Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem Examination May-2023

RA3EL03 Machine Learning

Programme: B.Tech. Branch/Specialisation: RA

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. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. The model learns and updates itself through reward/punishment in case of- **1**

(a) Supervised learning algorithm
(b) Unsupervised learning algorithm
(c) Semi-Supervised learning algorithm
(d) Reinforcement Learning algorithm

ii. This type of learning to be used when there is no idea about the class or label of a particular data. The model has to find the pattern in data- **1**

(a) Supervised learning algorithm
(b) Unsupervised learning algorithm
(c) Semi-Supervised learning algorithm
(d) Reinforcement Learning algorithm

iii. Price prediction in the domain of real estate is an example of- **1**

(a) Unsupervised learning
(b) Supervised regression problem
(c) Supervised classification problem
(d) Categorical attribute

iv. SVM is an example of- **1**

(a) Linear Classifier and Maximum Margin Classifier
(b) Non-linear Classifier and Maximum Margin Classifier
(c) Linear Classifier and Minimum Margin Classifier
(d) Non-linear Classifier and Minimum Margin Classifier

P.T.O.

v. What will happen with bias and variance as you increase the size of training data in linear regression? **1**
(a) Bias increases and Variance increases
(b) Bias decreases and Variance increases
(c) Bias increases and Variance decreases
(d) None of these

vi. Logistic regression is a _____ regression technique that is used to model data having a _____ outcome. **1**
(a) Linear, numeric (b) Linear, binary
(c) Nonlinear, numeric (d) Nonlinear, binary

vii. k-mean clustering algorithm is an example of which type of clustering method? **1**
(a) Hierarchical (b) Partitioning
(c) Density Based (d) Random

viii. The Voronoi diagram is used in which type of clustering? **1**
(a) Hierarchical (b) Partitioning
(c) Density Based (d) Intuition based

ix. In the backpropagation algorithm, multiple iteration are known as- **1**
(a) Degree (b) Epoch (c) Cardinality (d) None of these

x. Multi-layer feed forward network consists of _____ layers. **1**
(a) Two (b) Three (c) One (d) Many

Q.2 i. Define machine learning. **2**
ii. Briefly describe the various types of human learning. **3**
iii. Explain the term abstraction and generalization. What role does generalization play in the process of machine learning? **5**
OR iv. Explain the various types of machine learning. **5**

Q.3 i. Explain naive Bayes classifier with an example of its use in practical life. **3**
ii. Explain the classification steps in details. **7**
OR iii. Discuss the SVM model in details along with advantages and disadvantages associated with it. **7**

Q.4 i. What are the assumption made in logistic regression? **3**
ii. Explain multiple variable regression with an example. **7**

OR iii. Explain Least Absolute Shrinkage Selector Operator (LASSO) and subset selection methods of improving the accuracy of linear regression. **7**

Q.5 i. Write the application of unsupervised learning. **4**
ii. What are the broad three categories of clustering techniques? Explain the characteristics of each briefly. **6**
OR iii. Write the algorithm for k-nearest neighbours. Discuss the error rate and validation error in the kNN algorithm. **6**

Q.6 Attempt any two:
i. Explain the single layer feed forward architecture of ANN. **5**
ii. Explain the backproportion algorithm. What are the limitation of this algorithm? **5**
iii. What is Convolution Neural Network (CNN) and Recurrent Neural Network (RNN)? Explain the various types of CNN. **5**

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Marking Scheme
RA3EL03 Machine learning

Q.1 i) The model learns and updates itself through reward/punishment in case of **1**

d) Reinforcement Learning algorithm

ii) This type of learning to be used when there is no idea about the class or label of a particular data. The model has to find the pattern in data **1**

b) Unsupervised learning algorithm

iii) Price prediction in the domain of real estate is an example of **1**

b) Supervised Regression Problem

iv) SVM is an example of **1**

a) Linear Classifier and Maximum Margin Classifier

v) What will happen with bias and variance as you increase the size of training data in linear regression? **1**

c) Bias increases and Variance decreases

vi) Logistic regression is a …….. regression technique that is used to model data having a …….. outcome. **1**

d) nonlinear, binary

vii) k-mean clustering algorithm is an example of which type of clustering method ? **1**

b) Partitioning

viii) The Voronoi diagram is used in which type of clustering? **1**

b) Partitioning

ix) In the backpropagation algorithm, multiple iteration are known as **1**

b) Epoch

x) Multi-layer feed forward network consist of _____ layers. **1**

b) Three

Q.2 i. Define machine learning. **2**

Definition of machine learning – 2 marks

ii. Briefly describe the various types of human learning. **3**

Types of human learning briefly – (1mark each)
i) learning direct guidance
ii) learning indirect guidance
iii) Self learning

iii. Explain the term abstraction and generalization. What role does generalization play in the process of machine learning. **5**

Explaining terms abstraction and generalization – 2 marks
Role of generalization – 3 marks

OR iv. Explain the various types of machine learning. **5**

Types of machine learning-
Supervised – 2 marks
Unsupervised -2 marks
Reinforced – 1 mark

Q.3 i. Explain naive Bayes classifier with an example of its use in practical life. **3**

Naive Bayes classifier – 2 marks
Example – 1 marks

ii. Explain the classification steps in details. **7**

Classification steps – 1 mark for each step
Identification of data , data processing, training set, algorithm selection, tranning, evaluation of test set .. classifier

OR iii. Discuss the SVM model in details along with advantages and disadvantages associated with it. **7**

SVM model explanation – 4 marks
Advantages and disadvantages – 3 marks

Q.4 i. What are the assumption made in logistic regression. **3**

Any 2 assumption – 1 mark
Any 3 assumption – 2 marks
4 or more assumption – 3 marks

ii. Explain multiple variable regression with an example. **7**

Multiple variable regression explanation-

OR iii. Explain Least Absolute Shrinkage selector Operator (LASSO) and subset selection methods of improving the accuracy of linear regression. **7**

LASSO method - 4 marks
Subset selection method – 3 marks

Q.5 i. Write the application of unsupervised learning. **4**

3 application – 2 marks
4 application – 3 marks
5 and more application – 4 marks

ii. What are the broad three categories of clustering techniques? Explain the characteristics of each briefly. **6**

Three categories –
i)Partitioning method - 2 marks
ii) Hierarchical methods – 2 marks
iii) Density based method – 2 marks

OR iii. Write the algorithm for k-nearest neighbours. Discuss the error rate and validation error in the kNN algorithm. **6**

Algorithm for k nearest neighbours- 4 marks
Error rate and validation error - 2 marks

Q.6 Attempt any two:

i. Explain the single layer feed forward architecture of ANN. **5**

Explanation of single layer feed forward architecture – 3 marks
Diagram – 2 marks

ii. Explain the backproportion algorithm. What are the limitation of this algorithm. **5**

Backproportion algorithm – 2 marks
Diagram – 1 mark
Limitation – 2 marks

iii. What is convolution neural network (CNN) and Recurrent Neural Network(RNN) . Explain the various types of CNN. **5**

CNN – 1 mark
RNN – 1 mark
Types of CNN – 3 marks

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