

## PREDICTIVE ANALYTICS WITH MACHINE LEARNING

# Predicting Hospital Readmissions

### Data Source :

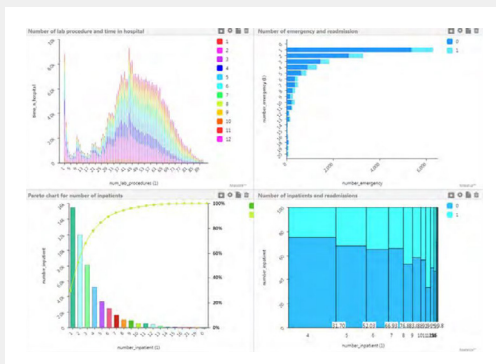
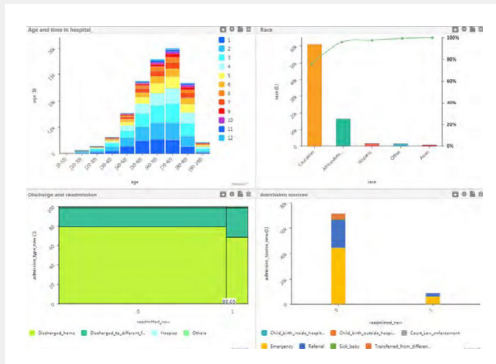
Machine Learning Repository

### Data Type :

Hospital Patient Data Set

### Application :

Analance



**Analance**

### PROOF OF CONCEPT – POWERED BY ANALANCE

**Hospital Readmissions** often indicate poor quality of care by hospitals. When patients are readmitted within less than 30 days of discharge, this may lead to penalties if the readmission percentage is greater than the expected rates.



## LEVERAGING ML TO REDUCE READMISSIONS

Analance used a hospital's patient data set to predict the likelihood of a patient being readmitted—with summaries and findings easy to explore through dashboards and reports.

By leveraging Analance machine learning (ML), patients can be classified into risk categories based on their likelihood of being readmitted and future outcomes can be predicted with accuracy as high as 61.6%. With built-in automations, alerts can be scheduled to notify healthcare professionals when patients are at risk of being readmitted. This allows providers to facilitate early intervention and improve the numbers of readmitted patients.



## EXPLORATORY DATA AND MODELING PROCESS

With visibility into a patient's risk of readmission, healthcare institutions can implement proactive measures to lessen unexpected readmissions and reduce cost.

A total of 101,766 patient records were observed and 46 different predictor variables were considered such as race, gender, admission type, age, discharge disposition, admission source, and more.

All variables available were studied to understand distributions. Data was cleaned by the means of handling outlying values, missing values, and looking for interrelationships between predictors before looking to see if any data had a significant relationship with the outcome. A Bivariate Analysis (Chi-Squared) was done for all predictoroutcome combinations, which helped in restricting the analysis to only those predictors that majorly influence hospital readmissions.



## DATA MODELING AND FINDINGS

A total of 50 different models were built but the Random Forest model was chosen as the winning model based on the model accuracy. From the analysis performed, the highest risk of readmission was found for:

- Patients who have not been tested for A1C (11.74%)
- Patients who were discharged to other facilities (16%)
- Patients who were admitted for Nephrology (15.3%), Vascular Surgery (14.12%), or Psychiatry (12.19%)



## DATA ANALYSIS AND INSIGHTS

Perhaps the reason why the A1C blood test is linked to readmission risk is because tests like this could provide visibility into whether the patient requires further care or not. Another risk factor discovered is what happens after discharge. Patients who were discharged to other facilities have a higher risk of readmission compared to patients who underwent hospice care. This might be because of the sudden change in environment, which might have aggravated existing symptoms.



## NEXT STEPS

Hospital personnel can proactively request relevant screening tests such as the A1C blood test, optimize transitions after discharge, schedule follow-up consultations, and pay close attention to patients with conditions that have a much higher chance of readmission.

## ABOUT DUCEN

Ducen is a trusted technology solutions provider that aims to empower Fortune 1000 companies through quality solutions and services. We work with organizations across various verticals to drive business outcomes and enhance their customer experience. Through our enterprise analytics platform, we build and manage data-driven digital platforms including business intelligence and advanced analytics solutions. We also offer a comprehensive services portfolio covering data management and cyber security to help clients stay ahead of the technology curve.

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