PES UNIVERSITY

# PES University, Bengaluru

(Established under Karnataka Act No. 16 of 2013)

UE17CS338

## DECEMBER 2020: IN SEMESTER ASSESSMENT B Tech CSE

ESA

## UE17CS338 – Topics in Deep Learning

| Time: 3 Hrs | Answer All Questions | Max Marks: 100 |
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| 1. | a) | Explain Nestrov's Adaptive Gradient with a diagram(1) and equations(2) and its advantages(2) | 5 |
| | b) | Write a program using a neural network in Keras to classify digits from an MNIST data set. Write the entire program including imports. Calculate the loss and print its accuracy | 10 |
| | c) | State the 5 elements of a Markov decision process | 5 |
| 2. | a) | State the KKT conditions for SVM | 5 |
| | b) | State 3 types of kernels and explain them. | 5 |
| | c) | State the soft margin primal and dual formulation of SVM. | 5 |
| | d | Explain SMO algorithm | 5 |
| 3. | a) | What is a Recurrent Neural Network?(1). Explain the working of a RNN with a neat diagram(4)<br>State 2 advantages and 3 disadvantages of RNN (5) | 10 |
| | b) | Draw a neat diagram of LSTM and explain the equations involved | 5 |
| | c) | State 5 different types of Autoencoders | 5 |
| 4. | a) | Draw a neat sketch of a CNN model (4)<br>Explain the equation kernels in CNN (2)<br>State the dimensions of the feature map in terms of inout , padding and stride (2)<br>Why do we need a fully connected layer in CNN (2) | 10 |
| | b) | Explain Entropy for probability distribution with a formula (2)<br>Explain KL divergence with its formula (2)<br>Is KL divergence a distance metric (1) | 5 |
| | c) | Explain the working of GAN with a neat diagram(3) . State the generator loss function and the discriminator loss function (1+1) | 5 |
| 5. | a) | State 5 applications of CNN | 5 |
| | b) | Draw a neat sketch of a Capsule network (3)<br>Explain dynamic routing in capsule networks (5)<br>What problems do capsule networks solve (2) | 10 |
| | c) | Name 5 optimizer functions used in deep learning | 5 |