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Question Paper Code : 50054

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Fifth Semester

Artificial Intelligence and Data Science

AD 8552 — MACHINE LEARNING

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Elaborate on machine learning methods based on time. Is time an essential component for machine learning?
2. Why is visualization an important feature of machine learning?
3. Differentiate regression and classification with examples.
4. List the probabilistic models used in machine learning with appropriate examples.
5. How recommendation system has become a part of our lifestyle.
6. List atleast four open source machine learning libraries and their uses.
7. What are the techniques followed for data exploration in machine learning?
8. What is the importance of error based learning in machine learning?
9. How a human face can be recognized using machine learning techniques?
10. Give any three complex real time applications where machine learning can become handy and make the job simpler.

PART B — (5 × 13 = 65 marks)

11. (a) Give a detailed structure and example for types and sub-types of machine learning. (13)

Or

- (b) Differentiate linearity and non-linearity. Give an example of nonlinear relationship between input and output being converted into linear relationship. Provide graphs for the same. (13)
12. (a) Consider the below samples with x and y variables.

| y | x |
|-----|-----|
| 3 | 1 |
| 5 | 3 |
| 7 | 4 |
| 9 | 7 |
| 10 | 8 |

Apply simple linear regression, and compute the following:

- (i) Intercept (3)
 (ii) Slope of the input variable (3)
 (iii) Predict the y values for all the observations (3)
 (iv) Find the Mean Square Error. (4)

Or

- (b) Assume that you are appointed as the health minister of your state. You are asked to track the current covid cases. As a machine learning expert as well as the minister, how will you summarize the data and decide on the type of machine learning model to be applied on the data? Justify your answer by specifying the features of the sample data you have collected for the scenario. (13)
13. (a) Explain in detail how microsoft azure tackles machine learning. (13)

Or

- (b) Explain page ranking algorithm with a simple example and relate them with a recommendation system. (13)
14. (a) Information based machine learning is a necessary learning technique in the medical field. Extract one field in the medical domain and explain information based learning, assume data set if necessary. (13)

Or

- (b) Similarity based machine learning is a necessary learning technique in image recognition field. Explain how similarity based machine learning will work for a numerical dataset in case of face recognition, assume data set if necessary. (13)

15. (a) How machine learning can handle online fraud detection. Explain any two machine learning techniques that help in fraud detection (may be credit card fraud, spam fraud, online shopping credit points fraud) in details. (13)

Or

- (b) Explain the process involved in ALEXA for how identifies the song request laid by speech. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Suppose we are given with the positively labeled data points $\{(3, 1), (3, -1), (6, 1), (6, -1)\}$ and the negatively labelled data points $\{(1,0), (0,1), (0, -1), (-1, 0)\}$. Discover the support vectors that accurately discriminates the two classes. (15)

Or

- (b) Consider the data points $\{(3,1), (6,1), (1,0), (0,1), (0,2), (2,0)\}$. Apply hierarchical clustering algorithm with single link and complete link. Draw appropriate dendograms for each of the specifications.

Note: Use Manhattan distance to find the distance between two points. (15)