Final Exam

Due May 8 at 4pm **Points** 50 **Questions** 42
Available May 8 at 1pm - May 8 at 4pm 3 hours **Time Limit** 75 Minutes

Instructions

The exam on **modules 7, 8, 9, 10, 11 and 12.**
The exam will be available on **Monday May 08, 2023 from 1:00 PM to 4:00 PM**.
You need to answer **38 MCQs** with **1 point** for each + **4 Short questions** with **3 points** for each.
You will have only **75 minutes** to complete your exam in **one sitting.**

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	55 minutes	38 out of 50 *

* Some questions not yet graded

ⓘ Correct answers will be available on May 9 at 4:30pm.

Score for this quiz: **38** out of 50 *
Submitted May 8 at 2:02pm
This attempt took 55 minutes.

Question 1 1 / 1 pts

Why is the XOR problem exceptionally interesting to neural network researchers?

- because it can be expressed in a way that allows you to use a neural network

because it can be solved by a single layer perceptron

because it is the simplest linearly inseparable problem that exists

because it is complex binary operation that cannot be solved using neural networks

Question 2

1 / 1 pts

What is true regarding backpropagation rule?

none of the mentioned

it is a feedback neural network

hidden layers output is not all important, they are only meant for supporting input and output layers

actual output is determined by computing the outputs of units for each hidden layer

Question 3

1 / 1 pts

What is the objective of backpropagation algorithm?

to develop learning algorithm for multilayer feedforward neural network, so that network can be trained to capture the mapping implicitly

none of the mentioned

to develop learning algorithm for multilayer feedforward neural network

to develop leaning algorithm for single layer feedforward neural network

Question 4

1 / 1 pts

Why are linearly separable problems of interest of neural network researchers?

because they are the only class of problem that network can solve successfully

because they are the only mathematical functions that are continue

because they are the only mathematical functions you can draw

because they are the only class of problem that perceptron can solve successfully

Question 5

1 / 1 pts

What is true regarding backpropagation rule?

all of the mentioned

error in output is propagated backwards only to determine weight updates

- it is also called generalized delta rule
- there is no feedback of signal at any stage

Question 6

1 / 1 pts

What is meant by generalized in statement “backpropagation is a generalized delta rule” ?

- none of the mentioned
- it has no significance
- because delta rule can be extended to hidden layer units
- because delta is applied to only input and output layers, thus making it more simple and generalized

Question 7

1 / 1 pts

ROC chart is a _____ plot.

- Two-dimensional
- Multi-dimensional
- One-dimensional
- Three-dimensional

Question 8

1 / 1 pts

In ROC chart the proportion of false positive fp is on _____ and the proportion of true positive tp is on _____

- The vertical axis, the y-axis
- The horizontal axis, the vertical axis
- The vertical axis, the horizontal axis
- The horizontal axis, the x-axis

Question 9

1 / 1 pts

What's the objective of the support vector machine algorithm?

- None of the mentioned
- to find an optimal hyperplane in an N-dimensional space that distinctly classifies the data points where N is the number of target variables.
- to find an optimal hyperplane in an N-dimensional space that distinctly classifies the data points where N is the number of features.
- to find an optimal hyperplane in an N-dimensional space that distinctly classifies the data points where N is the number of samples.

Question 10

1 / 1 pts

For SVM, which options are correct?

- None of the mentioned.
- Support vectors are data points that are closer to the hyperplane and influence the position and orientation of the hyperplane
- Deleting the support vectors won't change the position of the hyperplane
- Support vectors are data points that are far away from the hyperplane and influence the position and orientation of the hyperplane

Question 11

1 / 1 pts

Which of the following is not a correct statement for SVM.

- All instances are required to define the maximum margin hyperplane.
- Instances closest to the maximum margin hyperplane are called support vectors
- SVMs can be reused as algorithms for learning linear classifiers
- SVMs are resilient to overfitting

Question 12

1 / 1 pts

In SVM, the Hyper plane, f(x)=sign(w*x+b), where ‘w’ is a?

- Distance
- None of the mentioned
- Vector
- Constant

Question 13

1 / 1 pts

Which of the following can affect the complexity of Apriori?

- Maximum number of items in the transactions
- Number of transactions in the database
- All of the mentioned
- Dimensionality of the given data set

Question 14

1 / 1 pts

Which of the following best describes lift in knowledge discovery?

- An unsupervised learning approach
- A measure of interestingness of a rule
- A data mining technique
- A known class attribute

Question 15

1 / 1 pts

Which of the following describes a strategy of frequent Itemset generation?

- All of the mentioned
- Use pruning techniques to reduce the number of candidates
- Reduce size of the number of transactions as the size of itemset increases
- Use efficient data structures to store the candidates or transactions

Question 16

1 / 1 pts

Which of the following is not an example of frequent pattern analysis?

