Total No. of Questions: 6 *Total No. of Printed Pages:2*

Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2022

CS3EA07 / IT3EA07 Machine Learning

Programme: B.Tech. Branch/Specialisation: CS/IT

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. Which of the following will be euclidean distance between the two data point A(1,3) and B(2,3)? **1**

(a) 1 (b) 2 (c) 4 (d) 8

ii. Generally, which of the following method(s) is used for predicting continuous dependent variable? **1**

1. Linear Regression
2. Logistic Regression

(a) 1 and 2 (b) Only 1

(c) Only 2 (d) None of these

iii. Regarding bias and variance, which of the following statements are true? (here 'high' and 'low' are relative to the ideal model.) **1**

(a) Models which overfit have a high bias.

(b) Models which overfit have a low bias.

(c) Models which underfit have a high variance.

(d) Models which underfit have a high variance and high bias.

iv. Which of the following are real world applications of the SVM? **1**

(a) Text and hypertext categorization

(b) Image classification

(c) Clustering of news articles

(d) All of these

v. In k-means clustering, "k" stands for numbers of- **1**

(a) Cluster centroids (b) Features

(c) Classes (d) Outputs

P.T.O.

vi. PCA is a method for- **1**
(a) Dimension reduction (b) Classification
(c) Clustering (d) Recommendation system

vii. A perceptron is- **1**
(a) A single layer feed-forward neural network with pre-processing
(b) An auto-associative neural network
(c) A double layer auto-associative neural network
(d) A neural network that contains feedback

viii. What are the general tasks that are performed with backpropagation algorithm? **1**
(a) Pattern mapping (b) Function approximation
(c) Prediction (d) All of these

ix. Which of the following algorithm is not an example of ensemble learning algorithm? **1**
(a) Random forest (b) Adaboost
(c) Gradient boosting (d) Decision trees

x. In which of the following applications can we use deep learning to solve the problem? **1**
(a) Protein structure prediction
(b) Prediction of chemical reactions
(c) Detection of exotic particles
(d) All of these

Q.2 i. Differentiate classification and regression. **2**
ii. Explain any 3 applications of machine learning. **3**
iii. Derive expression for gradient descent method. **5**
OR iv. Explain with example, how k-nearest neighbour algorithm works. **5**

Q.3 i. Define overfitting with example. **3**
ii. Explain decision tree algorithm with an example. **7**
OR iii. Explain how SVM classifier works and explain kernel methods. **7**

Q.4 i. Why dimension reduction is needed? **3**
ii. How k-means clustering algorithm works? Explain with example. **7**

OR iii. What is recommendation system? Explain method of collaborative filtering and matrix factorization. **7**

Q.5 i. Write short note on tensor flow. **4**
ii. Draw architecture of perceptron net and write down its learning algorithm. **6**
OR iii. Explain how back propagation network works? Also draw its architecture. **6**

Q.6 Attempt any two:
i. Explain random forest classifiers. **5**
ii. Write short note on “deep learning and its application areas”. **5**
iii. Define semi-supervised and reinforcement. **5**

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Marking Scheme
CS3EA07 / IT3EA07 Machine Learning

Q.1	i.	Which of the following will be Euclidean Distance between the two data point A(1,3) and B(2,3)? A) 1	**1**
	ii.	Generally, which of the following method(s) is used for predicting continuous dependent variable? 1. Linear Regression 2. Logistic Regression B. only 1	**1**
	iii.	Regarding bias and variance, which of the following statements are true? (Here 'high' and 'low' are relative to the ideal model.) (b) Models which overfit have a low bias.	**1**
	iv.	Which of the following are real world applications of the SVM? D) All of the above	**1**
	v.	In k-means clustering, "k" stands for numbers of " a) Cluster centroids	**1**
	vi.	PCA is a method for A) Dimension Reduction	**1**
	vii.	A perceptron is: a) a single layer feed-forward neural network with pre-processing	**1**
	viii.	What are the general tasks that are performed with backpropagation algorithm? D) all of the mentioned	**1**
	ix.	Which of the following algorithm are not an example of ensemble learning algorithm? D) Decision Trees	**1**
	x.	In which of the following applications can we use deep learning to solve the problem? D) All of these	**1**
Q.2	i.	1 Mark each for 2 differences.	**2**
	ii.	1 Mark each for 3 applications.	**3**
	iii.	Complete derivation	**5**
OR	iv.	Working of knn	**3**
		Example	**2**
Q.3	i.	Definition	**2**
		Example	**1**
	ii.	Definition	**2**
		Calculation of Entropy, Information Gain, Tree	**2** **2** **1**
OR	iii.	Definition, explanation of working	**2, 5**
Q.4	i.	1 Mark each for 3 reasons	**3**
	ii.	Algorithm, example	**4,3**
OR	iii.	Recommendation system, Collaborative filtering and Matrix factorization.	**2.5** **2.5** **2**
Q.5	i.	Definition and working	**2,2**
	ii.	Architecture Algorithm	**2** **4**
OR	iii.	Architecture Forward phase of Algorithm Backward phase of algorithm	**2** **2** **2**
Q.6		Attempt any two:	
	i.	Classifier	**5**
	ii.	Definition Application areas	**3** **2**
	iii.	Semi Supervised Learning Reinforcement Learning	**2.5** **2.5**

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