

Final Exam

LATEST SUBMISSION GRADE

60%

1.

Question 1

Which of the following is true about Machine Learning?

1 / 1 point



Machine Learning models help us in tasks such as object recognition, summarization, and recommendation.



Machine Learning models iteratively learn from data and allow computers to find hidden insights.



Machine Learning was inspired by the learning process of human beings.



All of the above.

Correct

2.

Question 2

Which of the following is not a Machine Learning technique?

0 / 1 point



Regression/Estimation



Heuristics



Clustering



Associations

Incorrect

3.

Question 3

Which of the following is true for **Multiple Linear Regression**?

0 / 1 point



One independent variable is used to predict a dependent variable.



The relationship between the independent variable x and the dependent variable y is modeled as an n th degree polynomial in x .



Multiple independent variables are used to predict a dependent variable.



Observational data are modeled by a function which is a nonlinear combination of the model parameters and depends on one or more independent variables.

Incorrect

4.

Question 4

In which of the following is correct for **Polynomial Regression**?

1 / 1 point



It can fit a curved line to your data.



It can be transformed into a linear regression model using the Least Squares method.



It can use the same mechanism as Multiple Linear Regression to find the parameters.



All of the above.

Correct

5.

Question 5

Which of the below is a sample of classification problem?

0 / 1 point



To predict the category to which a customer belongs to.



To predict whether a customer switches to another provider/brand.



To predict whether a customer responds to a particular advertising campaign or not.



All of the above

Incorrect

6.

Question 6

Which of the following is an example of Logistic Regression?

1 / 1 point



The probability of a person purchasing life insurance based on age and income.



All of the above.



The probability of a borrower defaulting on their mortgage based upon their credit score and age.



The odds of a particular individual having a heart attack based on how much they exercise and how much they weigh.

Correct

7.

Question 7

Which statement is **NOT TRUE** about k-means clustering?

1 / 1 point



The objective of k-means, is to form clusters in such a way that similar samples go into a cluster, and dissimilar samples fall into different clusters.



As k-means is an iterative algorithm, it guarantees that it will always converge to the global optimum.



k-means divides the data into non-overlapping clusters without any cluster-internal structure.

Correct

8.

Question 8

Which of the following are characteristics of DBSCAN? Select all that apply.

1 / 1 point



DBSCAN can find arbitrarily shaped clusters.

Correct



DBSCAN can find a cluster completely surrounded by a different cluster.

Correct



DBSCAN has a notion of noise, and is robust to outliers.

Correct



DBSCAN does not require one to specify the number of clusters such as k in k-means

Correct

9.

Question 9

A _____ system provides a better experience for the user by giving them a broader exposure to many different products they might be interested in.

0 / 1 point



Relationship



Reinforcement



Resource



Recommender

Incorrect

10.

Question 10

The statement "Show me more of the same of what I've liked before" is an example of what type of recommendation system?

1 / 1 point



Content-based



Collaborative



Demographic-based



Utility-based

Correct

Final Exam

LATEST SUBMISSION GRADE

70%

1.

Question 1

What is the subfield of computer science that gives "computers the ability to learn without being explicitly programmed."?

1 / 1 point



Computational science



Graphics and visual computing



Information management



Machine learning

Correct

2.

Question 2

Which of the following groups are not Machine Learning techniques?

1 / 1 point



Classification and Clustering



Numpy, Scipy and Scikit-Learn

Correct



Anomaly Detection and Recommendation Systems

3.

Question 3

In which of the following would you use **Multiple Linear Regression**?

1 / 1 point



Predicting population growth over time.



Predicting job performance of employees by number of sick days taken throughout a year.



Predicting weather based on month.



Predicting the production of apples in an orchard based on temperature and rainfall.

Correct

4.

Question 4

In which of the following is correct for **Polynomial Regression**?

1 / 1 point

☐

It can fit a curved line to your data.

☐

It can be transformed into a linear regression model using the Least Squares method.

☐

It can use the same mechanism as Multiple Linear Regression to find the parameters.

☒

All of the above.

Correct

5.

Question 5

Predicting whether a customer responds to a particular advertising campaign or not is an example of what?

0 / 1 point

☐

Machine learning

☐

None of the above

☐

Classification problem

☒

Regression

Incorrect

6.

Question 6

What is a statistical model that uses Logistic function to model the conditional probability?

1 / 1 point

☐

Ridge regression



Logistic regression



Stepwise Regression



Linear regression

Correct

7.

Question 7

Which of the following statements is false for k-means clustering?

0 / 1 point



The object of k-means is to form clusters in such a way that similar samples go into a cluster, and dissimilar samples fall into different clusters.



