Elective - III : Machine Learning

P. Pages : 2

Time : Three Hours

Max. Marks : 80

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Notes :
1. Solve Question 1 OR Questions No. 2.
2. Solve Question 3 OR Questions No. 4.
3. Solve Question 5 OR Questions No. 6.
4. Solve Question 7 OR Questions No. 8.
5. Solve Question 9 OR Questions No. 10.
6. Solve Question 11 OR Questions No. 12.
7. Due credit will be given to neatness and adequate dimensions.
8. Assume suitable data wherever necessary.
9. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Explain four example of machine learing in detail. **7**

   b) State & explain various types of machine learing. **7**

   OR

2. a) Explain Bayesian linear regression in detail. **7**

   b) What is variance reduction averaging technique? **7**

3. a) Explain linear discriminant for 2 classes. **6**

   b) How to use gradient descent to solve for 3 unknown variable x_1, x_2 and x_3 consider. a non linear system of equations **7**

   $$3x_1 - CO_3(x_2\, x_3) - 3/2 = 0$$

   $$4x_1^2 - 625\, x_2^2 + 2x_2 - 1 = 0$$

   $$\exp(-x_1\, x_2) + 20\, x_3 + \frac{10\pi - 3}{3} = 0$$

   OR

4. a) Explain two layer linear approximation. **6**

   b) Explain non-linear hypothesis with perception. **7**

5. a) State and Explain EM algorithm. **7**

   b) Explain the concept of Gaussian Mixture model with the help of diagram. **6**

   OR

6. a) Explain principle component Analysis for dimensionality reduction. **6**

   b) Derive the back propogation rule for Hidden unit weights. **7**

7. a) What are the limitation of machine learning? **6**

   b) Discuss learning in zero-bayes system. **7**

8. a) Explain sample complexity in detail. **7**

b) Write on - **6**
   i) Hypothesis class.   ii) Target class.
   iii) Inductive bias.

9. a) Write on : **6**
   i) Linear kernel.   ii) Polynomial kernel.
   iii) Gaussian kernel.

b) What is maximum margin classifier? **7**

OR

10. a) Write on : **6**
   i) Boot strapping.   ii) Bagging.
   iii) Boosting.

b) Explain structureal risk minimization. **7**

11. a) Discuss sampling – importance resampling. **7**

b) Explain Hybrid Monte carlo algorithm in detail. **7**

OR

12. a) Write on : **6**
   i) Value Iteration.   ii) Policy Iteration.

b) Explain mistake bound model of learning. **8**

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