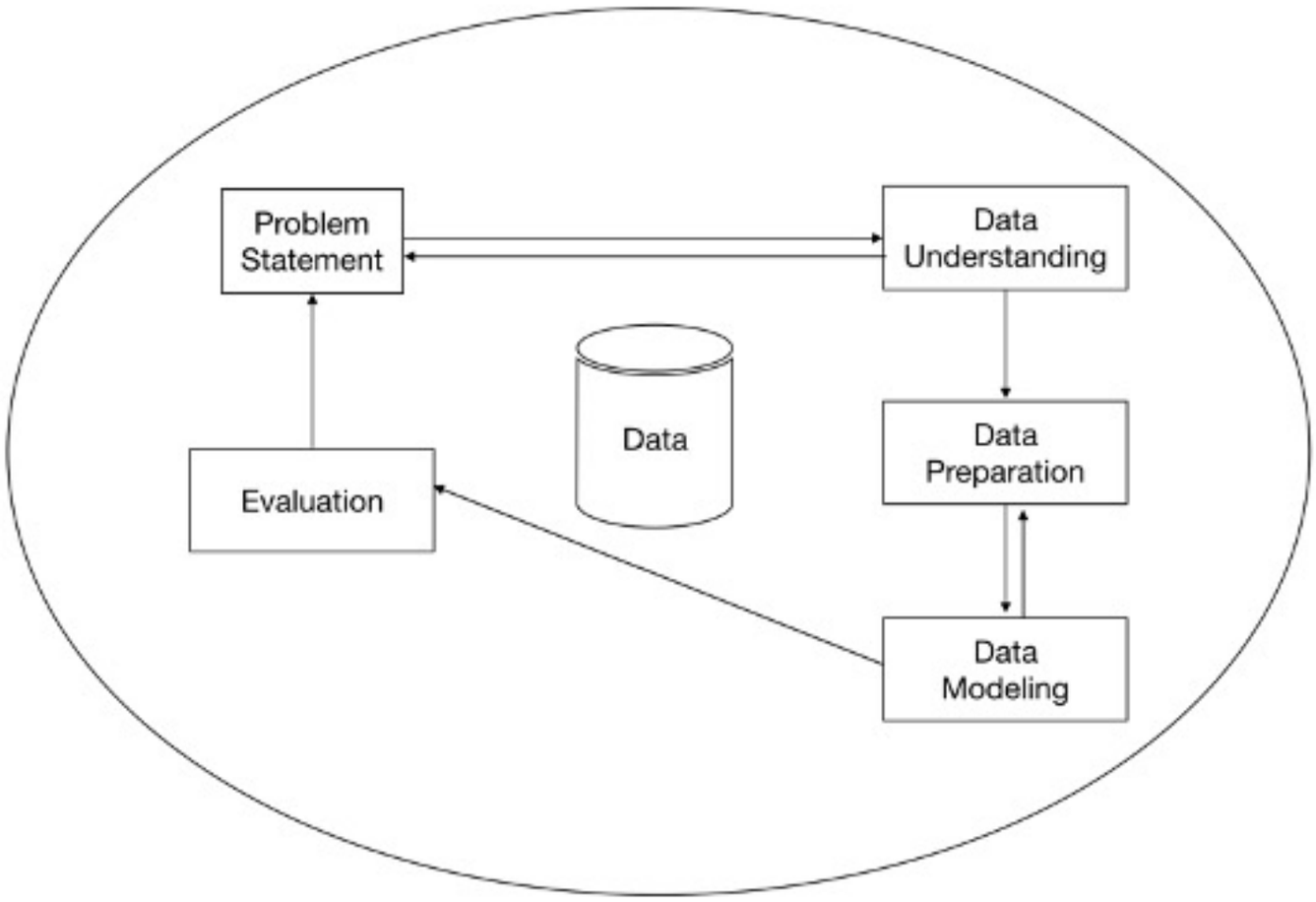
COVID-19: A Fight Against Time

Group Members: Khalid, Malak, Maram, Sara, Sarah

The CRISP Process Framework

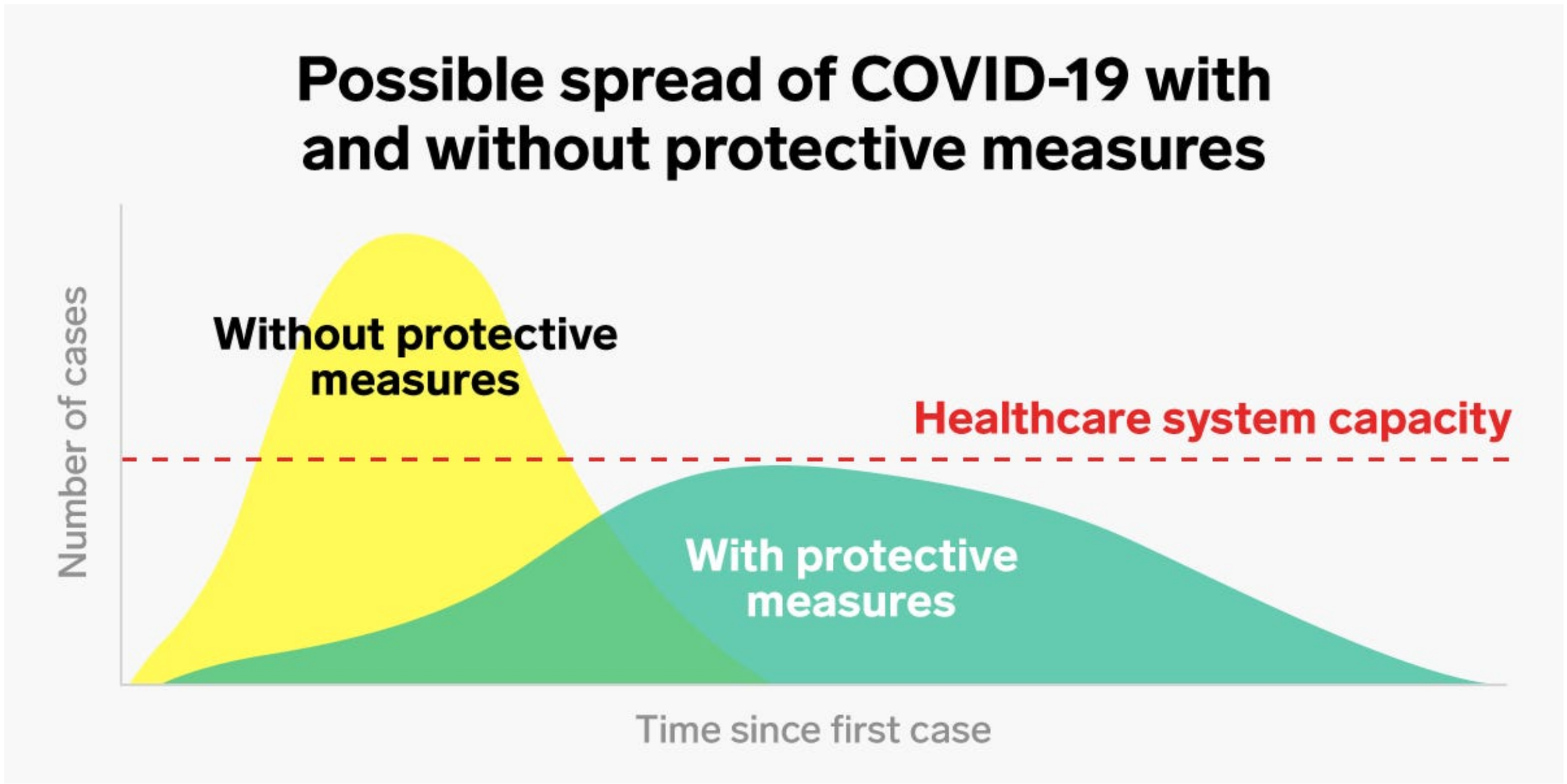


The CRISP Process Framework of Project 4 (COVID-19 hackathon) (based on Mamoor, 2020)

COVID-19: A Fight Against Time

COVID-19 is “a newly discovered coronavirus that infects humans and whose [rapid] spread has [led] to a global pandemic with zero available therapeutic strategies” (Mamoor, 2020, p. 5).

