

II SEMESTER M.TECH. (Industrial Automation and Robotics) End Sem Examination

SUBJECT: Machine Learning [MTE 5054] Date: 04/07/2022

Time: 3 Hour	Exam time: 2-5PM	MAX. MARKS: 50								
Instructions to Candidates:										
• Ans	swer ALL the questions.									

• Missing data may be suitably assumed and justified.

Q. No	Question			LO	BL
1a	Consider the confusion matrix obtained for binary classification	2	1	2	4
	problems. Highlight the significance of each cell in the matrix. Compute				
11	Precision, Recall, and F1 score from the matrix.	~	2	2	4.5
10	The following figures show the fitting curve for the regression model of the corn production training dataset. The curve shown using an arrow	С	2	2	4,5
	mark indicates the problem associated with the model Classify the				
	problem faced by the algorithm and suggest an alternate solution to				
	improve the model.				
	sp 0 151 sp 0 151 B 0 150 150 150 150				
	Proportion of farmland treated				
2-	Fig Q2(a) Fig Q2(b) Fig Q2(c)	5	2	1.0	4
Za	logistic regression	3	2	1,2	4
21	Demonstrate how SVM can be used to calve the nen linear elegistication	5	2	1	4
20	Demonstrate now SVM can be used to solve the non-linear classification			1	4
20	Name four activation functions used as a key incredient in training	5	2	1.2	24
5 a	multi-layer perceptron with a peat diagram	5	3	1,2	2,4
	How many neurons do you need in the output layer if you want to				
	classify email into spam or not? What activation function should you use				
	in the output layer? If instead, you want to tackle MNIST, how many				
	neurons do you need in the output layer, and which activation function				
	should you use?				
3b	A sample dataset below shows the features to identify whether each one			2	4,5
	is interested in the event or not.				

	Target variable Categorical variable							
	interested invited birthyear gender	timezone lat	ing					
	1 0 1994 Male	420 -6.35	7 106.362					
	1 0 1976 Male	-240 43.655	5 -79.419					
	1 0 1980 Male	-480 33.846	6 -117.977					
	1 0 1994 Female	420 -7.26	5 112.743	- Missing data				
	1 0 1986 Male	-480 NaN	NaN	Phissing data				
	1 0 1984 Male	-420 33.493	3 -111.934					
	Selection data User data Event data							
	Which method is suitable	e to find	the m	issing data (latitude and				
	longitude) in the table. Exp	plain the	recomm	ender system whether the				
	user is interested to attend	the ever	it or no	t after filling the missing				
	values with proper mathem	hatical bac	ckgroun	d. Arrange the features in				
40	The table below shows the I	aNot 5 A	of a use		6	4	2.4	15
4 a	Laver Type Maps Size Ker	nel size Stride		11 C .	0	4	2,4	4,5
	Out Fully connected 10	The Size Stride	DDE					
	F6 Fully connected = 84 =	_	tanh					
	C5 Convolution 120 1×1 5 $\times 1$	5 1	tanh					
	S4 Avg pooling 16 $5 \times 5 2 \times 3$	2 2	tanh					
	C3 Convolution 16 $10 \times 10.5 \times 10^{-5}$	5 1	tanh					
	S2 Avg pooling 6 $14 \times 14 \times 2 \times 12$	2 2	tanh					
	C1 Convolution 6 $28 \times 28.5 \times 10^{-11}$	5 1	tanh					
	In Input 1 $32 \times 32 =$		_					
	Analyza the significance	of the lay	- vor and	compute the number of				
	parameters required	of the la	yer and	compute the number of				
4b	How do you build your ow	n CNN fi	rom scra	atch and try to achieve the	6	4	2.4	5.6
	highest possible accuracy or	n MNIST?)	atom and ary to atome to the	Ū		_, .	5,0
5a	Can you name the main inno	ovations in	n AlexN	et, GoogleNet, and ResNet	6	4	2,4	4,5
	compared to LeNet-5?				_		,	9-
5b	Consider the train and test curve as shown in the Fig Q10. Training curves Test Curves					4	2,4	4,5
	201 1 100		20 1	m				
	(%)		6 4	56-laver				
	Lou Lou		or (%	20-laver				
	Se my	56-laver	erro	20-14901				
	iiii	m	test					
	-	20-layer						
	$\frac{0}{0}$ $\frac{1}{1}$ $\frac{2}{2}$ $\frac{3}{3}$ $\frac{4}{4}$ $\frac{5}{5}$ iter. (1e4)	6	0	$\frac{1}{2}$ $\frac{3}{4}$ $\frac{4}{5}$ $\frac{5}{6}$				
				101. (104)				
	ResNet Architecture came up with a solution to overcome the problem							
	faced due to the high number of layers. Analyze the skip connections							
	used in the architecture to overcome the problem.							