Question Paper - Evaluator view

Exam Date & Time: 02-Dec-2023 (01:15 PM - 04:30 PM)

CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY

Faculty of Technology and Engineering (FTE)
Fifth Semester of B.Tech (CE) Examination
November-December 2023
MACHINE LEARNING [CE360]

Marks: 70 **Duration: 195 mins.**

Section - 1

Answer all the questions. Section Duration: 40 mins

1	Which subfield of AI focuses on developingalgorithms that allow computers to learn from and make predictionsor decisions based on data? 1) Machine learning 2) Internet of Things 3) Blockchain 4) Cloud computing	(1)
2	Which of the following is type of unsupervised learning? 1) clustering 2) association 3) both 1 and 2 4) None of these	(1)
3	Which of the following method is used forfinding the optimal of a cluster in the K-Mean algorithm? 1) Elbow method 2) Manhattan method 3) Euclidian method 4) All of the above	(1)
4	The input image has been converted into a matrixof size 28 X 28 and a kernel/filter of size 7 X 7 with a stride of1. What will be the size of the convoluted matrix? 1) 20x20 2) 21x21 3) 22x22 4) 25x25	(1)
5	Which pooling operation that selects the maximum element from theregion of the feature map covered by the filter? 1) Max Pooling 2) High Pooling 3) Global pooling 4) None of these	(1)
6	Which of the following is a subset of machine learning? 1) Numpy 2) SciPy 3) Deep Learning 4) All of the above	(1)
7	Which of the followingneural networks uses supervised learning? 1) Multi-layer perceptron 2) Self-organizing feature map 3) Hopfield network 4) None of these	(1)
8	Artificial neural network is used for 1) Classification 2) Clustering 3) Pattern recognition 4) All of the above	(1)
9	To find the minimum or the maximum of a function, we set thegradient to zero because: 1) The value of the gradient at extrema of a function is always zero 2) Depends on the type of problem 3) Both 1 and 2 4) None of the above	(1)
10	When performing regression or classification, which of thefollowing is the correct way to preprocess the data? 1) Normalize the data -> PCA -> training 2) PCA -> normalize PCA output -> training 3) Normalize the data -> PCA -> normalize PCA output -> training 4) None of the above	(1)
11	RNNs stands for? 1) Receives neural networks 2) Report neural networks 3) Recording neural networks 4) Recurrent neural networks	(1)
12	CNN is mostly used when there is an? 1) structured data 2) unstructured data 3) Both 1 and 2 4) None of the above	(1)
13	What is true about Data Visualization? 1) Data Visualization is used to communicate information clearly and efficiently to users by the usage of information graphics such as tables and charts. 2) Data Visualization helps users in analyzing a large amount of data in a simpler way. 3) Data Visualization makes complex data more accessible, understandable, and usable. 4) All of the above	(1)
14	Which method shows hierarchical data in a nested format?	

	1) Treemaps 2) Scatter plots 3) Population pyramids 4) Area charts	(1)
15	How many types of feedback does reinforcement learning provide? 1) 1 2) 2 3) 3 4) 4	(1)
16	Which of the following is the practical example of reinforcementlearning? 1) House pricing prediction 2) Market basket analysis 3) Text classification 4) Driverless cars	(1)
17	To remove noise and inconsistent data, following is used: 1) Data Cleaning 2) Data Transformation 3) Data Reduction 4) Data Integration	(1)
18	Which statement about outliers is true? 1) Outliers should be part of the training dataset but should not be present in the test data. 2) Outliers should be identified and removed from a dataset. 3) The nature of the problem determines how outliers are used. 4) Outliers should be part of the test dataset but should not be present in the training data.	(1)
19	Identify the kind of learning algorithm for "facial identities forfacial expressions". 1) Prediction 2) Recognition Patterns 3) Recognizing anomalies 4) Generating patterns	(1)
20	The number of nodes in the input layer is 10 and the hidden layeris 5. The maximum number of connections from the input layer to thehidden layer are 1) 50 2) less than 50 3) more than 50 4) It is an arbitrary value	(1)

