HEALTHCARE ORGANIZATION

CENTER FOR BUSINESS ANALYTICS
UNIVERSITY of WASHINGTON | TACOMA
Milgard School of Business

TEAM A5


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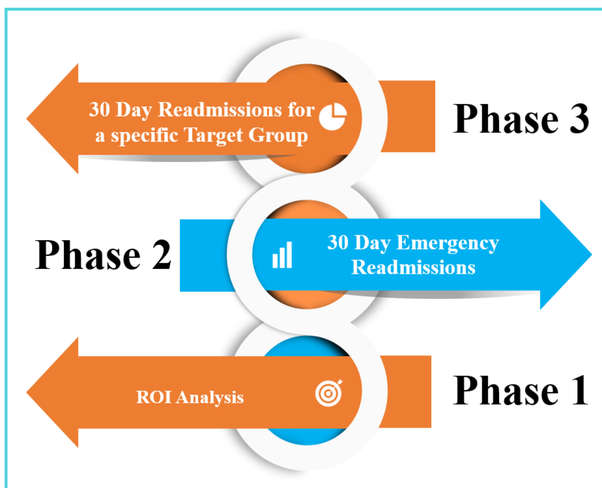
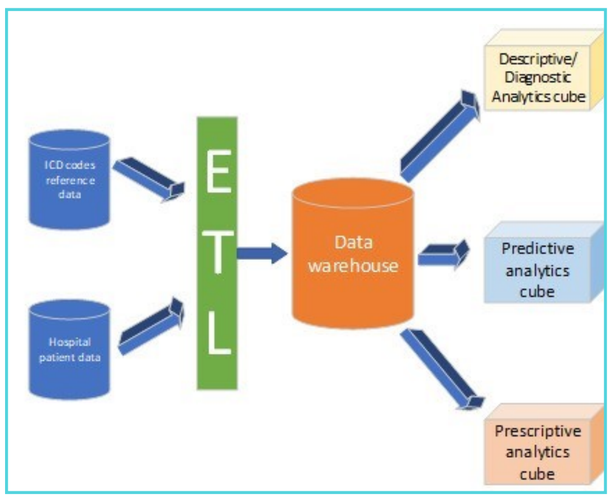


Project Background:

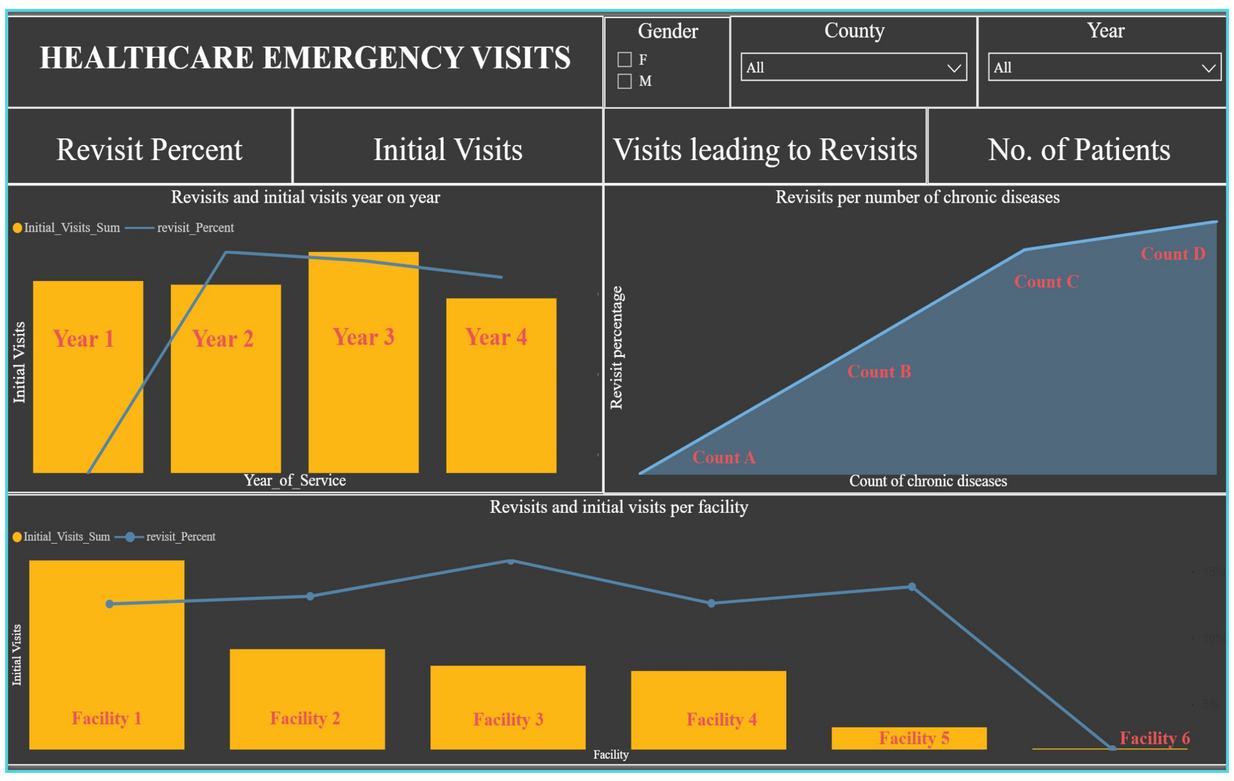
Reducing readmissions is an important metric of interest in the healthcare industry as it is an indicator of the quality of care provided. Reduction in readmissions will help the organizations to lower costs and improve patient satisfaction.

