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Course outline

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Week 4 : Assignment 4

Assignment not submitted   **Due date: 2025-02-19, 23:59 IST.**

1) Which of the following are regression problems? Assume that appropriate data is given.   *1 point*

☐ Predicting the house price.

☐ Predicting whether it will rain or not on a given day.

☐ Predicting the maximum temperature on a given day.

☐ Predicting the sales of the ice-creams.

2) Which of the following are multiclass classification problems?   *1 point*

☐ Classifying emails as spam or not spam.

☐ Classifying a person's blood type as A, B, AB, or O.

☐ Predicting the price of a second-hand car.

☐ Classifying a movie genre into Drama, Comedy, Action, or Thriller.

3) If a linear regression model achieves zero training error, can we say that all the data points lie on a straight line in the feature space?   *1 point*

○ Yes
○ No

Read the information given below and answer the questions from 4 to 6:

Data Description:

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An automotive service chain is launching its new grand service station this weekend. They offer to service a wide variety of cars. The current capacity of the station is to check 315 cars thoroughly per day. As an inaugural offer, they claim to freely check all cars that arrive on their launch day, and report whether they need servicing or not! Unexpectedly, they get 450 cars. The servicemen will not work longer than the working hours, but the data analysts have to! Can you save the day for the new service station? How can a data scientist save the day for them? He has been given a data set, '**ServiceTrain.csv**' that contains some attributes of the car that can be easily measured and a conclusion that if a service is needed or not. Now for the cars they cannot check in detail, they measure those attributes and store them in '**ServiceTest.csv**'

Problem Statement:

Use machine learning techniques to identify whether the cars require service or not.

Read the given datasets 'ServiceTrain.csv' and 'ServiceTest.csv' as train data and test data respectively and import all the required packages for analysis.

4) Which of the following machine learning techniques would NOT be appropriate to solve **1 point** the problem given in the problem statement?

○ kNN
○ Random Forest
○ Logistic Regression
○ Linear regression

Prepare the data by following the steps given below, and answer questions 5 and 6.
  • Encode categorical variable, Service - Yes as 1 and No as 0 for both the train and test datasets.
  • Split the set of independent features and the dependent feature on both the train and test datasets.
  • Set **random_state** for the instance of the logistic regression class as 0.

5) After applying logistic regression, what is/are the correct observations from the **1 point** resultant confusion matrix?

☐ True Positive = 29, True Negative = 94
☐ True Positive = 94, True Negative = 29
☐ False Positive = 5, True Negative = 94
☐ None of the above

6) The logistic regression model built between the input and output variables is checked **1 point** for its prediction accuracy of the test data. What is the accuracy range (in %) of the predictions made over test data?

○ 60 - 79
○ 90 - 95
○ 30 - 59

○ 80 – 89

7) How are categorical variables preprocessed before model building? **1 point**

○ Standardization
○ Dummy variables
○ Correlation
○ None of the above

8) A regression model with the function $y = 80 + 4.5x$ was built to understand the impact of **1 point** temperature x on ice cream sales y. The temperature this month is 10 degrees more than the previous month. What is the predicted difference in ice cream sales?

○ 56 units
○ 45 units
○ 80 units
○ None of the above

9) X and Y are two variables that have a strong linear relationship. Which of the following **1 point** statements are incorrect?

☐ There cannot be a negative relationship between the two variables.
☐ The relationship between the two variables is purely causal.
☐ One variable may or may not cause a change in the other variable.
☐ The variables can be positively or negatively correlated with each other.

The Global Happiness Index report contains the Happiness Score data with multiple features (namely the Economy, Family, Health, and Freedom) that could affect the target variable value.

Prepare the data by following the steps given below, and answer question 10.

• Split the set of independent features and the dependent feature on the given dataset

• Create training and testing data from the set of independent features and dependent feature by splitting the original data in the ratio 3:1 respectively, and set the value for **random_state** of the training/test split method's instance as 1

10) A multiple linear regression model is built on the Global Happiness Index dataset '**GHI** **1 point** **Report.csv**'. What is the RMSE of the baseline model?

○ 2.00
○ 0.50
○ 1.06
○ 0.75

You may submit any number of times before the due date. The final submission will be considered for grading.

Submit Answers