UNIT 1

1. The process of locating and encoding distinctive characteristics from biometric sample in order to generate template is termed as

A. Validation

B. Verification

C. Extraction

D. Feature extraction

Answer: Feature Extraction

2. Does the biometric data belong to Ajay? Is the above mentioned question refers to

A. Verification

B. Identification

C. Validation

D. Authorization

Answer: Verification.

3. Whose biometric data is this? Is the above mentioned question refers to

A. Verification

B. Identification

C. Validation

D. Authorization

Answer: Identification

4.Measure of the similarity between the template and the query is called

A. Match score

B. Distance Score

C. Rank score

D. Decision score

Answer: Match score

5.Matcher measures the dissimilarity between two feature sets the score is referred as

A. Match score

B. Distance Score

C. Rank score

D. Decision score

Answer: Distance score

6. “Are you someone who is known to the system?” Is referred as

A. Positive identification

B. Negative identification

C. Neutral identification

D. Positive verification

Answer: Positive identification

7. Are you who say you are not? is referred as

A. Positive identification

B. Negative identification

C. Neutral identification

D. Positive verification

Answer: Negative identification

8. Verification mode operates in

A. 1:1 mode

B. 1:N mode

C. N:1 mode

D. N:N mode

Answer: 1:1 mode

9. Identification mode operates in

A. 1:1 mode

B. 1: N mode

C. N: 1 mode

D. N : N mode

ANSWER: 1: N Mode

10. Which of the following is not a building block of biometric system?

A. Sensor

B. Feature Extractor

C. Matcher

D. Recognition

Answer: Recognition

11. The Process ofdetecting a face in a cluttered image is termed as

A. Segmentation

B. Quality enhancements

C.Smoothing

D. enhancement

Answer: Segmentation

12. Which of the following technique is used to minimize the noise introduced by the camera or illumination variations?

A. Histogram equalisation

B. Feature extraction

C. Sharpening

D. Enhancement

Answer: Histogram Equalisation

13. What will be the output of iris feature extraction?

A. Minutiae points

B. Binary vector

C. Vectors of real numbers

D. vectors of floating point numbers

Answer: Binary vector

14. Imposter score measures the similarity between

A. Two non-matesamples

B. Two mate samples

C. Three mate samples

D. Templates

Answer: two non-mate samples

15. Genuine scores less than the thresholds defines the

A. FRR

B. FAR

C. EER

D. GAR

Answer: FRR

16. Which type of multimodal fusion is done prior to matching?

A.Match score fusion

B. Rank level fusion

C. Decision level fusion

D. Feature level fusion

Answer: Feature level fusion

17. Signature comes under which biometric

A.Auditory biometric

B.Spatial biometric

C.Chemical biometric

D.Visual biometric

Answer: Spatial biometric

18. Face Recognition Vendor Test(FRVT) comes under which evaluation

A. Technology evaluation

B. Operation evaluation

C. Scenario evaluation

D. Evaluation

Answer: Technology evaluation

19. Which of the following is not a point operation?

A. Point

B. Local

C. Global

D. Neutral

Answer: Neutral

20. Which one of the following represents the second order derivative method for edge detection?

A. Zero crossing

B.Prewitt

C.Sobel

D.Robert

Answer: Zero crossing

21.Mx = [1 0; 0 -1]; My = [0 1; -1 0]; is the mask of which operator

A. Prewitt

B. Sobel

C. Canny

D. Robert

Answer: Robert

22. Digital images are represented as a discreteset of

A. Intensities

B. Values

C. Frequencies

D. Numbers

Answer: Intensities

23. The magnitude of the gradient indicates the

A. Edge strength

B. Edge direction

C. Normal edge

D. Sharp edge

Answer: Edge strength

24. Which one of the following is not the step of edge detection?

A. Histogram equalization

B. Thresholding

C. Localization

D. Smoothing

Answer: Histogram equalization.

25. Multiplication of g[x] and h[x] in spatial domain.This is equivalent to which operation in frequency domain?

A. Addition

B. Filtering

C. Convolution

D.Multiplication

Answer: Convolution

1. Optical Character Recognition is an example where only information required is general shape or outline.

a) Gray images

b) Binary Images

c) Color images

d) 2D images

Ans: b

2. Binary image is referred as _____ image

a) 1byte

b) 4 bit

c) 8 bit

d) 1 bit

Ans: d

3. A gray scale image contains _____ data that allows to have 256 gray levels.

a) 1 bit/pixel

b) 4 bits/pixel

c) 8 bits/pixel

d) 24 bits/pixel

Ans: c

4. Colour image contains _____ data for Red, green, Blue.

a) 1 bit/pixel

b) 4 bits/pixel

c) 8 bits/pixel

d) 24 bits/pixel

Ans: d

5. Identify which of the following represents “The output value at a specific coordinate is dependent on the input values in the neighborhood of that same coordinate “

a) Point

b) Global

c) Local

d) Histogram

Ans: c

6. _____ is a method increases the dynamic range of the gray-levels in a low-contrast image to cover full range of gray-levels.

a) Thresholding

b) Logarithm operator

c) Contrast Streching

d) Histogram Equalization

Ans : d

7. Binary images stored in memory as _____

a) file

b) bitmap

c) bytes

d) white and gray values

Ans : b

8. Smoothing is done before _____ to suppress noise as much as possible.

a) derivatives

b) edge detection

c) thresholding

d) equalization

Ans: a

9. If the difference is taken between points separated by Δx then by Taylor expansion for f (x + Δx) obtained as_____. Where O(Δx) is error.

a) $f'(x) = ((f(x + \Delta x) – f(x))/ \Delta x) – O(\Delta x)^2$

b) $f'(x) = ((f(x + \Delta x) – f(x+1))/ \Delta x+1) – O(\Delta x+1)^2$

c) $f'(x) = ((f(x + \Delta x))/ \Delta x) – O(\Delta x)^2$

d) $f'(x) = ((f(x + \Delta x) – f(x))/ O(\Delta x)^2$

Ans: a

10. The rate of change is constant at the peak of the first-order derivative. This is where there is _____ in the second order derivative with change of signs.

a) rate of growth

b) threshold

c) imaginary line

d) zero-crossing

Ans: d

11. one advantage of Laplacian operator is _____

a) smoothing

b) isotropic

c) bitonal

d) edge detection

Ans: b

12. The image differencing operation in image motion which delivers the difference image D is given by_____ Where $P(t)_{x,y}$ is time

a) D(t) = P(t) – P(t-1)

b) D(t) = P(t-1) – P(t)

c) D(t) = P(t)/P(t-1)

d) D(t) = P(t-1)/P(t)

Ans: a

13. ____ implementation defines a mapping from the image points into an accumulator space.

a) Rosenfeld transform

b) Prewitt

c) Radon transform

d) Hough transform

Ans: d

14. Smart card is an example of _____

a) token based system

b) knowledge based system

c) biometric information

d) Encrypted system

Ans: a

15. The system recognizes an individual by searching the template of all the users in the database for a match.

a) authentication mode

b) integrity mode

c) verification mode

d) Identification mode

Ans : d

16. Which one of the following is not a preprocessingsteps?

a) quality assessment

b) Normalization

c) enhancement

d) segmentation

Ans: b

17 . To force the system to return one among the N enrolled identities, irrespective of the value of some threshold is called _____

a) open set identification

b) closed set identification

c) semi automated biometric identification

d) threshold identification

Ans: b

18. A logarithmic scale used to plot the error rates as a graph is called as _____

a) genuine -imposter

b) Rate of growth

c) Receiver operating curve

d) Receiver operational characteristics

Ans: c

19. Multiple units of same biometrics is referred as _____

a) two or more attempts of same finger

b) acquiring biometric information from different fingers

c) multiple biometrics of same person

d) multiple matchers of same biometric

Ans: b

20. Normalization and similarity score can be used in _____ fusion strategy.

a) Decision level

b) Feature level

c) Rank level

d) Match score level

Ans : d

21. The person is unaware of biometric recognition is _____

a) overt

b) covert

c) habituated

d) non habituated

Ans: b

22. Handwriting is the type of _____ biometric

a) behavioral biometric

b) visual biometric

c) spatial biometric

d) chemical biometric

Ans: c

23. Two samples of same biometric traitmay not be recognized as match is called _____

a) False Match Rate

b) False Non match Rate

c) False genuine rate

d) False imposter rate

Ans: b

24. 1-FRR = ?

a) FNMR

b) FMR

c) Genuine Accept Rate

d) Imposter accept rate

Ans: c

25. Outputs the identities of the top t matches(1<t<N) and a human expert manually determines the identity among the t selected identities that matches the given query is called _____

a) open set identification

b) closed set identification

c) semi automated biometric identification

d) threshold identification

Ans: c

1. The horizontal gradient pixels are denoted by _____
    A. Gx
    B. Gy
    C. Gt
    D. Gs

    Answer: A

2. Second derivative approximation says that it is non-zero only at _____
    A. Ramp
    B. Edges
    C. Onset
    D. Step

    Answer: C

3. Which of the following is an example of token based system?
    A. Password
    B. PIN
    C. Card key
    D. Biometric

    Answer: C

4. What is the first and foremost step in Image Processing?
    A. Image restoration
    B. Image enhancement
    C. Image acquisition
    D. Segmentation

    Answer: C

5. Two samples of same biometric trait(mate samples) may not be recognized as match and this leads to_____
    A. False non match
    B. False match
    C. False non match rate
    D. False match rate

    Answer: A

6. _____ when the biometric system accurately determines a positive match.
    A. True acceptance
    B. True rejection
    C. False non match rate
    D. False match rate

