NED UNIVERSITY OF ENGINEERING & TECHNOLOGY

Centre for Multidisciplinary Postgraduate Program (CMPP) – NED Academy
Postgraduate Diploma in Data Science, AI & Generative AI
Final Examination – Fall-I-2024
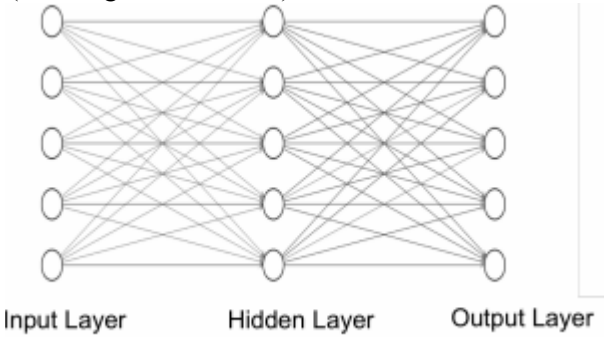### Course: PGD/DSAI-560 Deep Learning

Time: 3 Hours   Max. Marks: 60

Instructions:

i. Attempt all questions
ii. Marks for each question are given.
iii. You are required to abide by all rules and regulations set for the examination by the NED Academy.
iv. Total time of examination is 3 hours. No extra time will be provided after the time is over.

S. No.	Question	Marks
1.	**1-** Which of the following techniques does NOT prevent a model from overfitting? (i) Data augmentation (ii) Dropout (iii) Early stopping (iv) None of the above **2-** A 2-layer neural network with 5 neurons in each layer has a total of 60 parameters (i.e. weights and biases) Input Layer Hidden Layer Output Layer (i) True (ii) False **3-** Which of the following is true about the vanishing gradient problem? (Circle all that apply) (i) Tanh is usually preferred over sigmoid because it doesn't suffer from vanishing gradients (ii) Vanishing gradient causes deeper layers to learn more slowly than earlier layers (iii) Leaky ReLU is less likely to suffer from vanishing gradients than sigmoid (iv) Xavier initialization can help prevent the vanishing gradient problem **4-** Consider a trained logistic regression. Its weight vector is W and its test accuracy on a given data set is A. Assuming there is no bias, dividing W by 2 won't change the test accuracy. (i) True (ii) False **5-** After training a neural network, you observe a large gap between the training accuracy (100%) and the test accuracy (42%). Which of the following methods is commonly used to reduce this? (i) Generative Adversarial Networks (ii) Dropout (iii) Sigmoid activation (iv) RMSprop optimer	5
2.	**The questions in this section can be answered in 2-4 sentences.** **1-** You would like to train a dog/cat image classifier using mini-batch gradient descent. You have already split your dataset into train, dev and test sets. The classes are balanced. You realize that within the training set, the images are ordered in such a way that all the dog images come first and all the cat images come after. A friend tells you: "you absolutely need to shuffle your training set before the training procedure". Is your friend right? Explain.	15

	2- You want to build a 10-class neural network classifier, given a cat image, you want to classify which of the 10 cat breeds it belongs to. a. What loss function do you use? b. which activation function you used for the model. c. One of your friends has trained a cat vs. non-cat classifier. It performs very well and you want to use transfer learning to build your own model. Explain what additional hyper parameters (due to the transfer learning) you will need to tune. **3-**Why do the layers in a deep architecture need to be non-linear? **4-**Cite 3 layers commonly used in a convolutional neural network.	
3.	This dataset is a collection of images from the internet, played really amazing player (So, can hope for perfection in shots). Then the data was augmented to give rise to the data I provide in front of you. https://www.kaggle.com/datasets/aneesh10/cricket-shot-dataset **General Information:** The directory drives consist of the cover drive, straight drive and off drive. The directory legglance-flick contains the images for the leg glance and flick shot. The directory pullshot has the images for pull shot. The directory sweep has the image for sweep shot. This dataset can be used for various purposes. It can be used for: **Apply any pre-trained model for classification of shot.** **Note: This dataset is already augmented and some images may be pretty bad. I would suggest to not augment it further**	15
4.	a. What do you understand by the Transfer Learning? b. Draw a given model using keras Functional API 	10
5.	Predict age, gender and ethnicity of people using any Pre-trained and UTKFace datasets https://www.kaggle.com/datasets/jangedoo/utkface-new OR	15

	Create a Model for Sentiment Analysis using RNN (Applying Embedding Technique)	