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AY 2022-23
School of Computing
CURRICULUM: IIITUGCSE20
Cycle Test – I
20, Sept.'22
(2:00 PM – 3:00 PM)

Degree	B. Tech.	**Branch**	CSE/IT/ECE
Semester	V		
Subject Code & Name	CSSE11: Machine Learning		
Time: 60 Minutes	**Answer All Questions**		**Maximum: 20 Marks**

Sl. No.	Question	Marks
1.a	How is the concept of Inductive Bias applied in machine learning?	(1)
1.b	Consider the following sequence of positive and negative training examples describing the concept "pair of people who live in the same house". Each training example describes an ordered pair of people, with each person described by their gender, hair color (black, brown, or blonde), height (tall, medium, or short), and nationality (US, French, German, Irish, Indian, Japanese, or Portuguese). Training Examples 1 + < < male brown tall US > < female black short US > > 2 + < < male brown short French > < female black short US > > 3 - < < female brown tall German > < female black short Indian > > 4 + < < male brown tall Irish > < female brown short Irish > > Consider a hypothesis space defined over these instances, in which each hypothesis is represented by a pair of 4-tuples, and where each attribute constraint may be a specific value, "?," or "Ø,". Provide a hand trace of the Candidate-Elimination algorithm learning from the above training examples and hypothesis language. In particular, show the specific and general boundaries of the version space after it has processed the first training example, then the second training example, etc.	(2)
1.c	How many distinct hypotheses from the given hypothesis space in Qn. No. 1.b are consistent with the single positive training example?	(2)

Contd. ...(2)

2.a	Define n fold cross validation with suitable diagram.	(1)
2.b	Explain the concept of Bias-Variance Trade-off. List any two methods to reduce the variance.	(2)
2.c	What should be done when a model suffers from low bias and high variance?	(2)
3.a	List the assumptions to apply regression to any problem.	(1)
3.b	Differentiate between Batch gradient descent and Stochastic gradient descent cost functions in linear regression.	(2)
3.c	Consider the following situations in which regression can be used: 1. Testing if hours of work affects hours of sleep. 2. Testing if the number of cigarettes smoked affects blood pressure. Identify Dependent Variable and Independent Variable in both cases.	(2)
4.a	Draw a suitable diagram to show the workflow of reinforcement learning.	(1)
4.b	Give two computer applications for which machine learning approaches seem to be appropriate and two for which they seem to be inappropriate.	(2)
4.c	What is meant by a well –posed learning problem? Explain the important features that are required to well-define a learning problem.	(2)