Problem Statement



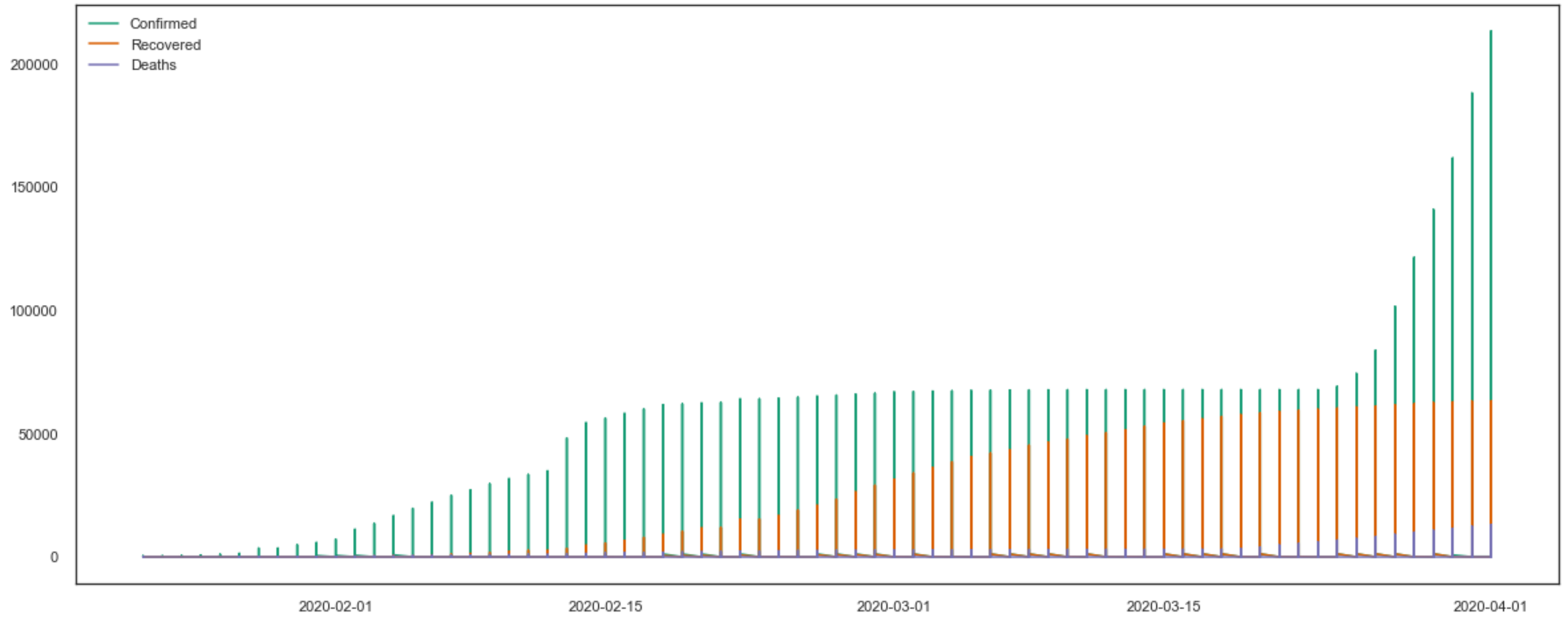
Source: Business Insider

Problem Statement

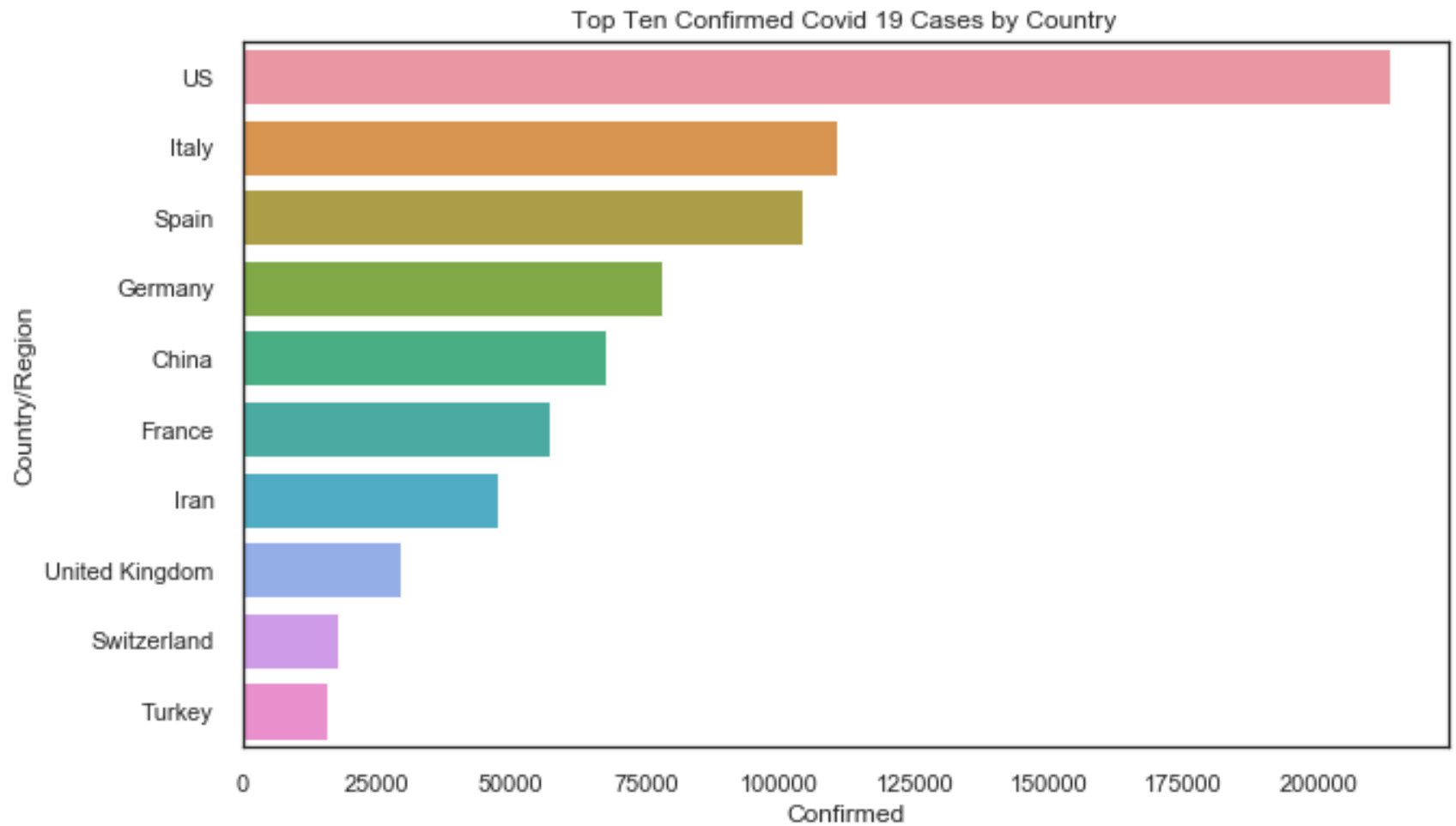
To explore how the outbreak of COVID-19 has spread around the world in such a short time and try to predict how it will continue to spread in order to provide insights to help combat the disease.

