

Deep Learning Project

Mahdy's Research Academy

Service 4

Image classification & Time Series Analysis

Implement Feed Forward Neural Network

- CIFAR-10 dataset
- Dataset link (<https://www.cs.toronto.edu/~kriz/cifar-10-python.tar.gz>)
- Import data
- Check data type and take necessary actions
- Visualize data
- Pre-process data
- Split data (train/ validation/ test)
- Design a Neural Network
- Train it
- Predict
- Plot train/ test acc and loss
- Experiment with learning rate/ batch size
- Try to achieve the highest accuracy.

Implement Convolutional Neural Network

- CIFAR-10 dataset
- Dataset link (<https://www.cs.toronto.edu/~kriz/cifar-10-python.tar.gz>)
- Import data
- Check data type and take necessary actions
- Visualize data
- Pre-process data
- Split data (train/ validation/ test)
- Design a Convolutional Neural Network
- Train it
- Predict
- Plot train/ test acc and loss
- Experiment with learning rate/ batch size
- Try to achieve the highest accuracy.

Implement LSTM

- Airplane_Crashes_and_Fatalities dataset
- Dataset link (Check in google classroom)
- Import data
- Check data type and take necessary actions
- Visualize data
- Pre-process data
- Split data (train/ validation/ test)
- Design a LSTM
- Train it
- Predict
- Try to achieve the lowest RMSE.

Write a comparative analysis of the implemented models (minimum 3 page. Font size 12, Times New Roman) - some questions are provided below to help you

- Performance comparison
- Architecture comparison
- Advantages vs. disadvantages
- Which is better and why
- What was the initial performance of each model
- What have you done to improve it
- Describe your choices hyperparameters, loss function, number of epochs etc.
- What are difficulties you have faced implementing the models
- What do you think of the dataset and the algorithms implemented?

Submission Guideline:

1. Submit 3 separate “.ipynb” file
2. One for FCNN and One for CNN, One for LSTM.
3. Provide proper title for each code segment in each “.ipynb” file
4. Explain your understanding for each cell.
5. Upload as a zip file in google classroom assignment.

Plagiarism is highly discouraged and consequences will be applicable if detected.