MSDF END SEMESTER MAKE-UP EXAMINATION (FEBRUARY 2022)

COURSE CODE : MULTI-SENSOR DATA FUSION
COURSE NAME : ICE 4057
SEMESTER : VII
DATE OF EXAM : 24/02/2022
DURATION : 45 + 3 minutes

Instructions for Students:
(1) ANSWER ALL THE QUESTIONS.
(2) EACH QUESTION CARRIES 1 MARK.
(3) YOU ARE INSTRUCTED TO INFORM THE INVIGILATOR AFTER SUBMISSION OF THIS FORM IN THE CHAT SECTION.

* Required

* This form will record your name, please fill your name.

1

STUDENT NAME: *

2

REGISTRATION NUMBER: *

3

The fusion classification proposed by Dasarathy is based on _____. (1 Point)

- I/O characteristics
- Fusion type
- None
- Sensor configuration

4

Communication bottleneck is a drawback in _____ topology. (1 Point)

- Both Decentralized and Hierarchical
- Centralized
- Decentralized
- Hierarchical

5

In image applications, fusing images of same scene taken during day and night with different cameras is an example for _____ sensor configuration. (1 Point)

- Competitive
- Cooperative
- Complementary
- None

6

State true or false
a) PCA aims to achieve maximum class separability.
b) PCA is a supervised technique used for dimensionality reduction.

(1 Point)

- (a) is false and (b) is true
- (a) is true and (b) is false
- (a) is false and (b) is false
- (a) is true and (b) is true

7

Spatial alignment is used as the primary fusion algorithm in _____ class of applications. (1 Point)

- DaI-FeO
- FeI-DeO
- FeI-FeO
- DaI-DaO

8

_____ is a constraint for DDTW (1 Point)

- Slope constraint
- Continuity
- Boundary conditions
- Monotonicity

9

State true or false:
(a) Spatial alignment is the conversion of local sensor observation time to common time axis.
(b) Continuity is one of the constraints in DTW.

(1 Point)

- (a) is false and (b) is true
- (a) is true and (b) is false
- (a) is false and (b) is false
- (a) is true and (b) is true

10

Histogram estimation is the approach used to calculate _____. (1 Point)

- Maximum information
- All of the above
- Mutual Information
- Multiple Information

11

_____ is more commonly referred to as Image registration. (1 Point)

- Spatial alignment
- Temporal alignment
- Radiometric normalization
- Semantic alignment

12

State true or false:
a)Min-Max is one of the parametric normalization functions.
b)Binarization is a method of radiometric normalization process for converting sensor measurements into values between 0 to 1.

(1 Point)

- a) is false and b) is true
- a) is false and b) is false
- a) is true and b) is false
- a) is true and b) is true

13

Multiplication and division can be performed on _____ scale of measurement.
(1 Point)

- Ordinal
- Nominal
- Ratio
- Interval

14

_____ method is a non-Bayesian method used for single target data association.
(1 Point)

- NNSF
- PDAF
- GNN
- None

15

Which of the following is not a characteristic of NNSF. (1 Point)

- Simple to implement
- Non-Bayesian
- Used for single target tracking.
- Complex and expensive

16

State true or false.
(a) The gating method helps in pruning matches that are geometrically unlikely from the start.
(b) Data association is the process of associating uncertain measurements to known tracks.

(1 Point)

- (a) is true and (b) is true
- (a) is false and (b) is false
- (a) is false and (b) is true
- (a) is true and (b) is false

17

_____ architecture represents both multi-sensor fusion and multi-sensor integration. (1 Point)

- Pau's
- Luo and Kay's
- JDL
- Thomopoulos's

18

Level 4 of JDL model is _____ refinement. (1 Point)

- Situation
- Subobject
- Object
- Process

19

Data fusion focuses on the detection of relationship and entities through _____ reasoning. (1 Point)

- a) Abductive
- b) Deductive
- c) Inductive
- d) Both a) and c)

20

_____ reflects the commander's intent in the context of mission goals and priorities.

(1 Point)

- Information needs
- Objective setting
- Task and plans
- Observability context

21

The duality of Impact is _____ in resource management. (1 Point)

- Plan
- Objective
- Resource
- Control

22

The level 1 of the resource management system is _____. (1 Point)

- Resource relationship management
- Mission objective management
- Resource response management
- Design management

23

In distributed blackboard data fusion model, C represents _____ of sensor measurement. (1 Point)

- Correct value
- Correlation value
- Certain level
- Confidence level

24

In _____ level of Thomopoulos architecture, data is combined based on a statistical model. (1 Point)

- Evidence
- Sensor
- Dynamics
- Signal

25

The user requirement(UR) level 4 represents _____. (1 Point)

- Information needs
- Tasks and plans
- Collection objectives
- Dynamic replanning

26

Cost or benefit analysis is the characteristic of recommended data fusion _____ level. (1 Point)

- Situation assessment
- Entity assessment
- Impact assessment
- Signal/feature assessment

27

Dasarathy's _____ I/O model represents Model-based feature extraction. (1 Point)

- DEI-FEO
- DEI-DAO
- FEI-DAO
- DAI-DEO

28

State true or false
a) Bayesian filter technique is a probabilistic filtering technique.
b) Kalman filtering works mainly based on the state matrix.

(1 Point)

- a)is false and b) is false
- a)is true and b) is false
- a)is false and b) is true
- a)is true and b) is true

29

_____ filter is a recursive estimator. (1 Point)

- None
- Bayesian
- Information
- Kalman

30

The objective of _____ filtering is to remove unrelated data from the huge data stream. (1 Point)

- Bayesian
- Information
- None
- Kalman

31

In the given Bayes equation, P(z | x) represents _____. (1 Point)

$$P(\mathbf{x} \mid \mathbf{z}) = \frac{P(\mathbf{z} \mid \mathbf{x})P(\mathbf{x})}{P(\mathbf{z})}.$$

- Prior probability density function
- Conditional probability density function
- Likelihood
- Posterior distribution

32

State true or false:

(a) Track splitting does not completely decompose a multiple target tracking problem into single target problems.
(b) Global NNSF used for multi-object tracking is also called a greedy algorithm.
(1 Point)

- (a) is true and (b) is true
- (a) is false and (b) is true
- (a) is false and (b) is false
- (a) is true and (b) is false