Project Name: Predicting the Trajectory of the COVID-19 Pandemic

Led by: Nick Monozon
Timeline: Jan-Mar 2022

Overview

Since its identification in late 2019, COVID-19 has been the subject of extensive study by scientists and epidemiologists worldwide. Due to virus mutations, the ongoing rollout of vaccines, and the existence of asymptomatic carriers, case trajectories have frequently evolved in surprising and unexpected ways, prolonging the return to pre-pandemic conditions. With the infectious Omicron variant of COVID-19 quickly spreading across the world, case numbers continue to climb as 2022 approaches.

Hence, this project is extremely relevant to current conditions. The goal of this project is twofold: (1) to create aesthetically-pleasing and interactive visuals of both the spatial distribution and trajectory of COVID-19 cases and deaths, and (2) to predict the future trajectory of future cases by using machine learning libraries to fit Random Forest, Bayesian Ridge, ARIMA, and polynomial regression models to known data. To achieve (2), separate regression models will be developed accordingly for Los Angeles County. With detailed COVID-19 data released everyday, the validity of the models may also be assessed in real time.

Goals

- Create interactive heat maps and other visualizations of COVID-19 cases and deaths in Los Angeles County, California, and the U.S.
- Analyze the differences in COVID-19 cases and deaths across multiple geographic regions, with special attention paid to Los Angeles County.
- Use machine learning to develop separate regression models that predict weekly new COVID-19 cases for Los Angeles County.

Required Skills

- Basic Python knowledge
- Familiarity with data visualization packages (Matplotlib, Seaborn, etc.)
- Knowledge of NumPy, pandas, and scikit-learn
- Willingness to use new Python packages as needed for the project (e.g., Geoplotlib)
- Ability to implement regression models using scikit-learn

Specifications

- Individual roles and responsibilities will be determined once project members are finalized
- A preliminary quarter-long timetable will be immediately shared with team members, with further details being shared during week 2
- Time commitment will vary weekly
- Weekly check-in meetings (over Zoom) and a Slack group for effective communication
- Willingness to share your work and contributions to the project during our Week 9 presentation