ChE 197/297: Intro to AI/ML for Chemical Engineers
Case Studies in ChemE

Instructions: Answer each problem then create a solution using Python code via Jupyter Notebook.

Problem: Forecasting Atmospheric CO_2 levels at Mauna Loa

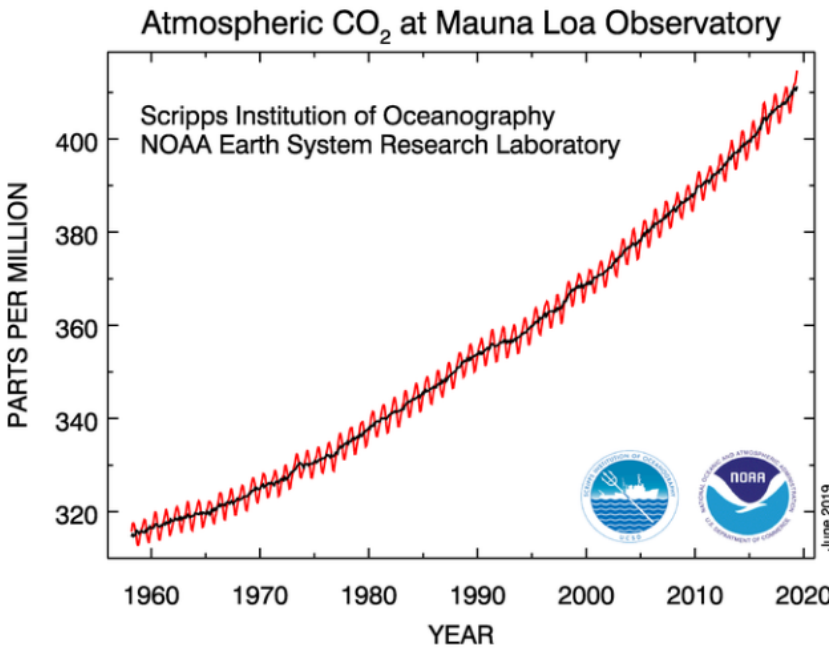

Figure 1. Atmospheric CO_2 data recorded at the Mauna Loa Observatory..

You are given a time series data set of the daily atmospheric CO2 readings in ppm recorded at the Mauna Loa Observatory in Hawaii. Our task is to create a forecasting model for this time series.

Do the following.

1. Take only the data from the year 2020 onwards.

2. Split the data into training (80%) and testing (20%). Normalize the data using Min-max scaling.

3. Train an ARIMA(p, D, q) model with p = 10, D = 3, and q = 0. Report the accuracy for training and testing data.

4. Train an LSTM with your choice of architecture, then do the same as in item 3.

END OF EXERCISE