Predictive Analytics in Rehospitalization- A Case Study

Predicting patient outcomes is essential for optimising resource allocation and service delivery in the healthcare industry. It is crucial to be able to predict the likelihood that a patient will need to be re-admitted to the hospital in the first thirty days after starting home care to provide proper intervention. The basis of this predictive model is always based on the data history.

Aashaya is working with HHA (Home Health Agency) database to predict the re-admission of the patient to the hospital in the next 30 days. HHA data for multiple agencies were used. Patient data was anonymised so there is no personal information, only Patient IDs, ICD codes, start of care information are used to identify patient episodes and the related events. Understanding of the data set with medical terminology, feature selection, etc., was done with expert advise of senior practicing physicians to ensure there is no loss of information.

An AI/ML model was developed that demonstrated the highest efficiency and was further optimised with the hyperparameters to deliver excellent performance. The model predicted the hospital readmission for each patient with in the **first 30day window as 84%.** Further it was classified as Low, Medium or High risk and appropriate intervention provided to lessen the likelihood of readmission to the hospital. Finally developed API can be used to predict the risk for the new entrant to the home health care so proper intervention can be done.

The business impact of this predictive model is significant for healthcare providers, insurers, and patients. By accurately identifying high-risk patients, healthcare organizations can implement targeted interventions, optimize resource allocation, and reduce hospital readmissions, ultimately **lowering costs of up to 25% and improving patient outcomes**. Early identification enables personalized care plans, enhancing patient adherence to treatments and reducing complications. For insurers, fewer readmissions translate to lower claim payouts, improving financial efficiency. Further the star rating of the agency also improves by this method of interventions. The attribution of this impact is through improved risk stratification, data-driven decision-making, and cost savings from reduced emergency admissions.

For any further information on this, please feel free to contact Dr. Mahesh Rao (mrao@aashayadesigns.com)