Unit-1: Introduction to Pattern Recognition (10 MCQs)

1. Pattern Recognition mainly deals with:

A. Identifying patterns in data

B. Creating graphics

C. Network routing

D. System administration

Answer: A

2. Which of the following is NOT an application of Pattern Recognition?

A. Speech recognition

B. Image classification

C. Weather forecasting

D. Compiler construction

Answer: D

3. Supervised learning uses:

A. Unlabeled data

B. Labeled data

C. Random data

D. No data

Answer: B

4. Unsupervised learning is mainly used for:

A. Classification

B. Clustering

C. Regression

D. Reinforcement

Answer: B

5. Statistical Pattern Recognition is based on:

A. Syntax rules

B. Probability theory

C. Hardware processing

D. String matching

Answer: B

6. Structural Pattern Recognition uses:

A. Graphs and rules

B. Probability models

C. Kernel functions

D. Random forests

Answer: A

7. The first step in Pattern Recognition system design is:

A. Feature extraction

B. Data acquisition

C. Classification

D. Evaluation

Answer: B

8. Feature Extraction refers to:

A. Removing irrelevant samples

B. Selecting top features

C. Converting raw data into meaningful features

D. Increasing dataset size

Answer: C

9. Supervised vs Unsupervised learning is differentiated by:

A. Time

B. Labels

C. Algorithm type

D. Data size

Answer: B

10. Pattern Recognition focuses on:

A. Finding patterns & classifying data

B. Data sorting

C. GUI design

D. Mathematical modeling only

Answer: A

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Unit-2: Statistical Pattern Recognition (12 MCQs)

11. Bayes Decision Theory minimizes:

A. Accuracy

B. Error probability

C. Time

D. Distance

Answer: B

12. Bayes classifier uses:

A. Prior + Likelihood

B. Hidden Markov models

C. Distance calculation

D. Graph theory

Answer: A

13. Maximum Likelihood Estimation finds parameters that:

A. Minimize data size

B. Maximize the probability of observed data

C. Randomize predictions

D. Create noise

Answer: B

14. Naïve Bayes assumes:

A. Features are dependent

B. Features are independent

C. Non-linear data

D. Only continuous data

Answer: B

15. Naïve Bayes is best suited for:

A. Image processing

B. Text classification

C. Video compression

D. Sorting algorithm

Answer: B

16. Parametric classifiers assume:

A. Known probability distribution

B. No distribution

C. Data is missing

D. Only supervised data

Answer: A

17. Non-parametric classifiers include:

A. Bayesian classifier

B. KNN

C. Gaussian model

D. Logistic regression

Answer: B

18. KNN classification depends on:

A. Mean

B. Distance measure

C. Prior probability

D. Variance

Answer: B

19. Probabilistic Graphical Models include:

A. SVM

B. Bayesian Networks

C. CNN

D. PCA

Answer: B

20. A fully connected undirected graph model is called:

A. Bayesian network

B. Markov Random Field

C. Decision tree

D. SVM

Answer: B

21. Which classifier estimates conditional probability?

A. KNN

B. Naïve Bayes

C. K-means

D. PCA

Answer: B

22. In statistical pattern recognition, classification is based on:

A. Syntax

B. Probability

C. Animations

D. Regression only

Answer: B

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Unit-3: Feature Extraction & Dimensionality Reduction (10 MCQs)

23. PCA is used for:

A. Increasing data

B. Clustering

C. Reducing dimensionality

D. Classification

Answer: C

24. PCA components are:

A. Correlated

B. Independent

C. Orthogonal

D. Unsupervised

Answer: C

25. LDA focuses on:

A. Maximum variance

B. Maximum class separability

C. Random projections

D. Density estimation

Answer: B

26. ICA extracts:

A. Independent components

B. Dependent components

C. Class labels

D. Graph structure

Answer: A

27. SVD is used in:

A. Dimensionality reduction

B. Only classification

C. Optimization

D. DBSCAN

Answer: A

28. Feature Selection differs from Feature Extraction in that:

A. Selection reduces data

B. Extraction creates new features

C. Selection increases features

D. Both are identical

Answer: B

29. Chi-square test is used in:

A. Feature extraction

B. Feature selection

C. Regression

D. Clustering

Answer: B

30. Filter methods in feature selection use:

A. Classifiers

B. Statistical tests

C. Neural networks

D. Trees only

Answer: B

31. Wrapper methods use:

A. SVM and classifiers

B. MLE

C. PCA

D. Graph theory

Answer: A

32. Embedded methods include:

A. LASSO

B. K-means

C. PCA

D. CNN

Answer: A

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Unit-4: Machine Learning for Pattern Recognition (12 MCQs)

