**Weekly Progress Report (Nov 6 – Nov 10): Tilly, Victoria, Lalla-Aicha**

**Progress/Accomplishments:**

* Tilly built ARIMA and Auto-ARIMA models on both the New England and South data sets. She initially found no seasonality in the data and went ahead with that assumption. For both modeling approaches, the New England models performed way better than the South models with MAE of around 421 confirmed cases for ARIMA and 399 confirmed cases for Auto-ARIMA. Surprisingly, Tilly’s ARIMA model for the South region performed better than her Auto-ARIMA counterparts. After discussing with Victoria and Professor Shi, Tilly found that her assumption on seasonality may be invalid, so she went ahead and removed all 0 values of confirmed cases in both data sets so she could decompose the data sets later on.
* Lalla started building her ARIMA model, and to better fit the model, shifted the data over by one. This would allow for better predictions since the model would then be fitted for the next day. However, complications arose as the ADF could not be computed with the shifted data, rather only with the regular data. Lalla also started building a prophet model, however issues arose importing the library. She attempted a conda install, as well as pip install, which after some time still did not properly load the library.
* Victoria switched to R and continued with her ARIMA and Auto-ARIMA models. She did univariate analysis with seasonality, focusing on only the change in confirmed cases over time. She decomposed the time series data by breaking the observed time series into trend lines and seasonality. Victoria first manually fits an ARIMA model, which involves the usual steps like order differencing (to make the series stationary) and identifying the lags, the number of moving average terms, etc. She then used Auto-ARIMA to fit the same data set. Victoria found that while the auto-ARIMA model performed better for the New England data set, it performed horribly for the South data set.

**Next Steps:**

* Build prophet single and prophet multiple regressors models
* Discuss all 4 models (ARIMA, Auto-ARIMA, Prophet Single, Prophet Multiple Regressors) in our Tuesday meeting
* Learn insights from each other’s models
* Prepare presentation slides on these 4 models
* Try multivariate adapted ARIMA