Description of the model implementation and forecasting

Model selection

After reviewing different papers and python software, related to data-based time-series prediction I decided to apply Prophet which an open source library published by Facebook that provides the ability to make time series predictions with good accuracy using simple intuitive parameters.

Model implementation and forecasting

From dataset, no. of observation of the confirmed cases fit to the Prophet model with additive seasonality and changepoint scale of 0.15 which is a key factor in forecasting accuracy and then build a dataframe and on which fit daily predictions for the next 30 days. As in fig. red doted lines shows changepoints where model detect sudden changes in the trend during model training. Black dot shows the actual data points and confirmed cases predicted by the blue lines with upper and lower limit. The plot shows a rapid increase in no.of cases from starting April and follow upward trend.

Model evaluation

Model evaluation done by the using Prophet's cross validation procedure which gives various prediction performance metrics. I took and plotted MAPE for my model evaluation which is easier to understand.

Results

The model predicts that confirmed cases will increased to 1.8 million approximately by 12th of April with mean absolute percentage error of 15.86 %.

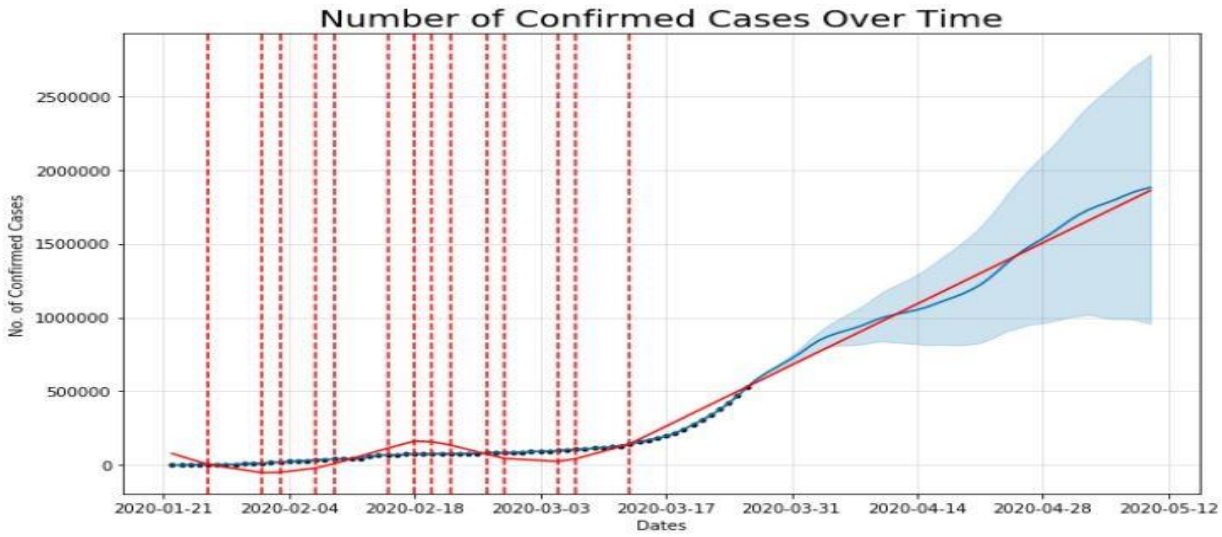

Figure 1: figure show the prediction of COVID-19 confirmed case

	horizon	mse	rmse	mae	mape	mdape	coverage
0	1 days	5.063867e+07	7116.085283	4727.061367	0.022788	0.016533	0.500000
1	2 days	4.312384e+08	20766.281314	13847.744936	0.058573	0.060663	0.333333
2	3 days	1.373465e+09	37060.289898	23883.708734	0.087327	0.066015	0.333333
3	4 days	3.360183e+09	57967.086048	37025.171942	0.122723	0.077733	0.000000
4	5 days	6.914701e+09	83154.679813	53166.360209	0.158446	0.120780	0.166667

Figure 2: model evaluation performance metrics table

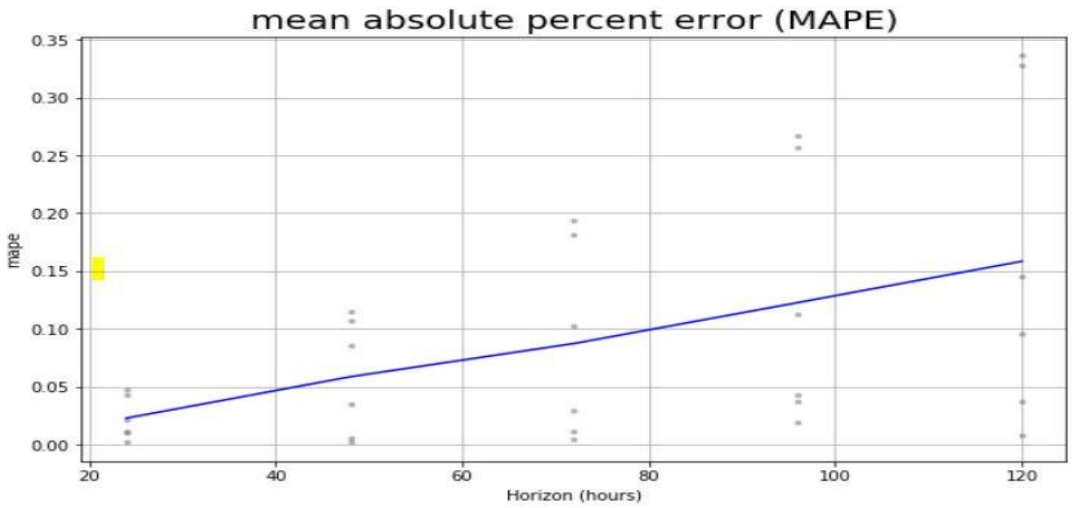

Figure 3: Plot of mean absolute percentage error