Answer: A

7. Users at your organization currently use a combination of smart cards and passwords, but an updated security policy requires multifactor security using three different factors. Which of the following can you add to meet the new requirement?
   A. Four-digit PIN
   B. Hardware tokens
   C. Fingerprint readers
   D. USB tokens

   Answer: C

8. Zero crossing operator use the following

a) First derivative

b) Second derivative

c) Sobel operator

d) Gaussian operator

Answer: B

9.Second derivative approximation says that value at end of ramp must be

A. Non-zero
B. Edges
C. Onset
D. Step

Answer: A

10. First derivatives are zero at points on

A. Non-zero
B. Edges
C. Constant Intensity
D. Step

Answer: C

11. Histogram Equalisation is mainly used for _____
   A. Image enhancement
   B. Blurring
   C.Contrast adjustment
   D. Smoothing

Answer: A

12. The probability that the system fails to detect a match between the input pattern and a matching template in the database is defined as_----------

A. False non match
B. False match
C. False non match rate
D. False match rate

Answer: C

13. Sobeloperator is not that good for detection of _____

A. Horizontal lines
B. Vertical lines
C. Diagonal lines
D. Edges

Answer: C

14. Subtraction of images can remove background _____

A. variations and highlight change
B. noise
C. camera variations
D. brightness

Answer: A

15. for diagonal edge detection we use

A. 1D mask
B. 2D mask
C. 3D mask
D. 4d mask

Answer: B

16. Guessing at the function values within the known range is called _____

A. Interpolation
B. Linear interpolation
C. Spatial transformation
D. Convolution

Answer: A

17. The image intensity abruptly changes from one value on one side of the discontinuity to a different value on the opposite side.

A. Step edge
B. Ramp edge
C. Ridge edge
D. Roof edge

Answer: A

18. For finding vertical lines we use mask of values

A. [-1 -1 -1; 2 2 2; -1 -1 -1]
B. [2 -1 -1; -1 2 -1; -1 -1 2]
C. [-1 2 -1; -1 2 -1; -1 2 -1]
D. [-1 -1 2; -1 2 -1;2 -1 -1]

Answer: C

19. A value returned by a biometric algorithm that indicates the degree of similarity or correlation between a biometric sample and a reference.

A. Comparison
B. Modality
C. Difference Score
D. Similarity Score

Answer: D

20. A biometric task where an unidentified individual is known to be in the database and the system attempts to determine his/her identity *

A. Closed-set Identification
B. Voice Verification
C. Biometric Identification
D. Open-set Identification

Answer: A

21. A Point in Image Space is now represented as _____

A. $y=mx + c$
B. $\rho = x \cos\theta+y \sin\theta$
C. $a=x-a \sin\theta$
D. $b=y-b\cos\theta$

Answer: B

22. Hough transform for circles

A. $(x - a)^2 + (y - b)^2 = c^2$
B. $y=mx + c$
C. $\rho = x \cos\theta+y \sin\theta$
D. $a=x-a \sin\theta$

Answer: A

23. Which of the following is goal of Hough transform??

A. to find the location of lines in images.
B. The length and the position of a line segment can be determined
C. Co-linear line segments can be separated.
D. Looks for only one single type of object.

Answer: A

24. Histogram equalization is a technique

A. for adjusting image intensities to variations and highlight change
B. for adjusting image intensities to enhance contrast.
C. for adjusting image intensities to smoothing
D. to find the location of lines in images

Answer: C

25. _____ is equivalent to the composed effects of translation, rotation, isotropic scaling and shear

A. Geometric transformations
B. Affine transformations
C. Spatial transformation
D. Linear transformation

Answer: B

4 marks:

1. Explain various building blocks of biometric system
2. Narrate the concept of verification and identification
3. Write short notes on histogram equalization
4. Explain any three performance measures of biometric system.
5. Define FMR, FNMR with proper equation
6. What are the various integration strategies? Describe each with example.
7. Perform vertical edge detection using Sobel filter on any 2D 6x6 pixel image and draw a conclusion.
8. Brief about first and second order derivative with diagram.
9. Explain Geometric transformations?
10. Explain in detail about Hough transform for circles?
11. Discuss first and second order derivative?
12. Compare Prewitt, Robert and sobel edge detector?

12 marks:

1. Summarize the design cycle of biometric system(12)
2. Describe various point operations with example(12)
3. Explain the prewitt,Robert and sobel edge detection with their corresponding mask.(12)
4. a) Explain in detail on Fusion strategies in multimodal biometric systems.(8)
   b) Describe image motion with an equation(4)
5. Explain in detail about edge detection, its types with neat diagram and an example.(12)
6. a) Explain Laplacian of Gaussian with proper steps.(6)
   b) Derive various performance measures of biometrics with ROC curves.(6)

7. Explain in detail about the various building blocks of biometric system.(12)

8. Explain steps in edge detection with example?
9. Discuss about functionalities (verification and validation)with diagrams?