Section-2

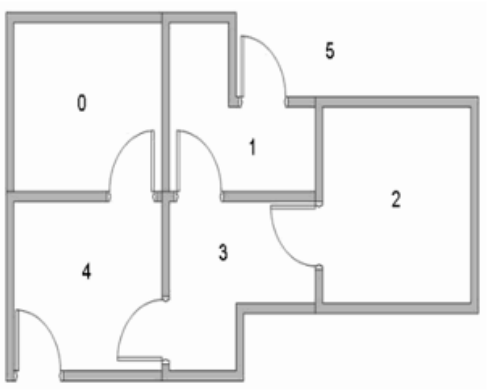
Answer 5 out of 7 questions.

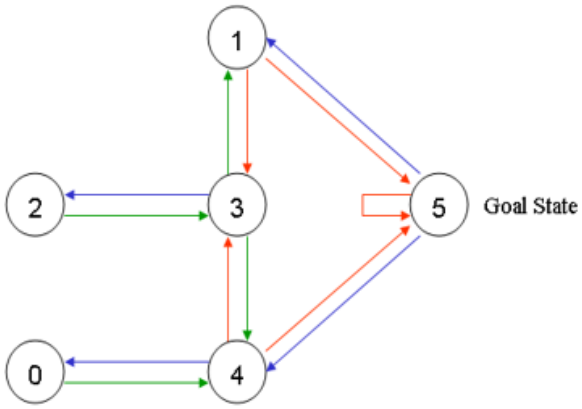
1	Explain DBSCAN clustering algorithm with example.	(5)
2	Consider the following data points in a two-dimensional space for ak-means clustering task: Perform kmeans clustering with k = 2. Initial centroids are at (3,5) and (10, 9). Calculate the final centroids after one iterationusing the Euclidean distance metric.	(5)
3	Compare and contrast model-based and model-free reinforcementlearning approaches. In which scenarios would you use each one?	(5)
4	List the various types of the activation functions and describe thepurpose of an activation functions (any 2) in a Feedforward NeuralNetwork	(5)
5	Given a set of data points with their pairwise distances, perform astep-by-step hierarchical clustering using the single linkagemethod for the following data points: A (1, 2) B (2, 3) C (2, 5) D (5, 8) E (6, 7) F (8, 8) Present the clusters formed at each step and the distancesconsidered during the merges.	(5)
6	Create a diagram or flowchart illustrating the architecture of aconvolutional neural network (CNN) for image classification,including the key components and layers.	(5)
7	Apply the Q-Learning Algorithm on below given scenario. Show theiteration up-to first episode.	

Data Point	X	Y
1.	2	3
2.	3	5
3.	6	8
4.	7	7
5.	10	9
6.	12	8

The nodes that lead immediately to the goal state should have aninstant reward of 100. Other nodes not directly connected to thetarget node have zero reward.

Consider the value of learning rate = 0.8 and the initial state asroom 1





(5)

Section - 3

Answer 5 out of 7 questions.

1	Illustrate the machine learning pipeline and describe itscomponents.	(5)
2	Mention the key steps involved in tabular data pre-processing inMachine Learning.	(5)
3	What is the use of linear regression in machine learning? Explainlinear regression model with example. Which are the evaluationmeasures used for linear regression model?	(5)
4	Which applications can be developed using RNN? Explain thearchitecture of RNN.	(5)
5	Compare and contrast logistic regression and SVM for binaryclassification. In what situations would you prefer to use logisticregression over SVM and vice versa?	(5)
6	Provide an example of a real-world application where gradientdescent is used to optimize a machine learning model's parameters,and explain how it improves the model's performance?	(5)
7	Design a transfer learning approach for a natural languageprocessing task, such as sentiment analysis, using a pre-trainedlanguage model.	(5)

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