- What kinds of DNA are sensitive to this new drug?
- What are the subsequent purchases after buying a PC?
- Can we predict the winner of match?

Can we automatically classify web documents?

Question 17

1 / 1 pts

Which of the following learning algorithm can be used to predict a combination of attributes?

- Naïve Bayesian.
- Decision tree.
- K-means
- Apriori.

Question 18

1 / 1 pts

The analysis performed to uncover the interesting statistical correlation between associated -attributes value pairs are known as the _____.

- Mining of asociation
- Mining of correlation
- All of the mentioned
- Mining of clusters

Question 19

1 / 1 pts

In cluster analysis, which of the following is an advantage of choosing k>1?

- Minimizes classification rate
- Maximizes misclassification rate
- Provides smoothing that reduces the risk of over fitting
- Doesn’t maximize classification rate

Question 20

1 / 1 pts

Which clustering algorithm starts with each cluster comprising exactly one observation and then progressively combines the two nearest clusters until there is just one cluster left at the end?

- Complete Linkage clustering
- Agglomerative clustering
- Single Linkage clustering
- Divisive clustering

Question 21

1 / 1 pts

Which of the following is not an application of cluster analysis?

- Help marketers discover distinct groups in their customer bases.
- Observing earth quake epicenters should be clustered along continent faults.
- Decide about the subsequent purchases after buying a PC.
- Identifying groups of motor insurance policy holders with a high average claim cost.

Question 22

1 / 1 pts

The aim of clustering models is to subdivide the records of a dataset into_____.

- Heterogeneous groups
- Learning groups
- Problem-Solving groups
- Homogeneous groups

Question 23

1 / 1 pts

Which of the following statements is incorrect about the hierarchal clustering?

- The hierarchal type of clustering is also known as the HCA
- All of the mentioned
- In general, the splits and merges both are determined in a greedy manner
- The choice of an appropriate metric can influence the shape of the cluster

Question 24

1 / 1 pts

Which of the following statement is NOT true about clustering?

- It is a supervised learning technique
- It uses clusters for data analysis
- It is an unsupervised learning technique
- It groups the data

Question 25

1 / 1 pts

A _____ is a tree diagram for displaying clustering results. Vertical lines represent clusters that are joined together.

- Tree plot
- Dendrogram
- Histogram
- Scatter plot

Question 26

1 / 1 pts

Which of the following is true about cluster analysis?

- Cluster analysis is the process of ungrouping objects into subsets that have meaning in the context of a particular problem
- .Clustering is referred to as a supervised learning method
- It can't uncover previously undetected relationships in a complex dataset.
- Clustering is referred to as an unsupervised learning method

Question 27

1 / 1 pts

For the purpose of anomaly detection, in the statistical-based approaches we need to -----.

- All of the mentioned
- assume data comes rom normal distribution

- reduce data to lower dimensional data
- use certain kernel function on the given data to construct such a model

Question 28

1 / 1 pts

One of the strengths of using statistical methods in anomaly detection is:

- Theoretically it can be Theoretically it can be applicable to all kinds of dataapplicable to all kinds of data
- All of the mentioned
- It is very effective to find the outliers.
- It can use many dimensionality reduction approaches.

Question 29

1 / 1 pts

An observation that is extreme, being distant from the rest of the data is termed a ------.

- Outlier
- Predictor
- Class
- Feature

Question 30

1 / 1 pts

Data may contain erroneous or anomalous values, which are usually referred to as_____.

- Reduction
- Inconsistencies
- Noise
- Outliers

Question 31

1 / 1 pts

One reason of anomaly detection is:

- Data coming from different classes
- All of the mentioned
- Errors from collecting data
- Normal variations can be seen on data

Question 32

1 / 1 pts

One of the drawbacks of using density methods in anomaly detection is:

It may be hard to estimate the true density distribution for high dimensional data.

Sometime it can be sensitive to variations in density

Density may become less meaningful in high-dimensional space.

All of the mentioned

Question 33

1 / 1 pts

Which of the following is not type of data mining in recommender systems?

Model-based method uses a collection of ratings to learn a model

Mining of spatiotemporal, biological, diverse semantics and relationships

All of the mentioned

Extract from known to unknown ratings to predict user-item combinations

Question 34

1 / 1 pts

Which of the following is not an example application of data mining in science and engineering?

- Use sequential pattern mining to investigate changes in customer consumption or loyalty
- All of the mentioned
- Use data mining in monitoring systems, software bugs and network intrusion
- Mining of spatiotemporal, biological, diverse semantics and relationships C)

Question 35

1 / 1 pts

Which of the following is one of the purposes of the visualization?

