 2

Date: 28th March 2022 **Duration: 45 minutes**

1. **No clarifications during the exam.**
2. **Make *reasonable assumptions* and *clearly state* them to answer *ambiguous* questions.**
3. **Use the common default interpretation of any concept/method as discussed in class.**
4. **Show your steps / reasons. Be concise and organized.**
5. **Floating point answers should be upto 2 significant decimal places.**
6. **Calculators are allowed. Sharing of calculators not allowed.**

1) Given the following frequent itemsets what candidates will Apriori compute for the next database scan?

(i) AB, AC, AD, BC, BD, CD, AE

(A) ABC, ABD, ACD, BCD, ABE, ACE, ADE, BCD, ABCD
(B) ABC, ABD, ACD, BCD, ABE, ACE, ADE, BCD
(C) ABC, ABD, ACD, BCD, ABCD
(D) ABC, ABD, ACD, BCD
(E) Null-set

(ii) ABC, ABD, ACD, BCD, BCE, CDE

(A) ABCD, BCDE, ACDE, ABCDE
(B) ABCD, BCDE, ACDE
(C) ABCD, BCDE
(D) ABCD
(E) Null-set

[10]

2) Consider the following data.

Record#	Colour	Type	Origin
1	Red	Sports	Domestic
2	Red	Sports	Domestic
3	Red	Sports	Domestic
4	Yellow	Sports	Domestic
5	Yellow	Sports	Imported
6	Yellow	SUV	Imported
7	Yellow	SUV	Imported
8	Yellow	SUV	Domestic
9	Red	SUV	Imported
10	Red	Sports	Imported

[10]

What is the distance between the following pairs of records (upto 2 decimal places), using the technique discussed in class:

(i) 1 and 4 _____

(ii) What are the 3 nearest neighbours of record 10 (if weights of the features (origin, type, colour) are (0.5, 0.3, 0.2) respectively) _____

3) Data: {(Ram,64,60),(Shyam,60,61),(Gita,59,70),(Mohan,68,71)}. Run 2 iterations of k-means algorithm using euclidean distance and k=2. Choose Shyam and Gita as initial means. The clusters after 2 iterations are: _____ and _____

[10]

4) For the data in Q3, given that Ram, Shyam and Mohan are in one cluster and Gita is in the other cluster, determine:

(i) Single-link distance between the two clusters: _____
(ii) Complete-link distance between the two clusters: _____
(iii) Average-link distance between the two clusters: _____

[15]