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, DECEMBER - 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 DTW algorithm and its warping path constraints.
1B. With a diagram describe the domains in generic multi-sensor data fusion system.
1C. With an example, explain centralized and hierarchical network topologies.

(3+3+4)

2A. Explain puzzle solving metaphor.
2B. Obtain mutual information expression between two random variables.
2C. Given two time series, $P=(2.7, 1.9, 3.2, 5)^T$ and $Q=(3.2, 2.7, 1.5, 5.8)^T$, find cumulative matrix D in DTW using dynamic programming.

(3+3+4)

3A. List any four duality between data fusion and resource management.
3B. Explain the importance of resource management in information processing cycle.
3C. The following Table gives the data of height, score on some test, and age of six persons. Determine the Mahalanobis distance of another person with corresponding data of (63, 630, 46) from the given data.

X Height	Y Score	Z Age
77	547	27
61	553	31
74	578	35
67	632	48
71	615	54
76	657	57

(2+3+5)

4A. Draw the characteristic functional flow across data fusion levels.
4B. Describe Luo-Kay data fusion framework.
4C. Explain recommended revised JDL data fusion framework.

(2+3+5)

5A. Briefly discuss nearest neighbour algorithm.
5B. Write a note on information filter.
5C. With a block diagram illustrate Kalman filter cycle.

(3+3+4)

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