Reg. No. | | | | | | | | | | |

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

SEVENTH SEMESTER B.TECH. (INSTRUMENTATION AND CONTROL ENGG.)

END SEMESTER DEGREE EXAMINATIONS, NOVEMBER - 2019

SUBJECT: MULTI-SENSOR DATA FUSION [ICE 4011]

TIME: 3 HOURS MAX. MARKS: 50

Instructions to candidates :*Answer ALL questions and missing data may be suitably assumed.*

Include diagrams and equations wherever necessary

1A. Describe data fusion system classification based on fusion type.

1B. With an example, explain serial and parallel fusion networks.

1C. Given two time series, P= (6.3, 2.7, 8.3, 6.9) ^{T} and Q= (5.2, 1.1, 7.4, 8.3) ^{T}, find cumulative matrix D in DTW using dynamic programming.

(2+4+4)

2A. Let X=(x_1, x_2, x_3, x_4) ^{T} denote an input vector. By partitioning X using two different clustering algorithms, resulting identity vectors are: A= (α_1 α_1 α_2 α_2) ^{T}, B= (β_1 β_2 β_2 β_1) ^{T}, α_1= [1 1 0 0], α_2= [0 0 1 1], β_1= [1 0 0 1], β_2= [0 1 1 0]. Write the corresponding two co-association matrices and mean co-association matrix.

2B. Describe video compression process with an example and also mention the constraints.

2C. Given data for five people in Table below, each person vector has a height, score on some test, and age, determine the Mahalanobis distance of another person v = (63, 630, 46) from the set of data.

X Height	Y Score	Z Age
77	557	34
61	593	37
74	588	40
67	652	42
71	605	57

(3+3+4)

3A. Four jobs (J_1, J_2, J_3 and J_4) need to be executed by four workers (W_1, W_2, W_3 and W_4), one job per worker. The matrix below shows the cost of assigning a certain worker to a certain job. Using Hungarian algorithm minimize the total cost of the assignment.

	J_1	J_2	J_3	J_4
W_1	82	83	69	92
W_2	77	37	49	92
W_3	11	69	5	86
W_4	8	9	98	23

3B. With extended information processing framework explain the importance of data mining in

information processing.

(4+6)

4A. Describe black box data fusion framework.

4B. Explain TRIP model implications for resource management.

4C. Describe Esteban data fusion framework.

(2+3+5)

5A. Differentiate between data fusion and data mining

5B. Briefly explain Baysian filtering technique.

5C. Describe Kalman filtering technique.

(2+3+5)

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