Question 6

Which step / phase of the learning workflow that defines the potential accuracy of your project?

Data Acquisition

Question 7

In which phase of the learning workflow one needs to break dataset? and what are these sets?

Data Preprocessing (and Feature Engineering)

0.25 points Save Answer

What does MSE stand for?

Mean Square Error

How we can prove that a given ML model will work well on new data and not only on the training data?

We need to check the accuracy of the model against the test data set.. This proves if the model works well on new data or if it only works on the training data.

Why do we need to shuffle the data before starting the training process?

So, the ML algorithm doesn't pick up a pattern that isn't really there! Because the data in certain order.

The set of parameters that are selected based on their influence on the model are called_____

hyperparameters

2. Differentiate between classification and regression with an example. (1.5 Marks)

➢ Classification vs. Regression:

Classification	Regression
• Classification is the task of predicting a discrete class label	• Regression is the task of predicting a continuous quantity
• In a classification problem data is labelled into one of two or more classes	• A regression problem requires the prediction of a quantity
• A classification problem with two classes is called binary, more than two classes is called a multi-class classification	• A regression problem with multiple input variables is called a multivariate regression problem
• Classifying an email as spam or non-spam is an example of a classification problem	• Predicting the price of a stock over a period of time is a regression problem

QUESTION 3

Identify which ML technique adapts a policy for mapping from states actions that tells you what to do in a given sta

- Supervised Learning
- Semi supervised learning
- Reinforcement learning
- UnSupervised Learning

QUESTION 6

Differentiate between univariate, model-based selection and iterative feature selection.

Consider adult incomes in the United States dataset derived from the 1994 census database, which consists of continuous features- age and hours-per-week and categorical features- workclass, education, sex, and occupation

Analyze, which of the below technique is used to replace categorical variables with one or more new features of continuous variables

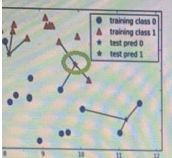
- US Data
- Univariate Nonlinear Transformations
- One-hot encoding
- Binning
- ANOVA

السؤال 10 — 1 درجات — حفظ الإجابة

which feature selction technique builds a series of models with varying numbers of features

- Non-Univariate Transformation
- Iterative Selection
- Univariate Statistics
- Model-based Selection

to predict the class of new data point x=1 and y=3 using 3-NN. In which class (this data point belong to?(The new data point is big circle with green color



- Training class 0
- Training class 1
- Test pred 0
- Test pred 1

QUESTION 6

Consider a binary classification problem to predict whether a custo than 3 children or is not divorced, then they want to buy a boat". Whi

- The rule generalises to new data
- The rule is able to capture all the aspects of and variability in the data
- The Rule seems too simple and underfitting occurs
- The Rule seems too complex and overfitting occurs

السؤال 12

Python uses _____ to indicate blocks

- Newline
- semicolon
- Square brackets
- indentation

السؤال 13

machine learning technique learns a function f(x) to predict y given x

- Supervised Learning
- Probabilistic modelling
- Reinforcement learning
- UnSupervised Learning

QUESTION 12

Given a IRIS flower dataset which contains class labels machine learning problems it belongs

- Binary and Multiclass classification
- Regression
- Binary Classification
- Multiclass Classification

QUESTION 13

Discuss the pros and cons of K-NN

السؤال 9

d represents color of mobile phones for certain brand. Recognize, which of

- .Feature F1 is an example of discrete variable
- .Feature F1 is an example of categorial variable
- .Feature F1 is an example of continuous variables
- .Feature F1 is an example of discrete and continuous variables

---

.Let's say, you are working with the synthetic dataset of counts, which of the below technique can be applied to overcome the challenges in Univariate nonlinear transformation

- both B and C
- ( )pow
- ( )log
- ( )exp

---

hether a customer will buy a boat. Given " If the customer is older than 45, and divorced, then they want to buy a boat". Which of the below claims are correct

- The Rule seems too complex and overfitting occurs
- The Rule seems too simple and underfitting occurs
- The rule generalises to new data
- The rule is able to capture all the aspects of and variability in the data

---

QUESTION 1

Identify which machine learning model can handle both categorical and numeric

- A. Logistic Regression
- B. Neural Networks
- C. Decision trees
- D. Naïve Bayes