- All of the mentioned
- It helps find interesting regions for any further analysis.
- It assists to search for trends and relationships among data.
- It can provide qualitative overview of large data sets

Question 36

1 / 1 pts

Which one of the following can be considered as the correct application of the data mining?

- Fraud detection
- Management and market analysis
- All of the mentioned
- Corporate Analysis & Risk management

Question 37

1 / 1 pts

In web mining, _____ is used to know the order in which URLs tend to be accessed.

- classification
- sequential analysis
- associations
- clustering

Question 38

1 / 1 pts

Which of the following is method of preserving privacy in data mining process?

- Removing sensitive features or fields associated with the data
- Personal information is encrypted and stored at different locations
- Add noise to the data in order to mask some attribute values of records

All of the mentioned

Question 39

Not yet graded / 3 pts

In your opinion, what are the major **5 trends** in data mining research today? Name one **major issue** in data mining, which in your view, may have a strong impact on society.

Your Answer:

1) deep learning

2) big data mining

3) privacy and security

4) multimedia data mining

5) spatial and geographic data mining

Data mining models' potential for bias is a significant problem that could have a significant impact on society. Both the algorithms themselves and the data used to train the models have the potential to introduce bias. Biased models have the potential to produce unjust and discriminatory results, which can have a significant impact on people and society. Examples of these outcomes include decisions about employment, lending, and criminal justice. To ensure justice and equity, strategies for identifying and reducing bias in data mining models must be developed.

Question 40

Not yet graded / 3 pts

Clustering has been popularly recognized as an important data mining task with broad applications. Give **one application example** for each of the following cases:

a) An application that takes clustering as a **major** data mining function.

b) An application that takes clustering as a **preprocessing tool for data preparation** for other data mining tasks.

Your Answer:

a) A data mining program that uses clustering as a primary/ major function.

CITY-PLANNING : Indentifying groups of houses according to their house type, value and a geographical location.

b) An application that take clustering as a preprocesing tool for data preparation for other data mining tasks.

Clustering is a techninque that can be used in the semi- Supervised learning process.
There are various issues where you may have no notation about what the data and the relationships are about since there are missing labels or no labels at all.
we can use clustering to determine the data natural segmentation of data and them apply some other model on it for better accuracy.

Question 41

Not yet graded / 3 pts

Consider a transaction dataset that contains five items, {A, B, C, D, E}. Suppose **the rules {A, B} → C has the same confidence as {A, B} → D**, which one of the following statements are true or not, and why:

1. a) The confidence of the {A, B} → {C, D} is the same as the confidence of {A, B} → {C}.
2. b) All transactions that contain {A, B, C} also contain {A, B, D}.

Your Answer:

The statement (a) is not true. The confidence of {A, B} → {C, D} cannot be determined from the confidence of {A, B} → C and {A, B} → D alone. Confidence is the probability that the consequent (C or D) is purchased given that the antecedent (A and B) is purchased. The confidence of {A, B} → {C, D} depends on the support of {A, B, C, D} as well as the support of {A, B}.

The statement (b) is not necessarily true. Just because {A, B} → C and {A, B} → D have the same confidence, it does not mean that all transactions containing {A, B, C} also contain {A, B, D}. It only means that the probability of purchasing C or D given the purchase of A and B is the same. The transactions containing {A, B, C} and {A, B, D} could be different, and there could be cases where {A, B, C} is purchased without {A, B, D}.

Question 42

Not yet graded / 3 pts

Consider the following set of one-dimensional points: **{4, 6, 17, 19, 23, 27, 33, 37}**. Suppose we apply **k-means clustering** to obtain three clusters, A, B, and C. If the three initial centroids are located at **(15, 25, 31)**, respectively. Show: The three clusters and their new three centers after the **first round** of execution.

Your Answer:

We must first initialize the cluster centroids before we can apply k-means clustering to the provided set of points. The three initial centroids are at (15, 25, and 31), correspondingly, as given. To create the first clusters, we will now associate each point with its nearest centroid.

Round 1:

The initial clusters are as follows:

Cluster A = {4, 6, 17, 19}

Cluster B = {23, 27}

Cluster C = {33, 37}

The mean of each cluster gives us the new centroids:

New centroid for cluster A = (4 + 6 + 17 + 19)/4 = 11.5

New centroid for cluster B = (23 + 27)/2 = 25

New centroid for cluster C = (33 + 37)/2 = 35

Therefore, after the first round of execution, the three clusters and their new centroids are as follows:

Cluster A = {4, 6, 17, 19}, centroid = 11.5

Cluster B = {23, 27}, centroid = 25

Cluster C = {33, 37}, centroid = 35

Note that the initial cluster assignment is arbitrary, so a different initialization may result in different clusters and centroids after the first round.

Quiz Score: **38** out of 50