33. SVM finds:

A. Minimum margin hyperplane

B. Maximum margin hyperplane

C. Random decision boundary

D. Probabilistic decision

Answer: B

34. Kernel trick is used in:

A. PCA

B. SVM

C. HMM

D. DBSCAN

Answer: B

35. Decision tree splits are based on:

A. Entropy/Gini

B. Variance only

C. Linear equations

D. CNN layers

Answer: A

36. Random forest reduces:

A. Bias

B. Variance

C. Noise

D. Components

Answer: B

37. CNNs are best for:

A. Text

B. Sequence

C. Images

D. Audio

Answer: C

38. MLP is a:

A. Linear model

B. Graph model

C. Feedforward neural network

D. Clustering model

Answer: C

39. Autoencoders are used for:

A. Classification

B. Dimensionality reduction

C. Reinforcement

D. Clustering

Answer: B

40. Deep learning means:

A. Few layers

B. Many hidden layers

C. Only input-output layers

D. Only linear models

Answer: B

41. Precision is defined as:

A. TP / (TP + FP)

B. TP / (TP + FN)

C. FP / (TN + TP)

D. TN / FP

Answer: A

42. Recall is:

A. TP / (TP + FN)

B. TN / (TN + FP)

C. FN / TP

D. FP / TP

Answer: A

43. F1-score is harmonic mean of:

A. Precision & Recall

B. Precision & Accuracy

C. Recall & Accuracy

D. Error & variance

Answer: A

44. ROC curve plots:

A. TP vs FN

B. TPR vs FPR

C. Accuracy vs precision

D. Error vs recall

Answer: B

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Unit-5: Clustering & Unsupervised Learning (10 MCQs)

45. K-means minimizes:

A. Maximum distance

B. Within-cluster sum of squares

C. Entropy

D. Variance

Answer: B

46. K-means requires:

A. Number of clusters k

B. Density threshold

C. Hierarchical levels

D. Probability

Answer: A

47. DBSCAN identifies:

A. Only circular clusters

B. Noise and arbitrary shapes

C. Only linear clusters

D. Uniform clusters

Answer: B

48. Hierarchical clustering builds:

A. Neural network

B. Dendrogram

C. Decision tree

D. Graph model

Answer: B

49. GMM is based on:

A. Gaussian distributions

B. Entropy

C. CNN filters

D. KNN rules

Answer: A

50. HMMs are used for:

A. Static data

B. Sequential data

C. Images

D. Clustering only

Answer: B

51. SOM converts:

A. 2D to high-dimensional

B. High-dimensional to 2D

C. Noise to data

D. Data to text

Answer: B

52. The E-step in EM algorithm computes:

A. Missing values

B. Expected probabilities

C. Random outputs

D. Gradient

Answer: B

53. K-means converges when:

A. Centroids change

B. Centroids stabilize

C. Classes equal

D. Probabilities match

Answer: B

54. GMM optimizes parameters using:

A. SVM

B. EM Algorithm

C. CNN

D. Naïve Bayes

Answer: B

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Unit-6: Applications & Emerging Trends (6 MCQs)

55. Biometrics includes:

A. Face recognition

B. Sorting

C. Routing

D. Text editing

Answer: A

56. Object detection algorithms include:

A. YOLO

B. KNN

C. LDA

D. PCA

Answer: A

57. Speech recognition uses:

A. PCA

B. HMM

C. CNN always

D. K-means

Answer: B

58. NLP tasks include:

A. ATM transactions

B. Sentiment analysis

C. Routing

D. Memory allocation

Answer: B

59. AI-driven pattern recognition is mainly powered by:

A. Deep learning

B. Sorting algorithms

C. OS-level tools

D. File systems

Answer: A

60. Ethical issues include:

A. Bias