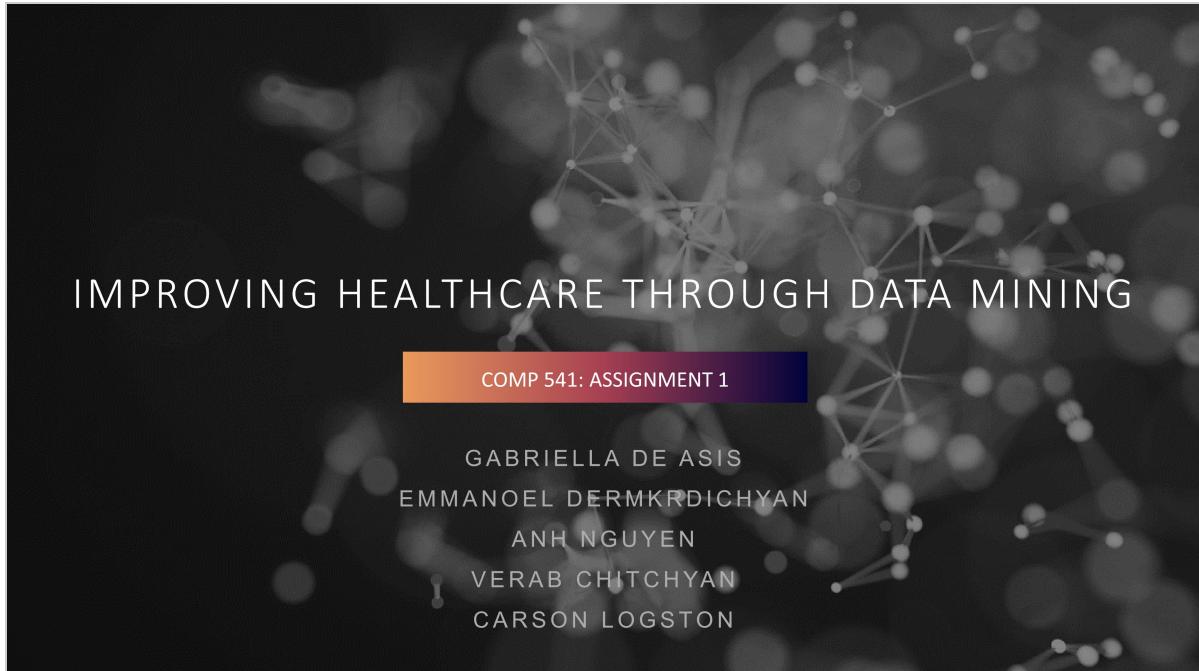


Improving Healthcare through Data Mining



A black and white photograph of a modern office meeting room. Several people are seated around a long conference table, engaged in a discussion. The room has a high ceiling with exposed ductwork and a large, round, pendant light fixture. To the right of the image, there is a white sidebar with the following text:

- DETERMINE BUSINESS OBJECTIVES
- BACKGROUND
- BUSINESS OBJECTIVES
- BUSINESS SUCCESS CRITERIA

In the bottom right corner of the sidebar, there is a purple rectangular box containing the text 'TRAVNUR AGENCY' and the number '2'.

- **Background:** TravNur Agency, established in 1958, is a travel nurse placement service company that provides nurses to hospitals in California. When a hospital needs more nurses because of an increased patient population or needs a nurse with a particular specialization, agencies like TravNur is contacted. Nurses typically sign short term contracts lasting several weeks to a few months. Sometimes, nurses are hired as a regular nurses after that travel contract. At other times, they return to the agency for a new contract at a different hospital.
- **Business Objectives:** Their business objective is to match nurses and hospitals. For TravNur to meet hospital needs, they must have enough nurses available for travel contracts to meet hospital demands. Likewise, they must generate enough contracts with hospitals to

ensure employment for their nurses.

- **Business Success Criteria:** Success is measured by the number of nurses TravNur is able to place with hospitals. With the rise in COVID-19 cases, TravNur considers the ability to have enough nurses on staff to meet hospital demands a criteria for success



ASSESS SITUATION

TRAVNUR AGENCY

INVENTORY OF RESOURCES

REQUIREMENTS, ASSUMPTIONS, & CONSTRAINTS

RISKS AND CONTINGENCIES

TERMINOLOGY

COSTS AND BENEFITS

3

- **Inventory of Resources:** The data mining resources for this project includes the data, data software to search datasets, technical support, data experts, and data mining experts, the experts being the group 1 COMP 541 students.
- **Requirements, Assumptions, and Constraints:** The constraints of this project is limited by team expertise and the time semester timeline. This project is based off of the assumption that the main reason for an influx in patients are caused by COVID-19 cases. We will be evaluating data relating to hospital shortages due to COVID-19 and will not be analyzing hospital shortages caused by other illnesses or diseases.
- **Risks and Contingencies:** The result of incorrectly predicting the amount of resources an area needs can result in proper resource allocation. It is essential to predict hospital shortages as accurately as possible in order to ensure that we have enough nurses to meet hospital needs which is essential during the Covid-19 pandemic.
- **Terminology:** Some of the terminology used in the datasets include: daily critical staff shortage, critical staff shortage anticipated within week, inpatient bed coverage, inpatient beds used, staffed adult ICU bed occupancy, total adult patients hospitalized confirmed and suspected covid coverage, total adult patients hospitalized confirmed COVID, total pediatric patients hospitalized confirmed COVID
- **Costs and Benefits:** Accurately predicting the number of nurses needed for hospitals prevents improper resource allocation. This is important to prevent under or over staffing. With a high demand for additional staffing during the Covid-19 pandemic, it is beneficial to accurately depict the amount of nurses hospitals will need. Benefits include time efficiency, money, effective utilization of able bodies, and more patients with Covid-19 getting the care they need.



DETERMINE DATA MINING GOALS

DATA MINING GOALS

DATA MINING SUCCESS CRITERIA

TRAVNUR AGENCY

4

- **Data Mining Goals:** With the rise in COVID-19 cases, TravNur Agency is interested in looking at COVID-19 trends in order to predict how many nurses will be needed in a particular area.
- **Data Mining Success Criteria:** Success is defined as the ability to predict hospital nurse shortages with a 70% accuracy within 1 week of the demand occurring. This allows the agency enough time to hire nurses and send them to a particular location.



PRODUCE PROJECT PLAN

PROJECT PLAN

INITIAL ASSESSMENT OF TOOLS AND TECHNIQUES

TRAVNUR AGENCY

5

- **Project Plan:**
 - Our first step is to analyze historical data. This includes identifying key indicators, removing irrelevant information, and filtering necessary information. We will be spending the rest of February on this task.

- Once data the data analysis of historical data is complete, we will use our findings to build a prediction model. Testing, evaluating, and adjusting this model will take the rest of the semester.
- Initial Assessment of Tools and Techniques:**
 - We will be testing model predictions by using historical data and comparing the predictions to actual shortage numbers in January and February 2021. This will give us a sense of how close our predictions are to actual numbers.
 - Based on the results, the model will be adjusted accordingly. We will repeat this step until we achieve 70% prediction accuracy within a week of the shortage occurring.

