Kingston General Hospital: Forecasting Hospital Bed Occupancy

Currently in the Canadian health care system, the government reimburses hospitals for a fixed number of beds each day. Each additional bed required by the hospital is funded directly through the hospital’s operating budget. Since hospitals cannot refuse care, efficiently scheduling elective procedures to not exceed the government quota is important to minimize costs. Our goal was to create a system for Dr. Siddhartha Srivastava of Kingston General Hospital that could accurately forecast how busy the hospital would be each day. By using the hospital’s internal data, we trained a prophet neural network that takes into account date, occupancy, and the Queen’s University academic calendar to predict future occupancy. When comparing our networks predictions with real occupancy data, the network displayed 89.7% forecasting accuracy. To make the network accessible our team has created a web application that allows the hospital administration to easily predict future occupancy, retrain the model with new data, and produce graphs similar to Figure 1, 2. Our model will help Dr. Srivastava and his administration better schedule procedures, plan for high demand periods, and ultimately allow the hospital to put their money to better use.