BTECH

Roll No:

(SEM VII) THEORY EXAMINATION 2023-24

MACHINE LEARNING

TIME: 3 HRS

PAPER ID-310955

M.MARKS: 100

Note: Attempt all Sections. If you require any missing data, then choose suitably.

	SECTION A	
1.	Attempt all questions in brief.2*10 =	= 20
Q.no.	Questions	
(a)	Define Machine Learning and briefly explain its significance in today's technological	
	landscape.	
(b)	Differentiate between Artificial Intelligence (AI) and Machine Learning (ML), highlig	hting
	their key distinctions.	
(c)	What is the main difference between classification and regression analysis in supervise	ed
	learning?	
(d)	Provide a brief overview of the types of support vector kernels.	
(e)	Explain the Multidimensional Scaling.	
(f)	How does K-Means Clustering work in unsupervised learning?	
(g)	Define the Back propagation Algorithm in neural networks.	
(h)	Outline the basics of the Decision Tree algorithm.	
(i)	Explain the meaning of reproduction in genetic algorithm	2
(j)	Explain the difference between reinforcement learning and deep learning.	0
	SECTION B	XV
2.	Attempt any <i>three</i> of the following: 10*3 =	= 30
(a)	Explain the fundamental concepts of machine learning and discuss its significance in va	rious
	fields. Provide examples of real-world applications of machine learning in mechanical	
	engineering.	
(b)	Discuss the concept of bias and variance in the context of evaluating an estimator. How	do
	these factors impact the performance of a machine learning model, and what strategies of	can be
	employed to strike a balance between them?	

(c)	Explain the principles of unsupervised learning and delve into the workings of K-Means
	Clustering and the Expectation-Maximization Algorithm. Provide real-world examples where
	these techniques can be effectively applied.
(d)	Explore the basics of Decision Trees, focusing on the ID3 Algorithm and the role of

	information gain and entropy. Discuss the challenges associated with decision tree learning
	and potential solutions.
(e)	Discuss the Genetic algorithm (GA) with suitable example. Also explain its advantages and
	applications.

	<u>nv</u>	
SE	CTION C	

3.	Attempt any <i>one</i> part of the following:	10*1 = 10
(a)	Discuss the key components involved in designing a machine learning system.	Provide
	insights into the challenges and considerations during the design phase.	
(b)	Differentiate between data science and machine learning. Discuss the overlap a	ind unique
	aspects of these two fields.	_
4.	Attempt any <i>one</i> part of the following:	10 * 1 = 10
(a)	Explore the principles of Support Vector Machines (SVM). Discuss the types of	of support
	vector kernels and the challenges associated with SVM. Provide a case study o	n car price
	prediction using SVM.	_
(b)	What is regression in machine learning? Explain with examples.	
5.	Attempt any <i>one</i> part of the following:	10*1 = 10
(a)	Draw the cluster of following 8 points into 3 clusters:	
	A1= (10,7), A2=(8,6), A3=(9,4), A4=(5,8), A5=(7,5), A6=(7,4), A7=(3,2), A8=(7,4), A7=(3,2), A8=(7,4), A7=(3,2), A8=(7,4), A7=(3,2), A8=(7,4), A7=(7,5), A6=(7,4), A7=(7,5), A8=(7,4), A8=(=(4,9). Use the
	k-means algorithm and Euclidean distance and take the Initial cluster centers and	re A2(8, 6),

D-310955	Roll No:

Printed Page: 2 of 2 Subject Code: KME074

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	A4(5, 8) & A8(4, 9) The solution up to two iterations
(1-)	Evalue Multidimensional Scaling and Lincor Distribute A saluris in the context of
(b)	unsupervised learning. How do these methods contribute to data analysis and pattern recognition?
6.	Attempt any <i>one</i> part of the following: $10*1 = 10$
(a)	Introduce neural networks, covering the perceptron and the Back propagation Algorithm. Explain the convergence analysis and the universal approximation theorem for the back propagation algorithm.
(b)	Explore the concept of Convolutional Neural Networks (CNNs) and the different types of layers in CNN architecture. Provide a case study demonstrating the application of CNN in real-world scenarios such as self-driving cars or building a smart speaker.
7.	Attempt any one part of the following: $10*1 = 10$
(a)	What is genetic algorithm? Explain with suitable example and give its advantages.
(b)	Examine the principles of Reinforcement Learning and its role in training intelligent systems. Compare and contrast reinforcement learning with supervised and unsupervised learning. Provide examples of real-world scenarios where reinforcement learning has been successfully
	applied.
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