None of the above.



k-means divides the data into non-overlapping clusters without any cluster-interval structure.



k-means clustering creates a tree of clusters

Incorrect

8.

Question 8

What does DBCSAN stand for?

1 / 1 point



Data-Based Spatial Clustering of Applications with Noise.



Data-Based Sample Clustering of Applications with Noise.



Density-based Spatial Cores of Applications with Noise.



Density-Based Spatial Clustering of Applications with Noise.

Correct

9.

Question 9

What is/are the advantage/s of Recommender Systems ?

1 / 1 point



Recommender Systems provide a better experience for the users by giving them a broader exposure to many different products they might be interested in.



Recommender Systems encourage users towards continual usage or purchase of their product



Recommender Systems benefit the service provider by increasing potential revenue and better security for its consumers.



All of the above.

Correct

10.

Question 10

Which of the following is NOT true regarding content-based recommendation systems?

0 / 1 point



Content-based recommendation system tries to recommend items based on similarity among items.



Content-based recommendation system tries to recommend items based on the similarity of users when buying, watching, or enjoying something.



Content-based recommendation system tries to recommend items based on the preferences of people living in your area.



All of the above.

Incorrect

Intro to Machine Learning

TOTAL POINTS 15

1. Supervised learning deals with unlabeled data, while unsupervised learning deals with labelled data. 3 points

☐ True
☒ False

2. Which of the following is **not true** about Machine Learning? 3 points

☐ Machine Learning was inspired by the learning process of human beings.
☐ Machine Learning models iteratively learn from data, and allow computers to find hidden insights.
☐ Machine Learning models help us in tasks such as object recognition, summarization, and recommendation.
☒ Machine learning gives computers the ability to make decision by writing down rules and methods and being explicitly programmed.

3. Which of the following groups are not Machine Learning techniques? 3 points

☐ Classification and Clustering
☒ Numpy, Scipy and Scikit-Learn
☐ Anomaly Detection and Recommendation Systems

4. The "Regression" technique in Machine Learning is a group of algorithms that are used for: 3 points

☒ Predicting a continuous value; for example predicting the price of a house based on its characteristics.
☐ Prediction of class/category of a case; for example a cell is benign or malignant, or a customer will churn or not.
☐ Finding items/events that often co-occur; for example grocery items that are usually bought together by a customer.

5. When comparing Supervised with Unsupervised learning, is this sentence True or False? 3 points

In contrast to Supervised learning, Unsupervised learning has more models and more evaluation methods that can be used in order to ensure the outcome of the model is accurate.

☒ False
☐ True

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Regression

TOTAL POINTS 15

1. **Multiple Linear Regression** is appropriate for: 3 points
 - ☐ Predicting the sales amount based on month
 - ☐ Predicting whether a drug is effective for a patient based on her characteristics
 - ☒ Predicting tomorrow's rainfall amount based on the wind speed and temperature
2. Which of the following is the meaning of "**Out of Sample Accuracy**" in the context of evaluation of models? 3 points
 - ☒ "Out of Sample Accuracy" is the percentage of correct predictions that the model makes on data that the model has NOT been trained on.
 - ☐ "Out of Sample Accuracy" is the accuracy of an overly trained model (which may captured noise and produced a non-generalized model)
3. When should we use **Multiple Linear Regression**? 3 points
 - ☒ When we would like to predict impacts of changes in independent variables on a dependent variable.
 - ☒ When there are multiple dependent variables
 - ☐ When we would like to identify the strength of the effect that the independent variables have on a dependent variable.
4. Which of the following statements are **TRUE** about **Polynomial Regression**? 3 points
 - ☒ Polynomial regression can use the same mechanism as Multiple Linear Regression to find the parameters.
 - ☒ Polynomial regression fits a curve line to your data.
 - ☒ Polynomial regression models can fit using the Least Squares method.
5. Which sentence is **NOT TRUE** about **Non-linear Regression**? 3 points
 - ☐ Nonlinear regression is a method to model non linear relationship between the dependent variable and a set of independent variables.
 - ☐ For a model to be considered non-linear, y must be a non-linear function of the parameters.
 - ☒ Non-linear regression must have more than one dependent variable.

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Classification

TOTAL POINTS 15

1. Which one **IS NOT** a sample of classification problem?

3 points

- ☐ To predict the category to which a customer belongs to.
- ☐ To predict whether a customer switches to another provider/brand.
- ☒ To predict the amount of money a customer will spend in one year.
- ☐ To predict whether a customer responds to a particular advertising campaign or not.

