Roll No. .....

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316103

December, 2019

M.Tech. (CE/CSE) - I SEMESTER

Machine Learning (MSC-18-106)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART - A

1. (a) Explain what is the role of probability theory in Machine learning? (1.5)

(b) Explain how un-supervised learning is different from supervised one? (1.5)

(c) What do you mean by a hypothesis and hypothesis space? How does hypothesis space depend on input features? (1.5)

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(d) What is Induction bias and inductive learning? (1.5)

(e) Why both over-fitting and under-fittings are undesired in the training? (1.5)

(f) How will you decide the value of k in k-NN algorithm? (1.5)

(g) What do you mean by entropy, when does it become maximum? (1.5)

(h) What are advantages of Bayesian interpretation of probability. (1.5)

(i) Explain the characteristics of sigmoidal function. (1.5)

(j) Explain boosting techniques for ensembles. (1.5)

PART - B

2. (a) What is re-enforced learning? How machine learning is different from traditional programming? (6)

(b) Derive the Sum rule, Product rule and Bayes rule from the basic notion of probability. (9)

3. Explain and give Gradient ascent algorithm for Logistic regression. (15)

4. (a) Give K-Mean clustering techniques and state how we can improve it? (8)

(b) What are Eigen values and Eigen vector, explain their role in Principal Component Analysis (PCA)? (7)

5. (a) Explain how Naïve Bayes classification do work? (10)

(b) Explain how Bayesian Networks are used for reasoning? (5)

6. (a) Explain how do we maximize the margin in SVM? (8)

(b) Explain how Kernel methods are applied on non-linearly separable data? (7)

7. (a) What are ensembles, explain how random forest is generated? (3,5)

(b) Explain RNN and how is it used for query suggestions? (7)