

Code :R7421207

1

IV B.Tech II Semester(R07) Regular Examinations, April 2011  
PATTERN RECOGNITION

(Common to Information Technology and Computer Science &amp; Systems Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions  
All questions carry equal marks

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1. (a) With the help of neat sketch explain the design cycle of a design pattern.  
(b) Differentiate between supervised learning and unsupervised learning.
2. (a) Define the following terms:
  - i. Decision Rule
  - ii. Evidence
  - iii. Likelihood
  - iv. Bayes decision rule(b) What is the role of the discriminant functions in pattern recognition?
3. (a) Explain the various special cases of discriminant functions for normal density.  
(b) Write short notes on compound Bayesian theory.
4. (a) How to estimate the parameters for Bayesian by using Gaussian. Explain.  
(b) Explain the Bayesian learning approach to pattern classification problems.
5. Discuss in detail about the application to normal mixtures
  - (a) Unknown mean vectors and
  - (b) All parameters unknown.
6. (a) Give brief description about the clustering and dimensionality reduction.  
(b) What is multidimensional scaling? Explain with an example.
7. (a) Discuss in detail about the decoding problem with veterbi algorithm.  
(b) Draw and explain the Markov chain with 5 states labeled (s1 to s5) with selected state transitions.
8. (a) Draw and explain the sentence model using HMM for the clapped grammar.  
(b) Explain in detail about the ML training.

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1. (a) Explain the different steps that are involved in design of a pattern recognition.  
(b) Give brief description about the post processing.
2. (a) Explain in detail about the Bayesian decision theory.  
(b) Draw and explain the functional structure of a general statistical pattern classifier.
3. (a) Discuss in detail about the discrete features of Bayes decision theory.  
(b) What are univariate density and multivariate density. Explain.
4. (a) Explain the Bayesian learning approach to pattern classification problems.  
(b) Describe the Bayesian estimation technique to calculate the univariate case.
5. (a) Give brief description about the similarity measures.  
(b) Discuss in detail about the criterion functions for clustering.
6. (a) Define hidden Markov model. Explain the different symbols involved in it.  
(b) Where are we using the evaluation problem. Explain.
7. (a) Write and explain the evolution problem and the forward algorithm.  
(b) List and explain the different assumptions made for Hidden Markov Model.
8. (a) Present a detailed note on MMI training procedure.  
(b) Give brief description about state emission HMM.

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1. (a) Draw and explain the components of typical pattern recognition system.  
(b) Discuss briefly about the decision theory and decision boundary.
2. (a) Discuss in detail about the minimum-error-rate classification.  
(b) Define the following:
  - i. Decision Rule
  - ii. Evidence
  - iii. Likelihood
  - iv. Bayes decision rule
3. (a) Explain the properties of multivariate normal density.  
(b) Explain with example the Bayesian decision for three dimensional binary data.
4. (a) How to estimate the parameters for Bayesian by using Gaussian? Explain.  
(b) Write short notes on parameter distribution.
5. (a) Write short notes on the following:
  - i. Sum of squared error criteria
  - ii. Maximum likelihood estimate.  
(b) Discuss in detail about the mixture densities and identifiability.
6. (a) Give brief description about the clustering and dimensionality reduction.  
(b) What is multidimensional scaling? Explain with example.
7. (a) List and explain the different assumptions made in the Hidden Markov Model.  
(b) Explain in detail about the Decoding problem.
8. (a) Explain in detail about the Arc emission HMM.  
(b) Explain in detail about the ML training.

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1. (a) Briefly describe about the machine perception.  
(b) Discuss in detail about the feature extraction.
2. (a) Explain in detail about the Bayesian decision theory.  
(b) What is the role of the discriminant functions in pattern recognition.
3. (a) Discuss in detail about the discrete features of Bayes decision theory.  
(b) Explain the properties of multivariate normal density.
4. (a) Explain the following terms:
  - i. Training data
  - ii. Maximum likelihood
  - iii. Bayesian estimation
  - iv. Bayesian learning.  
(b) Explain the multivariate case for Bayesian parameter estimation by using Gaussian.
5. (a) Give brief description about the similarity measures.  
(b) Discuss in detail about the mixture densities and identifiability.
6. (a) Distinguish between principle component analysis and non linear component analysis.  
(b) Write short notes on monotonicity constraint.
7. (a) Define hidden Markov model, explain the different symbols involved in it.  
(b) Where are we using the evaluation problem. Explain.
8. (a) Give mathematical description of Hidden Markov Model.  
(b) Draw and explain the sentence model using HMM for the clapped grammar.

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