2. Which of the following statements are **TRUE** about Logistic Regression? (select all that apply)

3 points

- ☒ Logistic regression can be used both for binary classification and multi-class classification
- ☒ Logistic regression is analogous to linear regression but takes a categorical/discrete target field instead of a numeric one.
- ☒ In logistic regression, the dependent variable is binary.

3. Which of the following examples is/are a sample application of Logistic Regression? (select all that apply)

3 points

- ☒ The probability that a person has a heart attack within a specified time period using person's age and sex.
- ☒ Customer's propensity to purchase a product or halt a subscription in marketing applications.
- ☒ Likelihood of a homeowner defaulting on a mortgage.
- ☐ Estimating the blood pressure of a patient based on her symptoms and biographical data.

4. Which one is **TRUE** about the kNN algorithm?

3 points

- ☒ kNN is a classification algorithm that takes a bunch of unlabelled points and uses them to learn how to label other points.
- ☐ kNN algorithm can be used to estimate values for a continuous target.



5. What is "**information gain**" in decision trees?

3 points

- ☐ It is the information that can decrease the level of certainty after splitting in each node.
- ☒ It is the entropy of a tree before split minus weighted entropy after split by an attribute.
- ☐ It is the amount of information disorder, or the amount of randomness in each node.

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Clustering

TOTAL POINTS 15

1. Which statement is **NOT TRUE** about k-means clustering?

3 points

- ☐ k-means divides the data into non-overlapping clusters without any cluster-internal structure.
- ☐ The objective of k-means, is to form clusters in such a way that similar samples go into a cluster, and dissimilar samples fall into different clusters.
- ☒ As k-means is an iterative algorithm, it guarantees that it will always converge to the global optimum.

2. Which of the following are characteristics of DBSCAN? Select all that apply.

3 points

- ☒ DBSCAN can find arbitrarily shaped clusters.
- ☒ DBSCAN can find a cluster completely surrounded by a different cluster.
- ☒ DBSCAN has a notion of noise, and is robust to outliers.
- ☒ DBSCAN does not require one to specify the number of clusters such as k in k-means

3. Which of the following is an application of clustering?

3 points

- ☐ Customer churn prediction
- ☐ Price estimation
- ☒ Customer segmentation
- ☐ Sales prediction

4. Which approach can be used to calculate dissimilarity of objects in clustering?

3 points

- ☐ Minkowski distance
- ☐ Euclidian distance
- ☐ Cosine similarity
- ☒ All of the above

5. How is a center point (centroid) picked for each cluster in k-means?

3 points

- ☒ We can randomly choose some observations out of the data set and use these observations as the initial means.
- ☒ We can create some random points as centroids of the clusters.
- ☐ We can select it through correlation analysis.

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Recommender System

TOTAL POINTS 15

1. What is/are the advantage/s of Recommender Systems ?

3 points

- ☐ Recommender Systems provide a better experience for the users by giving them a broader exposure to many different products they might be interested in.
- ☐ Recommender Systems encourage users towards continual usage or purchase of their product
- ☐ Recommender Systems benefit the service provider by increasing potential revenue and better security for its consumers.
- ☒ All of the above.

2. What is a **content-based recommendation system**?

3 points

- ☒ Content-based recommendation system tries to recommend items to the users based on their profile built upon their preferences and taste.
- ☐ Content-based recommendation system tries to recommend items based on similarity among items.
- ☐ Content-based recommendation system tries to recommend items based on the similarity of users when buying, watching, or enjoying something.
- ☐ All of above.

3. What is the meaning of "**Cold start**" in collaborative filtering?

3 points

- ☐ The difficulty in recommendation when we do not have enough ratings in the user-item dataset.
- ☒ The difficulty in recommendation when we have new user, and we cannot make a profile for him, or when we have a new item, which has not got any rating yet.
- ☐ The difficulty in recommendation when the number of users or items increases and the amount of data expands, so algorithms will begin to suffer drops in performance.

4. What is a "**Memory-based**" recommender system?

3 points

- ☐ In memory based approach, a model of users is developed in attempt to learn their preferences.
- ☒ In memory based approach, we use the entire user-item dataset to generate a recommendation system.
- ☐ In memory based approach, a recommender system is created using machine learning techniques such as regression, clustering, classification, etc.

5. What is the shortcoming of content-based recommender systems?

3 points

- ☒ Users will only get recommendations related to their preferences in their profile, and recommender engine may never recommend any item with other characteristics.
- ☐ As it is based on similarity among items and users, it is not easy to find the neighbour users.
- ☐ It needs to find similar group of users, so suffers from drops in performance, simply due to growth in the similarity computation.

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