Roll No												

PRESIDENCY UNIVERSITY
BENGALURU

Department of Research & Development

Mid - Term Examinations – AUGUST 2024

Odd Semester: Ph.D. Course Work
Course Code: CSE871
Course Name: Machine Learning and Deep Learning
Department: SOCSE & IS

Date: 12/08/2024
Time: 02:00pm – 03:30pm
Max Marks: 50
Weightage: 25%

Instructions:

(i) Read the all questions carefully and answer accordingly.
(ii) Do not write any matter on the question paper other than roll number.

PART A (THOUGHT PROVOKING)

Answer all the Questions. Each question carries 5 marks. (4Qx 5M= 20M)

1. Elucidate 5 real time applications of Machine Learning. (CO: 01 BL: Understand)

2. Explain in detail about the supervised learning approach with a suitable example. (CO: 01 BL: Understand)

3. Explore the theoretical limits of gradient descent algorithms. (CO: 02 BL: Understand)

4. A recommendation system is being designed to handle the cold start problem, where new users or items have limited interaction data. Classify the activation functions in the neural network layers affect the system's ability to generate meaningful for the above scenario. (CO: 02 BL: Understand)

PART B (PROBLEM SOLVING)

Answer all the Questions. Each question carries 10 marks. (3Qx 10M= 30M)

5. The agronomy scientist and investigators are looking to improve plant leaf disease identification using machine learning techniques. They have collected a large dataset of plant leaf disease spot records containing various plant leaf spot features such as size of spot, leaf blight, colours on leaf, history, and symptoms, along with the corresponding diagnosis and

treatment outcomes. Objective is to build a predictive model to recommend the most appropriate analysis for a new type of leaf spot based on their features. How would you approach this agriculture application using machine learning? Provide a step-by-step plan, including the choice of supervised or unsupervised learning, feature selection techniques, and the specific model you would use to recommend. Explain how you would handle the large-scale dataset and any challenges that may arise. (CO: 01 BL: Apply)

6. A retail company wants to forecast monthly sales for the next year based on historical sales data, marketing expenditure, and seasonal factors. Illustrate the approach in building a linear regression model to forecast future sales? Demonstrate features would you include, and how would you account for seasonal effects and potential trends in the data? Explain metrics would you use to evaluate the model's performance? (CO: 01 BL: Apply)

7. ABC company is developing a computer vision system that can classify images as either containing a cat or not. Company collected a dataset of labelled images and they want to develop a shallow neural network model for this task. Explain the steps involved in building a shallow neural network model for binary image classification. Elucidate the use of activation functions. Also, describe how gradient descent and derivatives are used to train the model. (CO: 01 BL: Apply)