AI Test 20

Solve the following machine learning problems with Python Machine learning frameworks. You can do up to any level (A, B, and C) and submit the assignment. Those who are doing up to C will get better scores. Make any assumptions required to fill in potential gaps in completion of the problem statement requirements. However, clearly explain your assumptions and comment your code well.

Key assessment criteria include data manipulations, data manipulation logic,

algorithm selection/algorithm parameter choice, Network Architecture (for Neural Networks), accuracy metrics of the model, and code design.

Comment code extensively with information related to your choices: E.g. Choice of Algorithm, hyperparameters, reasons for regularization(if any), design of processing techniques, etc.

**Level A**

**Dataset:**

Refer to this dataset of Nifty Stock prices of Indian companies. ( <https://www.kaggle.com/rohanrao/nifty50-stock-market-data> )

**Problem Statement:**

Create a Predictive Model using any Algorithm (any Deep Learning/Machine Learning) that can predict the stock price(**Close** column) of ASIANPAINTs. Refer [Forecasting: Principles and Practice](https://otexts.com/fpp2/) if you require any theoretical guidance on Time Series(e.g. metrics of importance, auto-correlation, seasonality, etc.).

Make a prediction for the year of 2008 using all previous data. Make a prediction for 2016 using data from 2009-2015.

Show accuracy of your algorithm and explain your choice of accuracy metric (RMSE/MAE/MAPE, etc.)

**Level B**

**Dataset:**

Same as Above

**Problem Statement:**

Create an LSTM Model with a fixed network layout. Create an optimization algorithm to tune the hyperparameters (learning rate, optimizer, etc.) and get higher accuracy of prediction. (same time period as Level A)

* Algorithm should optimize the model and save it into a file.
* Algorithm should also save the final accuracy results of the model into a file
* Create a serve algorithm that can accept a csv file as input and predict a year's worth of prices for the "Close" value of ASIANPAINTS.

**Level C**

**Dataset:**

Same as above

**Problem Statement:**

Create an Algorithm to accept a filename as an input flag and automatically develop a Time Series Model to predict stock prices for it. (SSame time periods as Level A)

* You can start with a base algorithm choice like LSTM. However, the structure of this network should not be predefined.
* This algorithm should automatically decide the structure of the network (no. of layers, no of neurons, etc) and hyperparameters to be used in the network
* This algorithm should accept the name of the stock to be used as input (e.g. ICICIBANK.csv) in command line while running the program.
* The algorithm should develop a model and save it as <stock\_name>.h5 after optimizing the network configuration.
* The algorithm should write the accuracy of the final algorithm to a file.