Semester Project

CS 637 Time Series and Forecasting, Fall 2021

For our semester together, we will be implementing a semester long individual project The goal here is to apply our learning in a real-world application to each of yours interest.

We will have periodic deliverables to ensure we are on track for an ultimate culmination of a final project deliverable and presentation.

Deliverable #1 – Due Monday 9/13

Defining Your Topic

1. One paragraph on defining your problem
    a. Which domain does this apply to?
    b. What are you trying to accomplish?
    c. Why are you trying to accomplish this goal?
2. One paragraph on defining the dataset
    a. Where was the data accessed from?
    b. How many observations and variables does the data include?
    c. How does the data agree with you solving your problem statement?

Deliverable #2 – Due Monday 10/25

Beginning Analysis

1. Correlation
    a. Correlogram
    b. Computation of variance
    c. Auto correlation
2. Forecasting Strategies
    a. Address each of the following topics (you do *not* need to implement these if they are not applicable to your project)
        i. Bass Model
        ii. Exponential Smoothing
        iii. Holt-Winters Method
3. Implement a basic stochastic model
    a. Determine if auto-regressive model is appropriate
        i. What is the number of lag terms?
    b. Determine alpha coefficient
    c. Build ACF plot

Deliverable #3 – Due Monday 11/15

Intermediate Analysis

1. Linear Regression
    a. We are looking for you to implement one (if not multiple) of the types of regression models we discussed in class
        i. Generalized least squares
        ii. Linear models with season variables
        iii. Harmonic seasonal models
        iv. Log Transform regression
        v. Non linear model
2. Construct a moving average model
    a. Interpret the model
3. Construct either a season or non-seasonal ARIMA model, based on your data
    a. Interpret the model
4. Construct a GARCH model
    a. Interpret the model