

SMART HOSPITALS

Klarrio Helps Deliver Better Patient Services with Predictive Models

CHALLENGE

Patients today are coming to Emergency Departments (ED) and being admitted to hospitals with multiple and increasingly complex healthcare needs. Hospital resources are stretched beyond their designed capacities, and in turn, government health expenditures are growing at rates significantly greater than GDP.

To improve hospital efficiency through technology, Monash Health provided Klarrio and Monash University with de-identifiable data sets that detailed every patient and emergency department admission over a five-year period. This information covered a diverse population of 2 million, more than 900,000 admissions involving about 350,000 unique patients, and detailing 100s of data fields, including demographics, medical records, and ED diagnoses, among others. Klarrio was asked to develop innovative real-time applications that used cutting-edge machine learning techniques that could alleviate the stress on the system.

APPLICATION

Leveraging numerous machine learning algorithms, including Gradient Boosting Machines and Neural Networks, Klarrio built models to: predict Length of Stay (LOS) in the ED and subsequent hospital admissions; the probability of a patient returning within seven days to the ED; and the number of patients likely to present to the ED in every 4-hour period looking ahead one week. Furthermore, utilising new methods borrowed from the field of game theory, the team was able to explain the root cause drivers of patient LOS and to drill into the drivers of Potentially Preventable Hospitalisations (PPH) for particular diseases such as cardiovascular disease.

IMPLEMENTATION

These models can be leveraged and extended to build real-time dashboards which will give hospital administrators the ability to better plan resources. The dashboards will provide historical and predicted views of the status of an ED department and hospital including: number of admissions; average LOS; as well as drilling down into details and predictions of every patient currently within the system. By extending the capability of the models, Klarrio in collaboration with Monash University can empower Monash Health to enable patients and hospital administrators to witness these benefits.

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