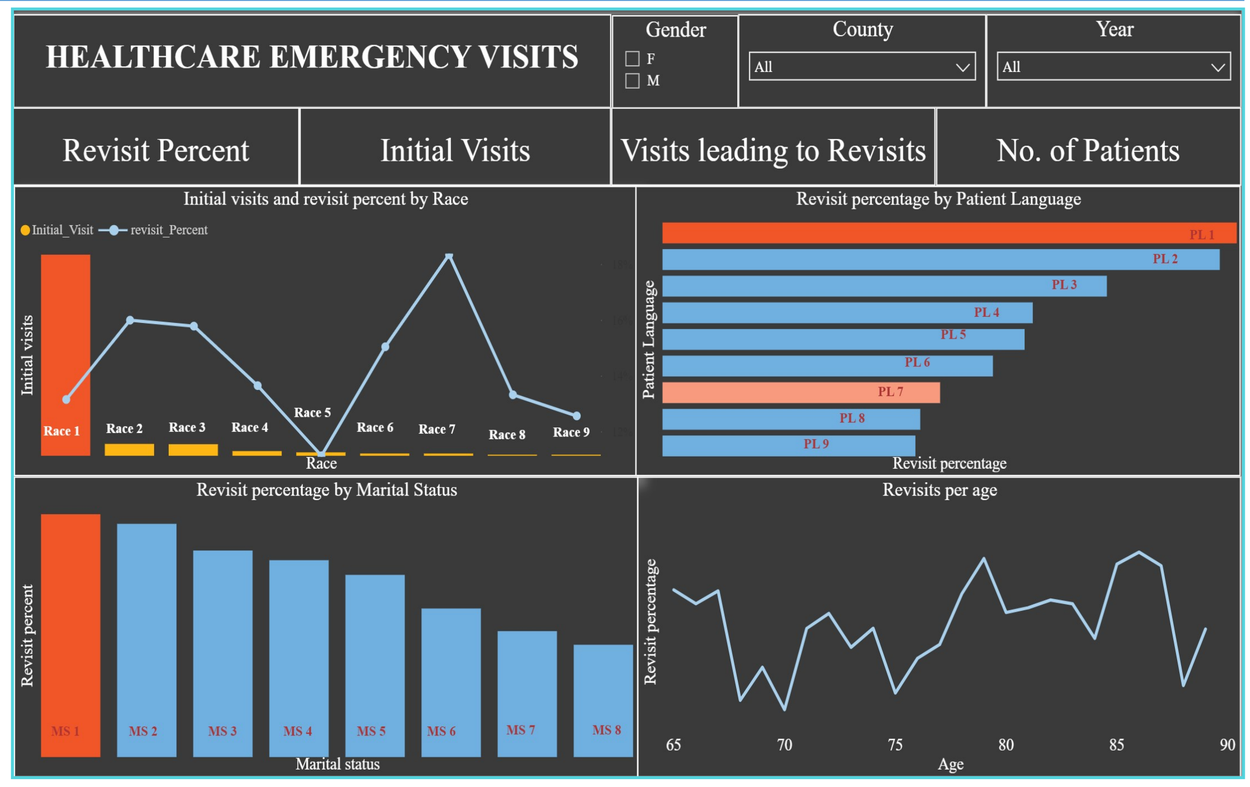
Project Goal:

The purpose of this project is to provide our healthcare provider insights and trends on their Emergency Readmission data and provide a machine learning solution that helps in predicting the probability of a potential visit transforming into a revisit and provide a digital solution in the form of a power app that can be applied by the clinical staff and utilized by doctors and parties of interest.



