

Department of Computer Science and Engineering
Amrita School of Computing
Amrita Vishwa Vidyapeetham – Coimbatore

III Year B.Tech. CSE VI Sem CSE/CCE
19CSE456 – Neural Networks and Deep Learning (PE-3)
Lab Evaluation – I

Instructions:

- The total mark for the lab evaluation is 10.
 - The questions should be neatly worked out in VS Code/Anaconda's Jupyter IDE and it needs to be made sure that the python notebook is named as Roll_Number_NNDL_Eval1.ipynb (e.g. CB.EN.U8CSE96108_NNDL_Eval1.ipynb).
 - The pdf (the file name should be same as the name of ipynb) exported version of ipynb should be uploaded to the outlook form whose link is:
<https://forms.office.com/r/Hja3w03wvr>.
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1. Loading the dataset (3 marks)

- a. Import all necessary dependencies to construct a Multilayer Perceptron and for carrying out visualization. (0.5 mark)
- b. Load the **cifar10** dataset (with train and test split) from **keras**. (0.5 mark)
- c. Perform necessary preprocessing on the images loaded from the **cifar10** dataset. (1 mark)
- d. Show the shapes of train and test sets (both predictor and predicted variables) (0.5 mark)
- e. Select a sample set of 16 images from the dataset and visualize in a 4X4 grid. (0.5 mark)

2. MLP Construction (3 marks)

- a. Construct a MLP network architecture with an input layer, 3 hidden layers, and an output layer. The number of neurons in the hidden layers can be 256, 128, and 64, respectively. **ReLU** must be the choice for hidden layers' activation functions and Present the summary of the network. (2 marks)
- b. Compile the model with **adam** to be the optimized and **sparse_categorical_crossentropy** being the loss function. Fit the constructed MLP with training data with values for epochs, batch_size, and validation_set being 10, 64, and 0.1, respectively. (1 mark)

3. Performance Evaluation (4 marks)

- a. Draw the accuracy and loss plots for training and validation sets for whatever model built because of fitting happening in questions number 2. (2 marks)

- b. Change the number of epochs and batch_size in question number 2 to 15 and 128. Then, draw the accuracy and loss plots for training and validation sets. (1 mark)
 - c. Present the test set accuracy and loss for both models (model created in question number 2 and 3) (1 mark)
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