



COMSATS University Islamabad, Attock Campus

Department of Computer Science

Program: BS(AI)

Fall 2022: Quiz 1	Course: Machine Learning Fundamentals (AIC354)	
Time Allowed: 20 Minutes	Dated: 17/03/2023	Marks: 10
Name:	Reg. No.:	
<i>Note:- Don't write anything on Question Paper except your Name & Reg. No.</i>		

Q#1: [CLO-1(SO-1)] [1+1+1+2 Marks] Briefly explain the types of machine learning algorithms.

- Supervised
- Unsupervised
- Reinforcement
- Difference between AI, ML and Deep Learning

Q#2: [CLO-1(SO-1)] [5 Marks] Differentiate between underfitting, overfitting and generalization.



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Fall 2022: Quiz 2	Course: Machine Learning Fundamentals (AIC354)	
Time Allowed: 30 Minutes	Dated: 07/04/2023	Marks: 10
Name:	Reg. No.:	
Note:- Don't write anything on Question Paper except your Name & Reg. No.		

Q#1: [CLO-2(SO-2,4)] [10 Marks] Apply the kNN classification technique with $k=3$. Make the confusion matrix and find out Accuracy, Precision, Recall, and F1-Score for the validation data.

//The data should be standardized before the learning process. However, ignore the standardization process, here, because the data having the same scale.

Training data			
	F1	F2	Output
(1)	3	1	True
(2)	2	2	False
(3)	1	2	False
(4)	5	5	True
(5)	4	5	False
(6)	4	1	True
(7)	2	4	True
(8)	2	3	False
(9)	1	5	True
(10)	5	2	False

Validation data			
	F1	F2	Output
(1)	3	5	True
(2)	1	3	True
(3)	2	1	False
(4)	4	2	False
(5)	2	5	True



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Fall 2022: Quiz 3	Course: Machine Learning Fundamentals (AIC354)	
Time Allowed: 10 Minutes	Dated: 02/06/2023	Marks: 10
Name:	Reg. No.:	
<i>Note:- Don't write anything on Question Paper except your Name & Reg. No.</i>		

Q#1: [CLO-3(SO-2,4)] [10 Marks]

Convert the following data to PCA domain:

//Note that the data has the same range, there is no need to standardize the data.

	X1 (feature 1)	X2 (feature 2)	PCA1	PCA2
Sample 1	1	1	?	?
Sample 2	2	1	?	?
Sample 3	1	4	?	?



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Fall 2022: Quiz 4	Course: Machine Learning Fundamentals (AIC354)	
Time Allowed: 30 Minutes	Dated: 09/06/2023	Marks: 10
Name:	Reg. No.:	
Note:- Don't write anything on Question Paper except your Name & Reg. No.		

Q#1: [CLO-4(SO-2,4)] [10 Marks]

Apply the Feedforward Backpropagation method and update all the weights using Stochastic Gradient Descent optimization technique. Apply the algorithm for a single iteration. Update only the weights w_{09} , w_{79} , and w_{57} .

Calculate the difference between the cost values (SSE) for before and after weight updating.

Input: $[X_1=1, X_2=0, X_3=1; \text{Output}=1]$

Suppose: **Learning rate** = 0.5, and **Activation function** at each hidden and output unit is Sigmoid.

Initial Weights:

Hidden layer 1: $w_{04}=0, w_{05}=0, w_{06}=1, w_{14}=0, w_{15}=0, w_{16}=3, w_{24}=0, w_{25}=1, w_{26}=0, w_{34}=0, w_{35}=0, w_{36}=0$

Hidden layer 2: $w_{07}=0, w_{08}=0, w_{47}=2, w_{48}=0, w_{57}=0, w_{58}=1, w_{67}=1, w_{68}=0$

Output layer 2: $w_{09}=1, w_{79}=0, w_{89}=1$

MLP:

