Q.5 Attempt any two:

i. Explain learning algorithm of perception. **5**

ii. How recurrent neural network perform training? Also draw architecture. **5**

iii. Write short note on: **5**
(a) Keras (b) TensorFlow

Q.6 Attempt any two:

i. Explain advantages of deep learning over machine learning. **5**

ii. What is reinforcement learning? How it improves learning process? **5**

iii. Explain semi-supervised learning. How it differentiates with supervised and unsupervised learning? **5**

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Total No. of Questions: 6 *Total No. of Printed Pages:4*

Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2019

CS3EA07 / IT3EA07 Machine Learning

Programme: B.Tech. Branch/Specialisation: CS/IT

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated.Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. Bayes theorem is: **1**
(a) P(A/B) = (P(BA)*P(A))/P(B)
(b) P(A/B) = (P(B/A)*P(B))/P(A)
(c) P(A/B) = (P(B/A)* P(A))/P(B)
(d) P(A/B) = (P(BA)*P(B))/P(A)

ii. Below are the 8 actual values of target variable in the train file. **1**
[0,0,0,1,1,1,1,1]
What is the entropy of the target variable?
(a) -(5/8 log(5/8) + 3/8 log(3/8))
(b) 5/8 log(5/8) + 3/8 log(3/8)
(c) 3/8 log(5/8) + 5/8 log(3/8)
(d) 5/8 log(3/8) – 3/8 log(5/8)

iii. The SVM's are less effective when: **1**
(a) The data is linearly separable
(b) The data is clean and ready to use
(c) The data is noisy and contains overlapping points
(d) None of these

iv. The cost parameter in the SVM means: **1**
(a) The number of cross-validations to be made
(b) The kernel to be used
(c) The trade-off between misclassification and simplicity of the model
(d) None of these

P.T.O.

v. Which of the following is true about PCA? **1**
(a) PCA is an unsupervised method.
(b) Maximum number of principal components <= number of features.
(c) All principal components are orthogonal to each other.
(d) All of these

vi. Which of the following can act as possible termination conditions in K-Means? **1**
(a) For a fixed number of iterations.
(b) Assignment of observations to clusters does not change between iterations. Except for cases with a bad local minimum.
(c) Centroids do not change between successive iterations.
(d) All of these

vii. Which of the following is not library of Keras? **1**
(a) CNTK (b) TensorFlow
(c) Theano (d) NLTK

viii. Which of the following is recurrent neural network? **1**
(a) Perception (b) Back propagation
(c) Adaline (d) Madaline

ix. In which of the following applications can we use deep learning to solve the problem? **1**
(a) Protein structure prediction
(b) Prediction of chemical reactions
(c) Detection of exotic particles
(d) All of these

x. Statement 1: It is possible to train a network well by initializing all the weights as 0 **1**
Statement 2: It is possible to train a network well by initializing biases as 0
Which of the statements given above is true?
(a) Statement 1 is true while Statement 2 is false
(b) Statement 2 is true while statement 1 is false
(c) Both statements are true
(d) Both statements are false

Q.2 Attempt any two:
i. Define machine learning. Differentiate linear regression and logistic regression. **5**
ii. Define supervised learning technique. Also explain gradient descent. **5**
iii. What is classification technique in machine learning? Explain ranking method in machine learning. **5**

Q.3 Attempt any two:
i. Design decision tree for the given data set considering CHOICE as the target feature. **5**

SIZE	SHAPE	COLOR	CHOICE
Medium	Brick	Blue	Yes
Small	Wedge	Red	No
Large	Wedge	Red	No
Small	Sphere	Red	Yes
Large	Pillar	Green	Yes
Large	Pillar	Red	No
Large	Sphere	Green	Yes

ii. Explain support vector machine in detail with example. **5**
iii. How optimization is performed in support vector machine? Explain the role kernels in it. **5**

Q.4 Attempt any two:
i. Explain the working of k-means clustering algorithm with diagram. **5**
ii. How principal component analysis reduce dimensions with diagram? **5**
iii. Explain matrix factorization. Calculate covariance matrix for 2D input: **5**

$$A = \begin{vmatrix} 1 & 2 & 3 & 4 \\ 4 & 1 & 3 & 1 \end{vmatrix}$$

Marking Scheme
CS3EA07 / IT3EA07 Machine Learning

Q.1	i.	Bayes theorem is: (c) P(A/B) = (P(B/A)* P(A))/P(B)		**1**
	ii.	Below are the 8 actual values of target variable in the train file. [0,0,0,1,1,1,1,1] What is the entropy of the target variable? (a) -(5/8 log(5/8) + 3/8 log(3/8))		**1**
	iii.	The SVM's are less effective when: (c) The data is noisy and contains overlapping points		**1**
	iv.	The cost parameter in the SVM means: (c) The trade-off between misclassification and simplicity of the model		**1**
	v.	Which of the following is true about PCA? (d) All of these		**1**
	vi.	Which of the following can act as possible termination conditions in K-Means? (d) All of these		**1**
	vii.	Which of the following is not library of Keras? (d) NLTK		**1**
	viii.	Which of the following is recurrent neural network? (b) Back propagation		**1**
	ix.	In which of the following applications can we use deep learning to solve the problem? (d) All of these		**1**
	x.	Statement 1: It is possible to train a network well by initializing all the weights as 0 Statement 2: It is possible to train a network well by initializing biases as 0 Which of the statements given above is true? (b) Statement 2 is true while statement 1 is false		**1**
Q.2		Attempt any two:		
	i.	Definition machine learning	2 marks	**5**
		Difference linear and logistic regression.	3 marks	
	ii.	Define supervised learning technique	2 marks	**5**
		Gradient descent	3 marks	
	iii.	Classification technique in machine learning	2 marks	**5**
		Ranking method in machine learning	3 marks	
Q.3		Attempt any two:		
	i.	Design decision tree for the given data set considering CHOICE as the target feature. Stepwise marking		**5**
	ii.	Support vector machine	3 marks	**5**
		Example	2 marks	
	iii.	Optimization is performed in support vector machine	3 marks	**5**
		Role kernels	2 marks	
Q.4		Attempt any two:		
	i.	Working of k-means clustering algorithm	3 marks	**5**
		Diagram	2 marks	
	ii.	Principal component analysis reduce dimensions	3 marks	**5**
		Diagram	2 marks	
	iii.	Matrix factorization	2 marks	**5**
		Calculate covariance matrix for 2D input	3 marks	
Q.5		Attempt any two:		
	i.	Learning algorithm of perception.		**5**
	ii.	Recurrent neural network perform training	3 marks	**5**
		Architecture	2 marks	
	iii.	Write short note on:		**5**
		(a) Keras	2.5 marks	
		(b) TensorFlow	2.5 marks	
Q.6		Attempt any two:		
	i.	Advantages of deep learning over machine learning.		**5**
		At least five points 1 mark for each	(1 mark * 5)	
	ii.	Reinforcement learning	2 marks	**5**
		It improves learning process	3 marks	
	iii.	Semi-supervised learning	2 marks	**5**
		Difference b/w supervised and unsupervised learning	3 marks	

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