Data Visualization

Plotting the data by date

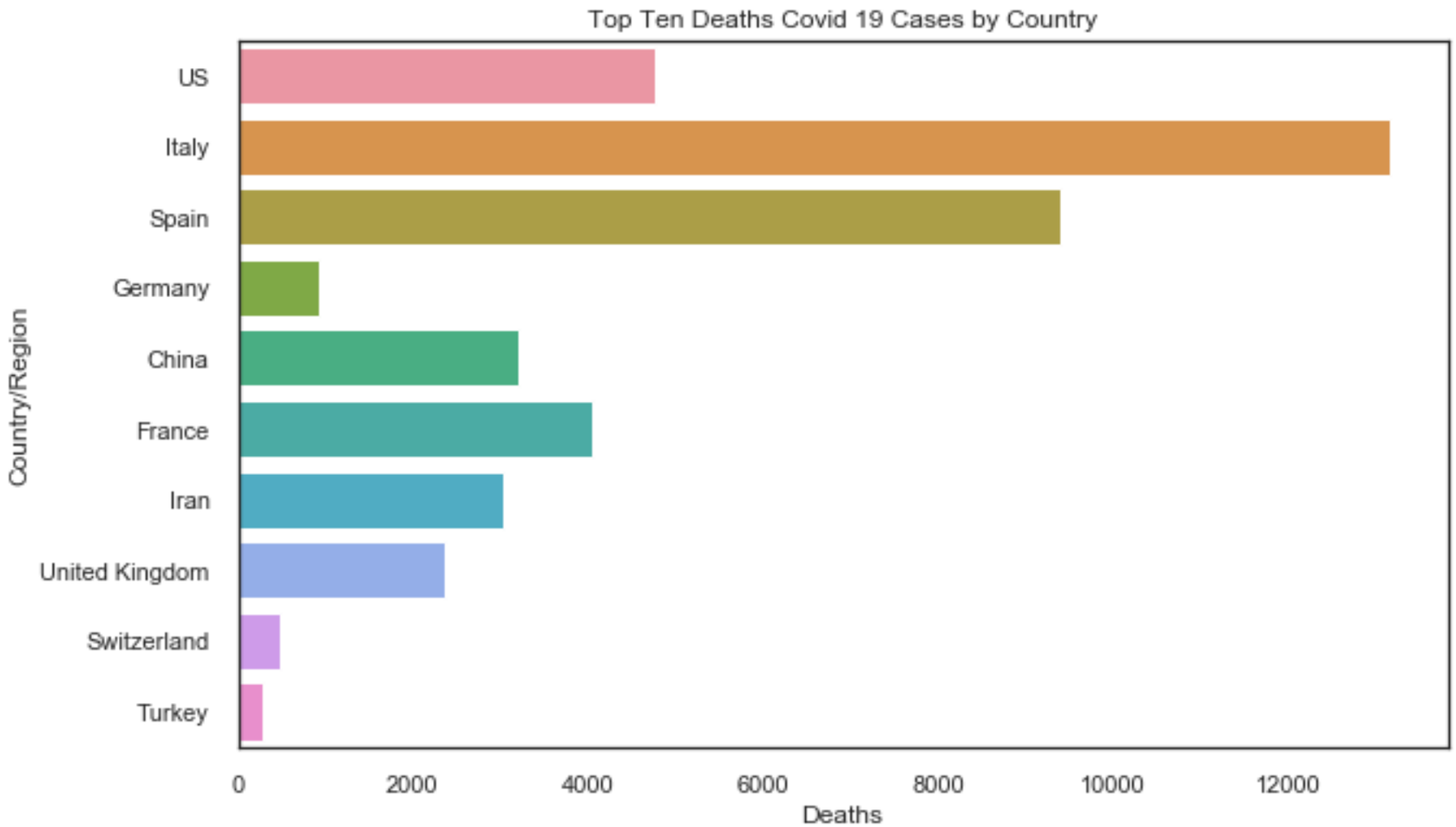


Data Visualization



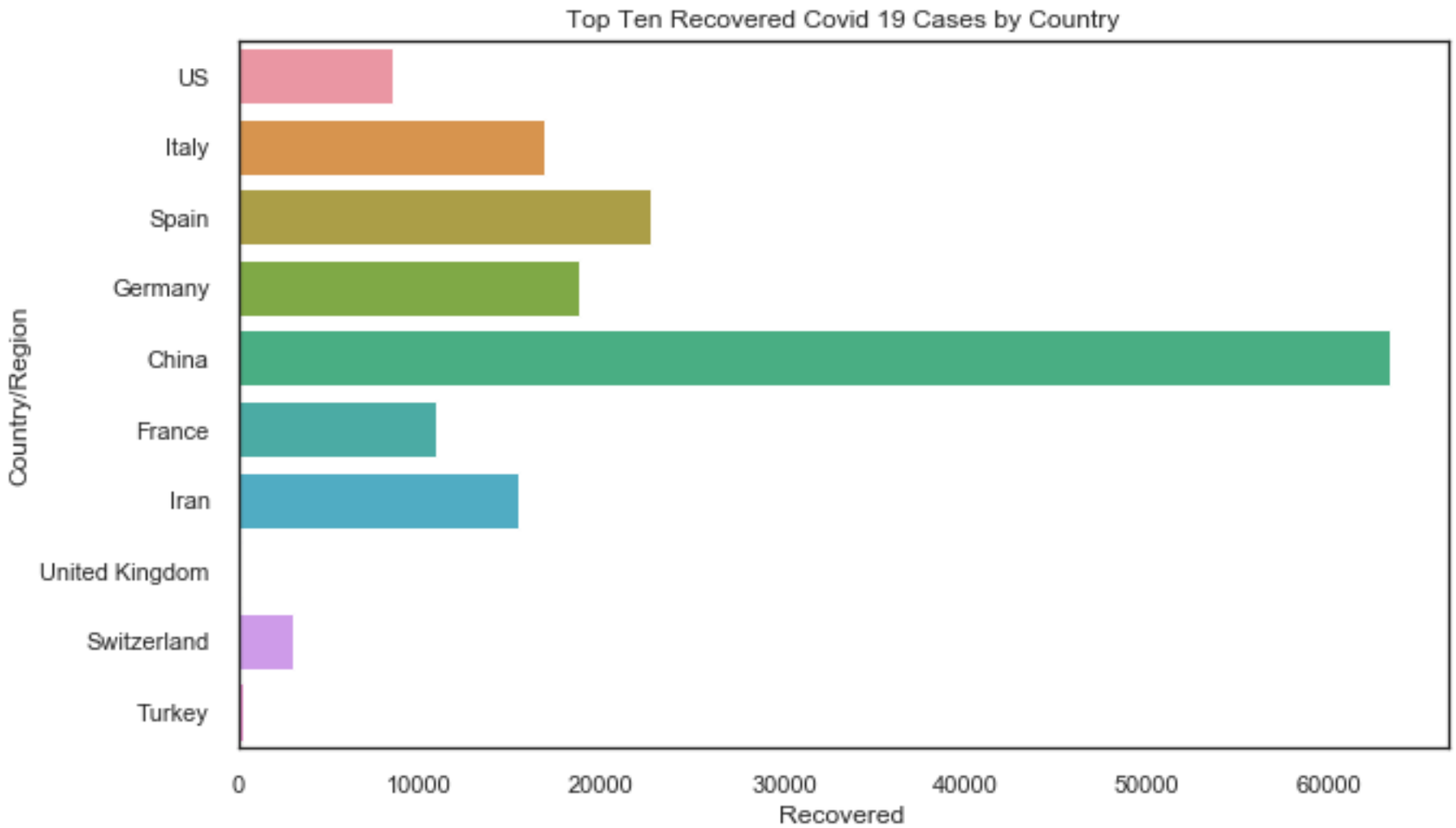
Data date: April 1st , 2020

Data Visualization



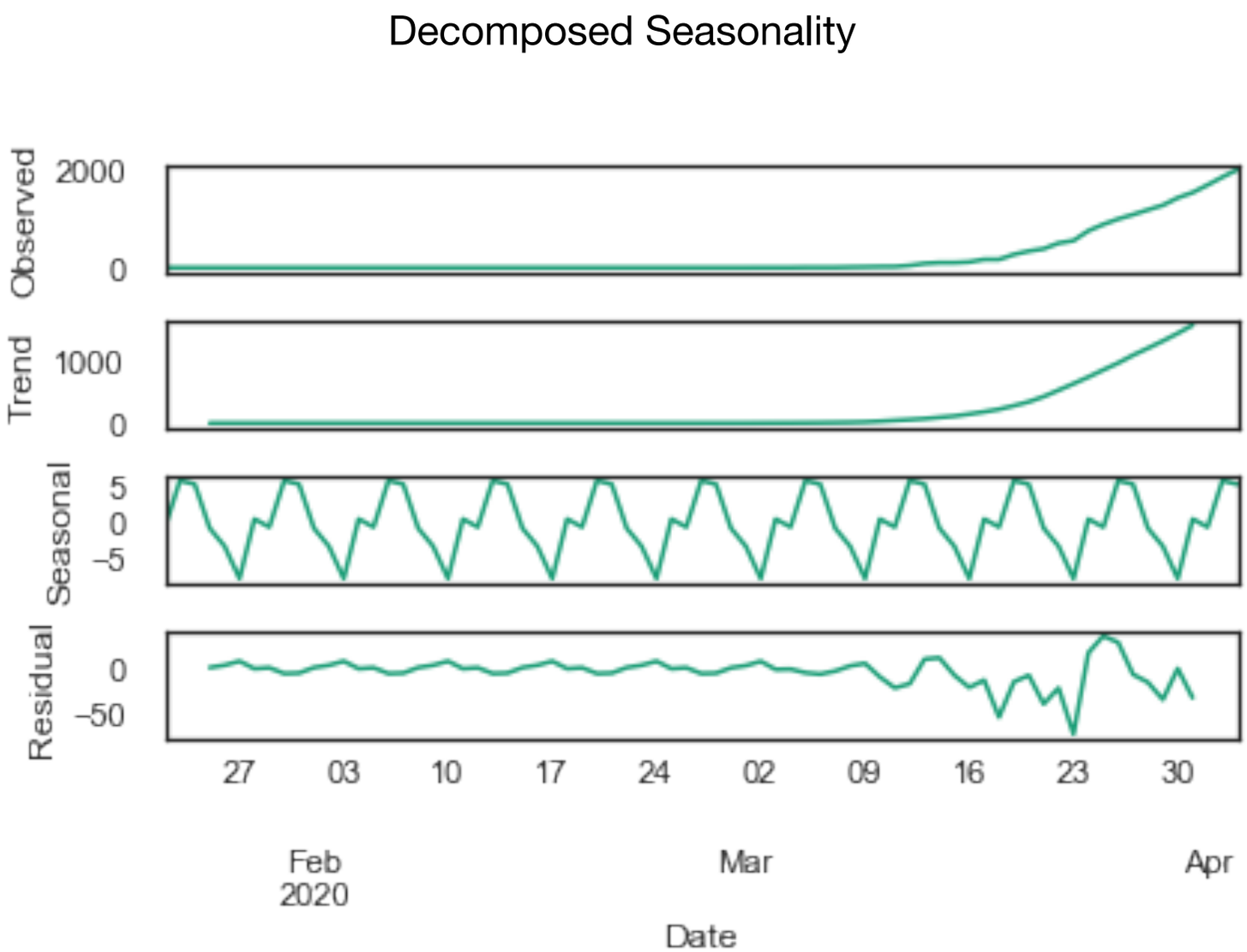
Data date: April 1st , 2020

Data Visualization

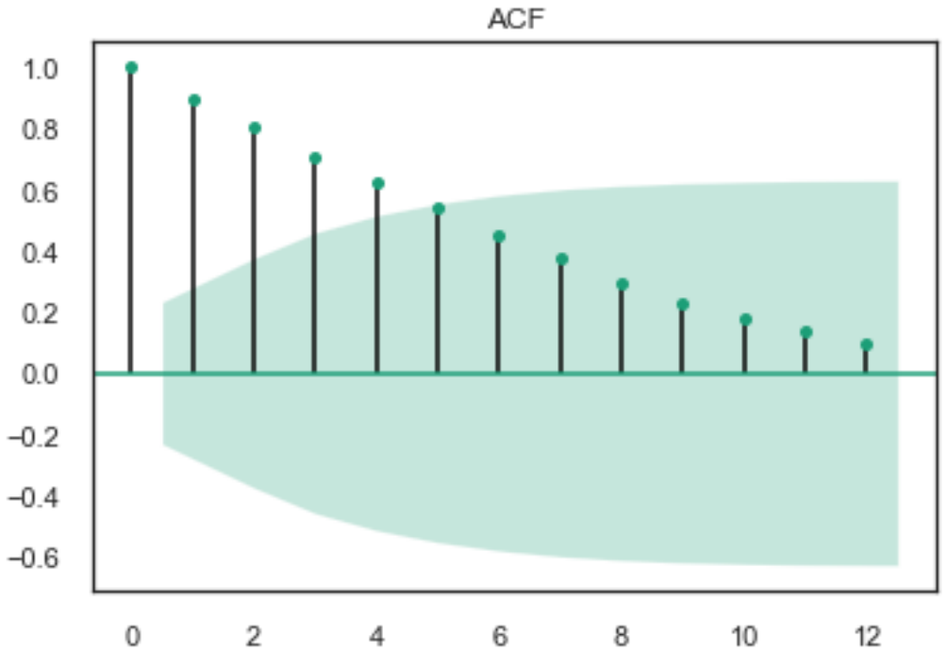


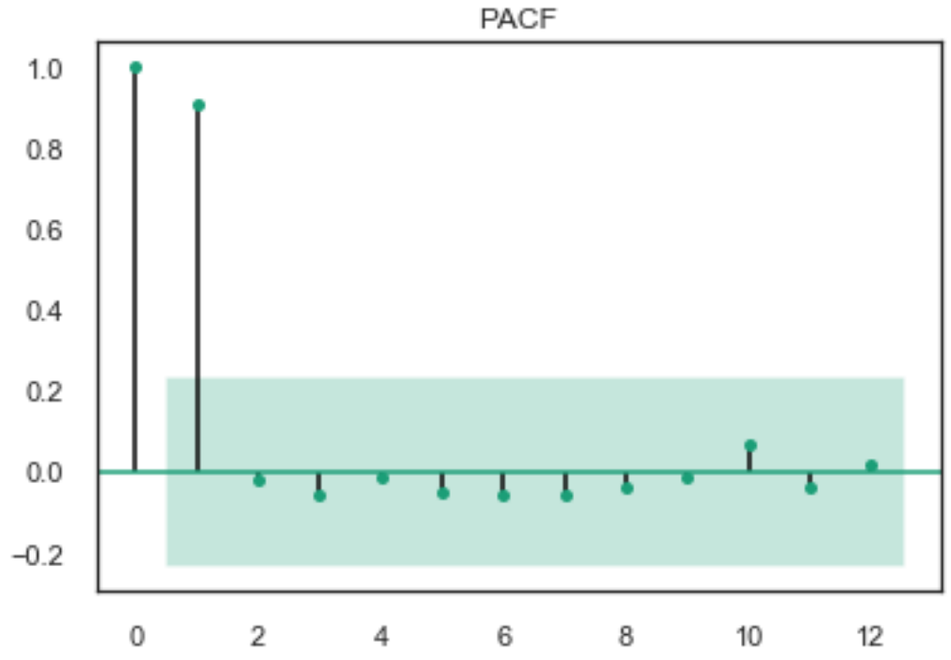
Data date: April 1st , 2020

Data Modeling

