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B.Tech DEGREE EXAMINATION, DECEMBER 2023

Fifth to Seventh Semester

18CSE357T - BIOMETRICS

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

Note:

i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours **Max. Marks: 100**

PART - A (20 × 1 = 20 Marks)

Answer **all** Questions

		Marks	BL	CO
1.	What type of signal is used in speech recognition system? (A) Electromagnetic signal (B) Radio signal (C) Electrical signal (D) Acoustic signal	1	1	1
2.	Which of the following is not a building block of biometric system? (A) Template Database (B) Decision Module (C) Recognition (D) Feature Extractor	1	2	1
3.	The purpose of negative identification is to prevent (A) a single person from using multiple identities (B) Multiple persons from using a single identity (C) a single person from using his/her identity (D) Multiple persons from using multiple identities	1	2	1
4.	Which one is not present in four building blocks of biometrics system. (A) Sensor (B) Feature extractor (C) Database (D) operator	1	2	1
5.	Which of the point processing technique increases the dynamic range of gray-level in the image? (A) Negative transformations (B) Contrast stretching (C) Power-law transformations (D) Histogram compression	1	1	2
6.	Which of the following fingerprint sensor is used commonly in laptops, mobile phones (A) Optical Frustrated Total Internal Reflection (FTIR) (B) Capacitance (C) Ultrasound Reflection (D) Piezoelectric Effect	1	1	2
7.	What type of biometric sensor is typically used for iris recognition? (A) Thermographic sensor (B) Capacitive sensor (C) Optical sensor (D) Pressure sensor	1	1	2
8.	Which of the following statements about ear recognition is true? (A) Ear recognition is primarily used for determining a person's age. (B) Earprints are as unique as fingerprints, making ear recognition highly accurate. (C) Ear recognition relies solely on the analysis of the outer ear's shape. (D) Ear recognition is a less secure biometric method compared to facial recognition.	1	1	2

9.	Which of the following techniques would perform better for reducing the dimensions of a data set? (A) Removing columns that have too many missing values (B) Removing columns that have high variance in data (C) Removing columns with dissimilar data trends (D) Removing columns with similar data trends	1	1	3
10.	Which of the following method uses the sum of the ranks assigned by the individual machines to calculate the value of mean of rank. (A) Highest rank method. (B) Borda count (C) Logistic regression method (D) Bayes fuse.	1	1	3
11.	Which one of the following statements is True for Type II error? (A) Rejecting an incorrect hypothesis. (B) Accepting an incorrect hypothesis. (C) Accepting a correct hypothesis. (D) Rejecting a correct hypothesis	1	1	3
12.	Which among the following is a level 3 detail in fingerprint recognition systems. (A) Orientation field (B) Ridge skeleton. (C) Ridge contour, pore, dots. (D) Delta, whorl.	1	1	3
13.	The interaction between the end user and a biometric system causes the capture of a biometric sample. Such a process is known as: (A) Identity (B) Live scan (C) Live capture (D) Mimic	1	1	4
14.	Identity cards like Aadhar cards and national security is an application of? (A) Iris recognition system (B) Finger recognition system (C) Voice recognition system (D) Facial recognition system	1	1	4
15.	Which among the following is related to Soft Biometrics (A) Fingerprint (B) Iris (C) Signature (D) Hair colour	1	1	4
16.	A security threat in a biometric system leads to _____ (A) System Resume (B) System failure (C) System restarts (D) System shutdown	1	1	4
17.	In access control, the three fundamental methods for verifying authorized access are (A) Something you have, Something you know and Something you are (B) Something you don't have, Something you are and Something you don't know (C) Something you don't know, Something you are and Something you write (D) Something you know, Something you read and Something you write	1	1	5
18.	The ____ method is proposed to classify gender (A) Object score alignment (B) Operator score alignment (C) Optimal score alignment (D) Optimal score assignment	1	1	5
19.	Biometric identification systems can also help governments to more equitably distribute welfare benefits to the ____: (A) Organization (B) Poor (C) Public (D) Country	1	1	5
20.	Which is not a biometric identifier among the following. (A) Fingerprints (B) Facial patterns (C) Typing cadence (D) Moles	1	1	5

PART - B (5 × 4 = 20 Marks) — Marks | BL | CO

Answer **any 5** Questions

21.	List the fundamentals steps of image processing with a neat sketch and explain any two of them in detail.	4	2	1
22.	Describe the Robert's edge detection method.	4	1	1
23.	Outline the block diagram of the restoration model of the image degradation.	4	2	2
24.	Discuss the fundamental principles and features involved in hand geometry recognition?	4	1	2
25.	Classify the types of multi biometrics systems.	4	2	3
26.	Describe any four ways to breach the security of a biometric system.	4	1	4
27.	Describe any four Impacts and Benefits of Biometrics in Banking.	4	1	5

PART - C (5 × 12 = 60 Marks) — **Marks** **BL** **CO**

Answer **all** Questions

28.	(a) Discuss any two geometric transformations performed on an image with neat sketches.	12	1	1
	(OR)			
	(b) Discuss the two types of identity management functionalities of a biometric system.			
29.	(a) Discuss the application of Image Enhancement techniques in Spatial and Frequency Domain with examples	12	3	2
	(OR)			
	(b) Design **a Hand Geometry system** and explain how you would apply hand geometry technology to enhance security measures in this context. Provide a detailed step-by-step plan that includes feature extraction, matching, and decision-making. Consider factors such as data preprocessing, the selection of hand features, and the choice of algorithms.			
30.	(a) Consider a biometric dataset consisting of two features (e.g., Fingerprint ridge count and iris Texture Complexity)	12	3	3

Individual	Fingerprint Ridge Count	Iris Texture Complexity
1	4	11
2	8	4
3	13	5
4	7	14

Perform PCA on this dataset to reduce its dimensionality. Calculate the principal components, eigenvalues, and eigenvectors. Explain how PCA can help in reducing the dimensionality of biometric data and how it can be applied for feature selection or extraction in biometric systems.

(OR)

(b) Suppose you are working on a biometric authentication system using Multimodal Biometrics. You have a dataset with facial ,Ear and Signature measurements

	FACE MATCHER	Ear Matcher	Signature Matcher
Identity	Rank	Rank	Rank
Person 1	3	2	1
Person 2	1	1	2
Person 3	4	4	3
Person 4	2	3	4

Find the Rank level fusion using Highest Rank, Borda Count and Logistic Regression method (Weight score: Face=0.3, Ear=0.4, and signature=0.3).

31.	(a) Enumerate and explain the criteria to evaluate the suitability of keystroke dynamics.	12	2	4
	(OR)			
	(b) With the help of a neat diagram rationalize the various methods of securing passwords?			
32.	(a) Write the role of Biometrics in Stock Market. Give a detailed elucidation of effects of Biometric system in the stock market.	12	2	5
	(OR)			
	(b) What is meant by security threat in biometric system? Explain various security threats that are leading to the distortion in biometric system.			

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