

College of Engineering, Pune

(F. Y. M. Tech)- (Electronics & TeleCommunications)

Digital Systems - (DS 518)- (Pattern Recognition & Classification)
Wired & Wireless - (WW 528)- (Pattern Recognition & Classification)
Signal Processing - (SP 524)- (Pattern Recognition & Classification)

Date- 13 May 2012

Timing: 3 hrs

Academic Year: 2011- 12

Max. Marks: 50

Instructions to candidate:

- 1) Neat Diagram or block must be drawn wherever necessary.
- 2) Assume suitable data if necessary.
- 3) Use of non-programmable electronic calculator is allowed.
- 4) Figures to the right indicate full marks.
- 5) All questions are compulsory.

- Q. 1 a). Why shape is used as feature in pattern recognition? What are typical problems in shape description? 10
- i. What is shape? What is shape similarity?
 - ii. What are requirements to a similarity measure? What are classes of similarity?
 - iii. What are structural approaches of shape?
 - iv. What are problems of skeletons? What are global convex hull?
 - v. When do the similarity measures fail?
- Q. 2 a). What are the four basic morphological operations? Mention their properties & applications. 5
- b). What is texture? What are the methods to describe it? What are its types? What is the role of co occurrence matrix in texture recognition? 5
- Q. 3 What are the components of PR system? What is feature extraction & what are the methods to extract them? What are classifiers? How are they represented? How is Bayesian decision made? What are its limitations? 10
- Q. 4 Show mathematical representations of neuron & perceptron. Draw block diagram of ANN. Showing adaptive interaction between individual neurons. Explain back propagation algorithm. 10
- Q. 5 a) Explain crossover & mutation in simple genetic algorithm with example. 5
- OR
- a) What are fuzzy sets? What is fuzzy membership function? Explain MF terminology with graph (core, crossover pts, α cut, support) 5
- b) Give Graham scan algorithm for finding convex hull of n points in two dimensions. Also compute the time complexity for the algorithm. 5
- OR
- b) Give "Gift wrapping" algorithm for finding convex hull of n points in two dimensions. Also compute the time complexity for the algorithm. 5

College of Engineering, Pune
END SEMESTER EXAM MAY 2012
F.Y. M. Tech (E & TC) – Wired & wireless Communications
(WW 518)- (Wireless Sensor Networks)

Day & Date- 8 /05/2012, Tuesday
Timing- 9 to 12 pm

Max. Marks- 50
Duration – 3Hrs.

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Draw neat figure wherever required

- | | | Marks |
|------|---|--------------|
| Q. 1 | A. Define following terms and their significance for sensor networks:
(i) Localization and tracking
(ii) Evaluation metric | 4 |
| | B. Address the coverage problems in context of area, point and barrier coverage. | 3 |
| | C. For wireless sensor networks (WSN) explain the need of following mechanisms: multihop wireless communication, energy efficient operation and auto - configuration. | 3 |
| Q. 2 | A. Compare 'Declarative routing protocol' and 'Directed diffusion protocol' based on, properties, basic approach and working. | 6 |
| | B. What is sensor Web?
Differentiate Sensor grid and sensor network on the basis of: design purpose, working and applications. | 4 |
| Q. 3 | A. Explain application areas of ZigBee network and its working based on protocol stack. | 3 |
| | B. What are the challenges for sensor network databases?
Explain the 'Query processing' feature in WSN.
What is the role of geographic hash table (GHT)? | 4 |
| | C. Explain the working of Greedy Perimeter Stateless Routing (GPSR) Protocol. | 3 |

- Q. 4 A. Compare Tiny OS, MANTIS, Contiki, RETOS operating systems based on features, kernel operation and application areas. 6
- B. Explain **any four** types of threats to wireless sensor networks (WSN). How 'Key management' and 'Self healing' techniques can add generic security to WSN? 4
- Q. 5 A. Write short notes on: (any 2) 6
- (i) UWB technology
 - (ii) MICA 2 sensor nodes
 - (iii) Stem T protocol
 - (iv) BIP Algorithm
- B. Comment on any two emerging techniques for WSN: 4
- (i) Building monitoring and control
 - (ii) Health care
 - (iii) Industrial process control