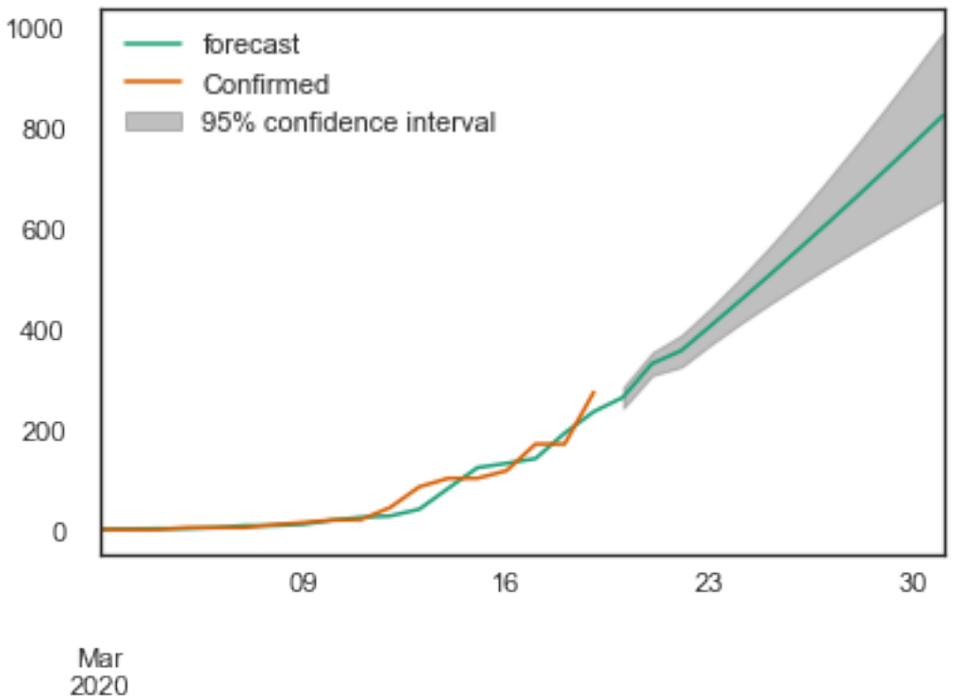


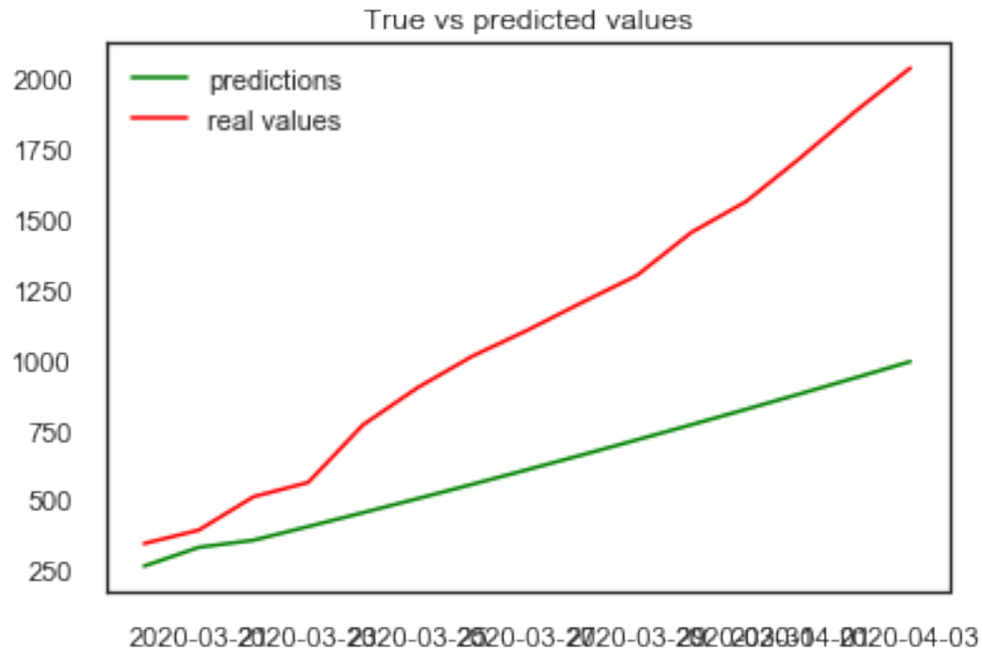
Data Modeling





Model Evaluation:
ARIMA Model Results



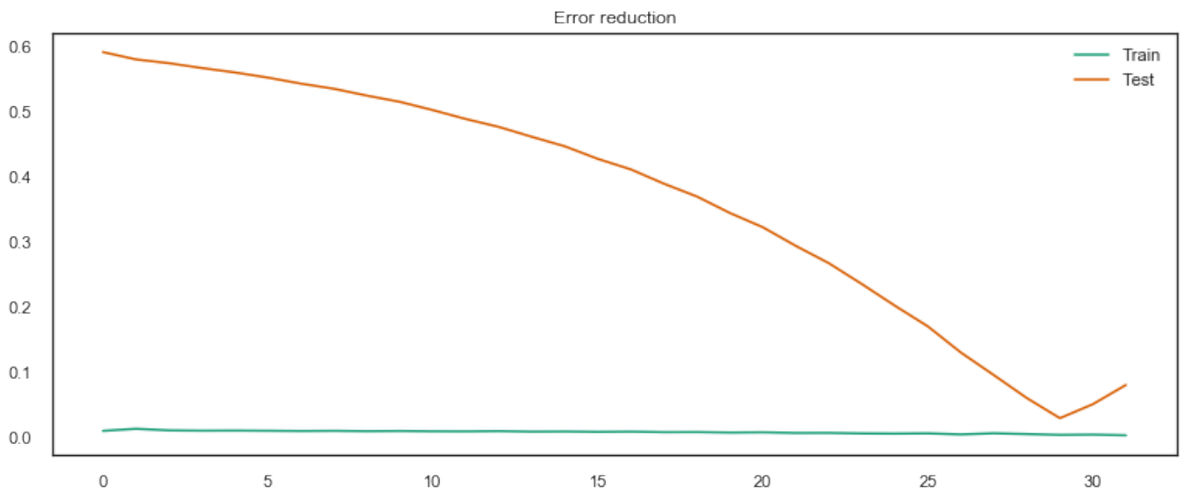


Mean absolute error: 500.480393

Mean absolute percentage error: 52.645572

MSE statsmodels :109.617349

Model Evaluation:
LSTM Model Results




```
Mean absolute error: 0.080253
Mean absolute  percentage error: 64.828265
```

Observations

