CBCS SCHEME

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18AI81

Eighth Semester B.E. Degree Examination, June/July 2024
Neural Networks and Deep Learning

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. With respect to reverse mode autodiff in tensor flow, explain the main benefits and drawbacks of creating a computation graph rather than directly executing the applications. **(06 Marks)**

b. Explain the steps required to feed the data to the training algorithm in tensor flow. **(04 Marks)**

c. With code snippet, explain the following :
i) Modularity and sharing variables in Tensor flow
ii) Save and restore the models in tensor flow. **(10 Marks)**

OR

2 a. With code snippet explain two different phases while training a DNN using tensor flow. **(10 Marks)**

b. With a neat diagram explain the architecture of a multilayer perceptron. **(10 Marks)**

Module-2

3 a. With the code snippet and equations discuss Xavier and the initialization pertaining to vanishing/exploding gradients problem. **(10 Marks)**

b. With the code snippet, explain Leaky Relu, a non saturating activation function related to vanishing gradient problem. **(10 Marks)**

OR

4 a. Write a note on Batch Normalization and Gradient clipping which supports exploding gradients problem. **(10 Marks)**

b. With an example, discuss how tweaking, dropping or replacing the upper layers helps in improving the performance of DNN model. **(10 Marks)**

Module-3

5 a. Illustrate asynchronous communication using Tensor flow Queues with code snippet and diagram. **(10 Marks)**

b. Briefly explain with a diagram, parallelizing neural networks on a Tensor flow cluster on condition of one neural network per device. **(10 Marks)**

OR

6 a. Discuss convolutional layer features with a diagram and explain the methods for stacking multiple features maps. **(10 Marks)**

b. What are pooling layers, explain Tensor flow implementations of pooling layers with a diagram and code. **(10 Marks)**

Module-4

7 a. Explain Recurrent Neural Networks and describe output of a recurrent layer for a single instance as well as all instances in a mini batch. **(10 Marks)**

b. With respect to Basic RNNs in tensor flow, write a note on:
   i) Static unrolling through time.
   ii) Dynamic unrolling through time. **(10 Marks)**

OR

8 a. With diagram and code snippet explain the steps required for training to predict time series in RNN. **(10 Marks)**

b. With LSTM cell diagram, explain LSTM computations features. **(10 Marks)**

Module-5

9 a. Discuss performing Principle Component Analysis (PCA) with an under complete linear autoencoder code. **(10 Marks)**

b. Briefly explain Sparse Autoencoders and denoising autoencoders with a neat diagram. **(10 Marks)**

OR

10 a. With a neat diagram and code snippet, describe the features of Neural Network policies. **(10 Marks)**

b. Summarize the application features of Markov Decision Processes with respect to Bellman optionality equation and values iteration algorithm. **(10 Marks)**

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