

# COMP39/9900 Computer Science/IT Capstone Project

## School of Computer Science and Engineering, UNSW

**Project Number:** P12

**Project Title:** Modelling the interplay of COVID-19 variants in Australia

**Project Clients:** Jiaojiao Jiang

**Project Specializations:** Software development; Big data analytics and visualization.

**Number of groups:** 5

### Background:

Australia experienced initial COVID-19 outbreaks in early 2020, leading to nationwide lockdowns and strict public health measures. The emergence of new variants has posed ongoing challenges. For instance, the Delta variant caused significant outbreaks in 2021, and the Omicron variant led to new waves of infections due to its high transmissibility. The aim of this project is to develop a system to understand and predict the interplay of different COVID-19 variants in Australia. This model will analyze the spread, mutation rates, and impact of various COVID-19 variants, providing valuable insights to inform public health strategies and interventions.

### Requirements and Scope:

1. Data Acquisition: Collecting data from national health departments.
2. Data Processing: Cleaning, preprocessing, and integrating data from multiple sources.
3. Model Development: Implementing the SEIRS-V model to simulate the local dynamics of infection spreading.
4. Variant Interaction Analysis: Analyzing how different variants interact and compete within the population.
5. Visualization Tools: Developing interactive dashboards and visualizations to display model results and predictions.

#### Data Collection

1. Data Sources: Integrate data from national health departments.

#### Epidemiological Model Development

1. Model Framework: Implement the SEIRS-V model to simulate the spread of COVID-19 and its variants.
2. Variant Interaction: Incorporate mechanisms to model the interaction between different variants, including competition and mutation dynamics.

## Visualization

1. Interactive Dashboards: Develop interactive dashboards to visualize model outputs, trends, and predictions.
2. Graphical Representations: Provide various types of visualizations such as line graphs, heat maps, and network diagrams to represent data and model results.

## **Required Knowledge and skills:**

### Programming Languages

1. Python: For data processing and backend development.
2. JavaScript: For frontend development.
3. SQL/NoSQL: For database management and querying.

### Adaptability and Collaboration

1. Learning New Technologies: Willingness to learn and adapt to new technologies and methodologies as the project evolves.
2. Team Collaboration: Ability to work effectively within a multidisciplinary team.

## **Expected outcomes/deliverables:**

source code, user guide, and documentation.

## **Supervision:**

Jiaojiao Jiang

## **Additional resources:**