- At an early stage, COVID-19 seemed to be only in China and its neighboring countries.
- Then it quickly spread to Europe, US, and other countries.
- In West Asia, especially Iran and Iraq, the virus spread quickly at the end of February, while the virus was spreading rapidly in Italy.
- The US, UK, Spain, Italy, Turkey, Germany, and France are still in the midst of a major outbreak.
- In Saudi Arabia, the virus started spreading on around March 2. A far-reaching lockdown and airport closures slowed down the virus but did not stop it from spreading.

Conclusions

Based on outside research, but also proven by the data, the spread of COVID-19 declined when countries implemented restrictive quarantines and lockdowns inhibiting the movement of their citizens (LaiApril, 2020).

References

- Mamoor, S., 2020. FBXL8 is differentially expressed and transcriptionally induced in MERS coronavirus infection.
- LaiApril, R., 2020. Are Countries Flattening the Curve for the Coronavirus?. The New York Time. Accessed on April 5th, 2020: (https://www.nytimes.com/interactive/2020/04/03/world/coronavirus-flatten-the-curve-countries.html).
- Putatunda, S., Rama, K., Ubrangala, D. and Kondapalli, R., 2019. SmartEDA: An R Package for Automated Exploratory Data Analysis. arXiv preprint arXiv:1903.04754.