# Advanced Time Series Analysis (IT 833)

**Submitted by: Sampat Kr Ghosh**
**Roll Number: 192IT020**
**Submitted to: Dr. Biju R Mohan**

## Assignment Report for Question 5

### Introduction
During the times of crude oil crisis, the whole stock market takes a hit. In this project, I have predicted stock prices using crude oil prices taken during the recent crude oil crisis.
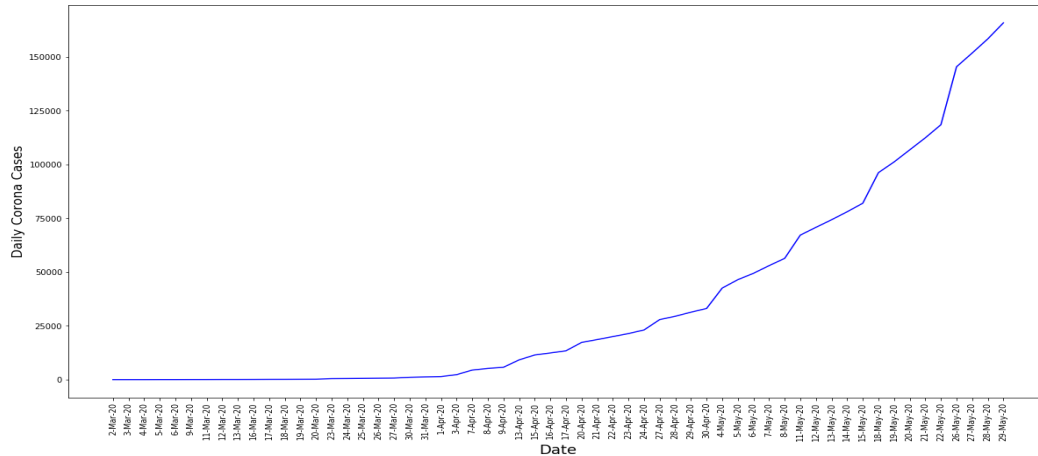
### Dataset
Stock Price dataset was taken from here. The prices are of Infosys. COVID19 India dataset was taken from here. Both datasets were taken from March 2, 2020 to May 29, 2020.

### Dataset Visualization
Below are the plots of both the datasets.



Infosys stock price Time Series during COVID19 pandemic

Cumulative COVID19 cases in India

**Correlation**

The correlation between COVID19 India cases and Stock price is 0.31618645. From this we can understand that during the initial days of lockdown, the stock prices decreased but later it became normal.

**Methodology**

The dataset was divided in 80% training data and 20% testing data. We changed from cumulative cases to daily cases for better prediction. Since, the dataset is small, for better prediction I have selected three features:

1. Daily COVID-19 cases
2. Average COVID-19 cases of last 3 days
3. Average Stock Price of last 3 days

Then the features were fitted using Linear Regression.

**Model Evaluation**

The RMSE of the model is 12.566504124505672 and $R^2$ score is 0.3495494129306247.

**Stock Price Prediction**

Below is the plot of the actual stock prices and predicted stock prices on testing data.

Stock Price Prediction