Lab Assignment 10. Working with Sequential Models

Problem Statement: Use models such as RNN/LSTM/GRU for classification"

Aim:

1. Understanding of sequential models
2. Classify and train with respect to these models on a variety of datasets

Steps

1. You can use the online available datasets also:
    1. https://www.kaggle.com/andradaolteanu/gtzan-dataset-music-genre-classification/tasks GTZAN: The dataset consists of 10 genres i.e Blues, Classical, Country, Disco, Hiphop, Jazz, Metal, Pop, Reggae, Rock, Each genre contains 100 songs. Total dataset: 1000 songs
    2. You can use https://raw.githubusercontent.com/jbrownlee/Datasets/master/airline-passengers.csv time series dataset

2. Create a univariate dataset i.e. 1 feature for classification. You can also take sequence as input i.e. 3,4,5 features as input.

3. Split the dataset (75% training and 25% testing) into training and testing sets with features as input (STFT and other features in case of audio, images feature matrix in case of images, numeric discretized features in case of numeric dataset) and class as target label.

4. Train RNN, GRU and LSTM to do the classification.

5. Run different model with different number of nodes and different number of layers such as 1, 2, 3, 4 etc.

6. For all the models plot the number of parameters learned, training accuracy, testing accuracy and running time for testing in bar chart. Analyse the results and discuss what you discovered!

Toolkits:
Music21 is a Python toolkit
Keras (Tensorflow)
librosa (v 0.7.2)
scipy (v 1.1.0)
sklearn (v 0.20.1)
sounddevice (v 0.3.14)
tensorflow (v 1.13.1)
numpy (v 1.17.2)