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ECE 1818 OE 31

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Roll No. of candidate

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Azara, Hatkhowapara
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2023

B.Tech. 8th Semester End-Term Examination

ETE/ECE

MACHINE LEARNING

New Regulation (w.e.f. 2017-2018) & New syllabus (w.e.f. 2018-2019)

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer question No. 1 and any *four* from the rest.

1. Answer the following (MCQ) : (10 × 1 = 10)
- (i) The average positive difference in values between computed and intended outcomes is known as
- (a) Root mean squared error (b) Mean squared error
(c) Mean absolute error (d) Mean positive error
- (ii) Increase in which of the following hyper parameter results into overfit in Random Forest?
- (1). Number of Trees. (2). Depth of Tree, (3). Learning Rate
- (a) Only 1 (b) Only 2
(c) 2 and 3 (d) 1, 2 and 3
- (iii) In a neural network, which of the following techniques is used to deal with overfitting?
- (a) Dropout (b) Regularization
(c) Batch Normalization (d) All of these
- (iv) A multiple regression model has:
- (a) Only one independent variable
(b) More than one independent variable
(c) More than one dependent variable
(d) None of the above

[Turn over

- (v) Which of the following statements regarding the prediction are correct?
- (a) The output attribute must be categorical
 - (b) The output attribute must be numerical
 - (c) The resultant model is designed to determine future outcomes
 - (d) The resultant model is designed to classify current behavior
- (vi) Which neural network architecture would be most suited to handle an image identification problem (recognizing a dog in a photo)?
- (a) Multi-Layer Perceptron
 - (b) Convolutional Neural Network
 - (c) Recurrent Neural network
 - (d) Perceptron
- (vii) Time complexity of K-fold cross-validation is
- (a) Linear in K
 - (b) Quadratic in K
 - (c) Cubic in K
 - (d) Exponential in K
- (viii) With Bayes classifier, missing data items are
- (a) Treated as equal compares
 - (b) Treated as unequal compares
 - (c) Replaced with a default value
 - (d) Ignored
- (ix) Which of the following algorithms is an example of the ensemble learning algorithm?
- (a) Random Forest
 - (b) Decision Tree
 - (c) NN
 - (d) SVM
- (x) Which of the following is not an inductive bias in a decision tree?
- (a) It prefers longer tree over shorter tree
 - (b) Trees that place nodes near the root with high information gain are preferred
 - (c) Over fitting is a natural phenomenon in a decision tree
 - (d) Prefer the shortest hypothesis that fits the data
2. (a) Give a definition of the term "machine learning". Explain with an example the concept of learning in the context of machine learning. Discuss application related to machine learning. (8)
- (b) Differentiate supervised machine learning from unsupervised machine learning. (3)
- (c) Define version space and illustrate it with an example. (4)

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3. (a) The dataset shown in table below for a person to consider go outdoor for enjoying sport. Use candidate elimination program to obtain final specific and general hypothesis. (6)

Sky	Air	Humidity	Wind	Water	Forest	Enjoy sport
Sunny	Warm	Normal	Strong	Warm	Same	Yes
Sunny	Warm	High	Strong	Warm	Same	No
Rainy	Cold	High	Strong	Warm	Change	Yes
Sunny	Warm	High	Strong	Cool	Change	Yes

- (b) Explain, in details, the process of K- fold cross- validation. (5)

- (c) Differentiate features extraction and feature reduction. (4)

4. (a) Define the following term (3)

Sample error

Variance

Standard deviation

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- (b) While predicting malignancy of tumour of a set of patients using a classification model, following are the data recorded: (7)

(i) Correct predictions: 15 malignant, 75 benign

(ii) Incorrect predictions: 3 malignant, 7 benign

Calculate the error rate, Kappa value, sensitivity, precision, and F- measure of the model.

- (c) Explain Naïve Bayes classifier with an example of its use in practical life. (5)

5. (a) Discuss the strengths and weaknesses of k- NN algorithm. (6)

- (b) Discuss how to avoid the over fitting problem in decision tree algorithm. (5)

- (c) Explain multiple linear regression in brief. (4)

6. (a) What are the broad three categories of clustering techniques? Explain the characteristics of each briefly. (6)
- (b) Explain, in details, the backpropagation algorithm. What are the limitations of this algorithm? (9)
7. Write short note on following (any three) (3 × 5 = 15)
- (a) Reinforcement learning
- (b) Random Forest
- (c) Artificial Neural Network
- (d) PAC learning model.

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