Code: PHCSDST105

MAULANA AZAD NATIONAL URDU UNIVERSITY

PhD (Computer Science) Course Work Examination - December - 2017

Common for M.Tech MTCS105PET

I-Semester Examination December-2017

Paper: Machine Learning

Time: 3 hours **Max. Marks: 70**

Instructions:

This Question Paper consists of three parts: Part- A, Part-B and Part-C. Attempt all Parts.

Part-A contains 10 compulsory questions of very short answer type questions. Answers to be given in one word/sentence. Answer all questions. Each question carries 01 marks. **(10 x 1 = 10 Marks)**

Part-B contains eight questions, of which students are supposed to answer any five questions. Answer each question in 200 words. Each question carries 06 marks. **(5 x 6 = 30 Marks)**

Part-C contains five questions, of which students are supposed to answer any three questions. Answer each question in 500 words. Each question carries 10 marks. **(3 x 10 = 30 Marks)**

[PART-A]

Question 1

i. What is Instance based Machine learning?
ii. Define the problem of 'Over fitting' in Machine learning?
iii. Define nominal, ordinal, and continuous variables with example.
iv. Differentiate between supervised and unsupervised Machine Learning with suitable examples.
v. Distinguish between classification and prediction with suitable examples.
vi. Write any two metrics applied for evaluating a classification model.
vii. Write the formula for computing entropy used in Information Gain.
viii. What is 'Training set' and 'Test set'?
ix. List down various approaches for machine learning?
x. Define a machine learning problem for disease prediction based on the symptoms

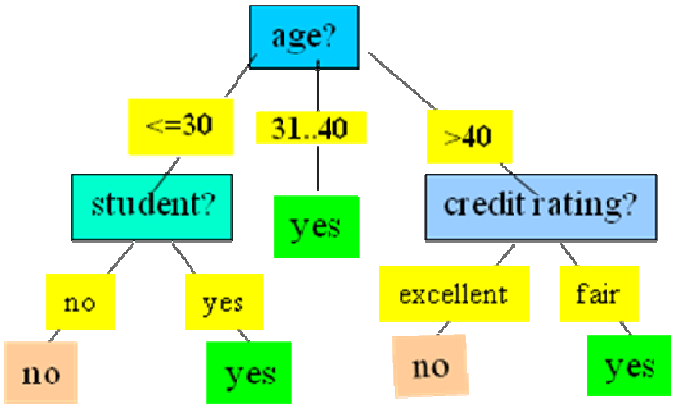
[PART-B]

2. Differentiate between Bagging and Boosting with suitable example.
3. Mention three main categories of learning? Which one is preferred over others and why? How to evaluate the learner's performance?
4. A learning system is cyclic process, write the basic steps involved. Write all three methods applied for testing of learning models.
5. Draw architecture of MLP and explain prediction method by back-propagation model.
6. How do you measure the performance of an intelligent model? Explain confusion matrix.

P.T.O.

7. Define Support Vector Machine (SVM). What are the advantages of SVM over ANN? How does SVM overcome the problem of over-fitting in ANN?

8. Apply the Rule-based Classification to the following tree structure and extract the rules for purchasing a system. Assume missing value if any.



9. What is hypothesis testing? Differentiate between Null hypothesis and Alternative hypothesis with suitable example.

[PART-C]

10. Discuss any two methods for assessing and comparing Classification Algorithms. Differentiate between re-sampling and cross-validation.
11. Write the steps of AdaBoost algorithm. Explain with example. Define voting function and write the steps of Bagging Algorithm.
12. Differentiate between Generative vs. discriminative training with suitable example.
13. Explain different types of clustering techniques and write the steps of k-Nearest-neighbor algorithm.
14. Write a short note on any four of the following:
    a. Naive Bayes learning algorithm
    b. Parameter smoothing
    c. Logisitic regression
    d. Bayes nets
    e. Markov nets