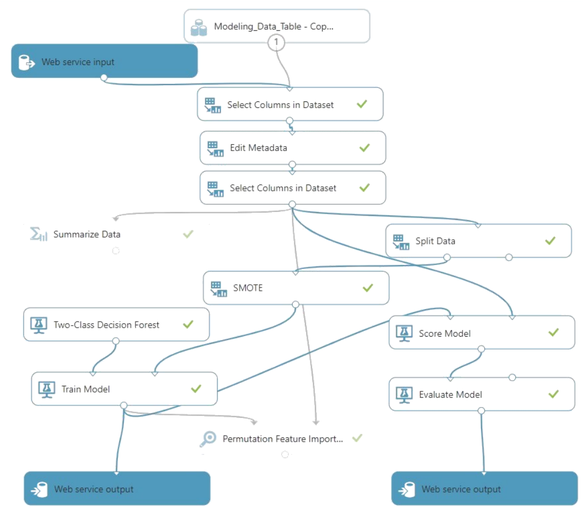
Descriptive/Diagnostic Analytics

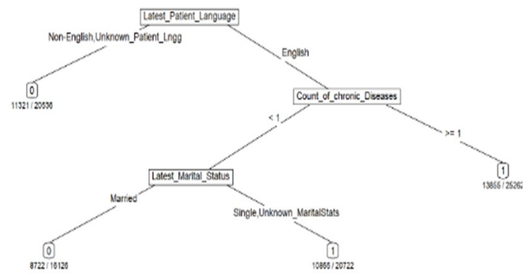




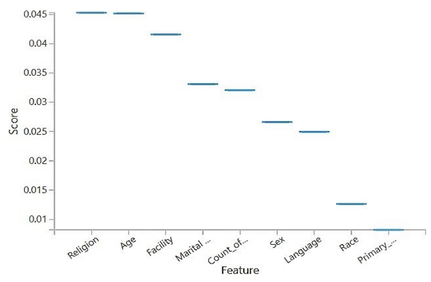
Insights: 1) As the count of chronic disease increases, the revisit percentage also increases. 2) Volume of visits for 'Facility 1' is the highest but the revisit percentage for 'Facility 3' is the highest.
3) Volume of visits are highest for Race 1 but revisits for Race 7 are the highest . 4) Highest revisit percentages for both the genders are seen for category 'MS 2' and immediate next 'MS 3'.
5) When the patient language is not English, the revisit percentage is observed to be high. 6) Highest revisits are observed for age groups above 75.

Predictive/Prescriptive Analytics





When the patient language is not English the probability of a visit turning into a readmit is HIGH.



Results: Our Model is 76% accurate with Recall of 0.64, Precision of 0.27, F1 score of 0.87, and AUC of 0.77

TOOLS AND TECHNIQUES USED:

Project and Business process management: Agile methodology, Kanban Board, Scrum, MS Project, Visio

Microsoft Azure

Process flow and data flow charts.

Visual Studio Online

python

Microsoft SQL Server

Power BI: Create calculated fields, measures, defined KPI, interactive dashbaord

R

Regression models: logistic regression, neural network, random forest, KNN nearest neighbor

PowerApps

SQL database creation, query and maintenance to extract transform and load

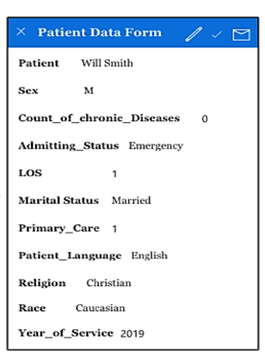
Power BI

Machine learning models, permutation feature importance, scored dataset, model evaluation metrics

Azure ML

Cognitive analytics implementation: data entry and maintenance system, email sending capability

Cognitive Analytics



The list of patients are extracted from the model results, important variables corresponding to patient information are fed in the system for the clinical staff to notify the doctors in advance.

Next Steps and Recommendations

- Implement suggestions to refine model
- Integrate machine learning model & algorithm into electronic health record system
- Operationalize model results
- Clear communication by staff of post discharge instructions

Address data completeness

Text mining of discharge instructions and follow up of patient care

Seasonality of data to understand weekly, monthly, yearly and year on year performance

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