السؤال 11

Parasitic gaps occur on average in 1/100,000 sentences. Maggie Louise Gal (aka "ML" Gal) has developed a machine learning approach to identify parasitic gaps. If a sentence has a parasitic gap, it correctly identifies it 97% of the time. If it doesn't, it will incorrectly say it does ? with probability 0.003. Suppose we run it on a sentence and the algorithm says it is a parasitic gap, what is the probability it actually is

- 0.002~
- 0.004~
- 0.005 ~
- 0.003 ~

السؤال 12

dataset which contains class labels { Iris Satosa, Iris Verginica, Iris Vercolor}. Identify which of the following supervised machine learning problems it belongs

---

Given the below table

ML.Pass AND EngPass	P(ML.Pass|EngPass)
true, true	.88
true, false	.01
false, true	.04
false, false	.07

What is: p(ML.Pass=true | EngPass=true)?

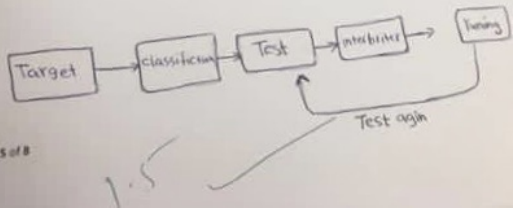
- A. 0.125
- B. 0.215
- C. 0.59
- D. 0.95

10. Parasitic gaps occur on average in 1/100,000 sentences. Maggie Louise Gal (aka "ML" Gal) has developed a machine learning approach to identify parasitic gaps. If a sentence has a parasitic gap, it correctly identifies it 97% of the time. If it doesn't, it will incorrectly say it does with probability 0.003. Suppose we run it on a sentence and the algorithm says it is a parasitic gap, what is the probability it actually is ?.

- A. ~0.003
- B. ~0.002
- C. ~0.004
- D. ~0.005

PART II: (10 Marks)

1. **Discuss with a neat figure the sequence of steps in Machine learning workflow.** (1.5 Marks)



Page 5 of 8

السؤال 9

1 درجات حفظ الإجابة

In scikit-learn, which function given below converts categorial variables to dummy continuous variables

- ( )pd.get_dummies
- Both A and Cs
- ()OneHotEncoder
- ( )data_dummies.head

Quiz:

- If you're given some scenario to specify whether, it's Supervised or unsupervised?

Scenario 1: Facebook recognizes your friend in a picture from an album of tagged photographs

Explanation:
It is supervised learning. Here Facebook is using tagged photos to recognize the person. Therefore, the tagged photos become the labels of the pictures and we know that when the machine is learning from labeled data, it is supervised learning.

Quiz:

- If you're given some scenario to specify whether it's Supervised or unsupervised?

Scenario 2: Recommending new songs based on someone's past music choices

Explanation:
It is supervised learning. The model is training a classifier on pre-existing labels (genres of songs). This is what *Netflix, Pandora*, and *Spotify* do all the time, they collect the songs/movies that you like already, evaluate the features based on your likes/dislikes and then recommend new movies/songs based on similar features.

Quiz:

- If you're given some scenario to specify whether it's Supervised or unsupervised?

Scenario 3: Analyze bank data for suspicious-looking transactions and flag the fraud transactions

Explanation:
It is unsupervised learning. In this case, the suspicious transactions are not defined, hence there are no labels of "fraud" and "not fraud". The model tries to identify outliers by looking at anomalous transactions and flags them as 'fraud'.

Exercise1:

Suppose we have a linear regression problem, perform two iterations using gradient descent algorithm. Show the final values of θ_0 *and* θ_1, consider initial vlaues for

$$\theta_0 = 2$$
$$\theta_1 = 3$$
$$\alpha = 0.5$$

And consider the dataset below:

	x_1	y
1	12	5
2	5	2

m=2

Gradient Descent

Previously (n=1):

Repeat {

$$\theta_0 := \theta_0 - \alpha \underbrace{\frac{1}{m}\sum_{i=1}^{m}(h_\theta(x^{(i)}) - y^{(i)})}_{\frac{\partial}{\partial\theta_0}J(\theta)}$$

$$\theta_1 := \theta_1 - \alpha \frac{1}{m}\sum_{i=1}^{m}(h_\theta(x^{(i)}) - y^{(i)})x^{(i)}$$

(simultaneously update θ_0, θ_1)

}

New algorithm ($n \geq 1$):

Repeat {

$$\theta_j := \theta_j - \alpha \frac{1}{m}\sum_{i=1}^{m}(h_\theta(x^{(i)}) - y^{(i)})x_j^{(i)}$$

(simultaneously update θ_j for $j = 0, \ldots, n$)

}