Chop AI

Comprehensive Hospital Outcome Prediction

AI assisted resource allocation and planning made easy

Presentation By

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Project Overview

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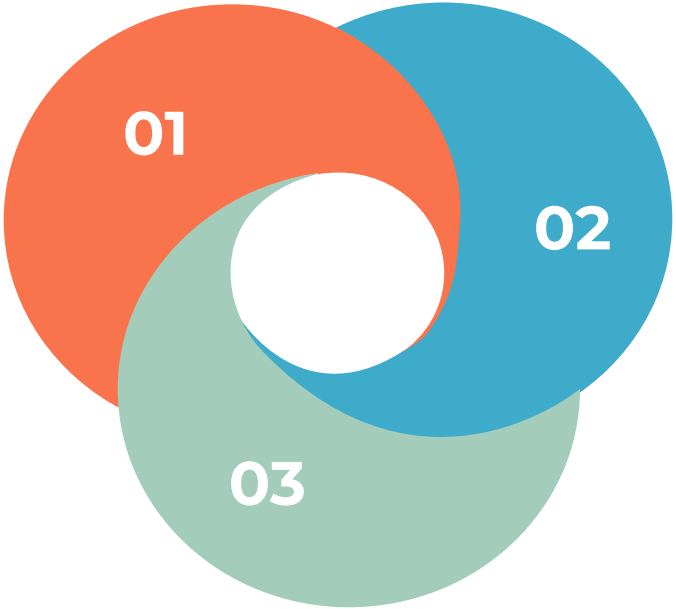
Problem Statement

In the medical sphere, predicting and allocating resources needed is a difficult task



Our vision is to help hospitals better plan and allocate resources

By developing a model that predicts patient outcomes, hospitals can make more efficient resource allocation decisions

Proposed Solution

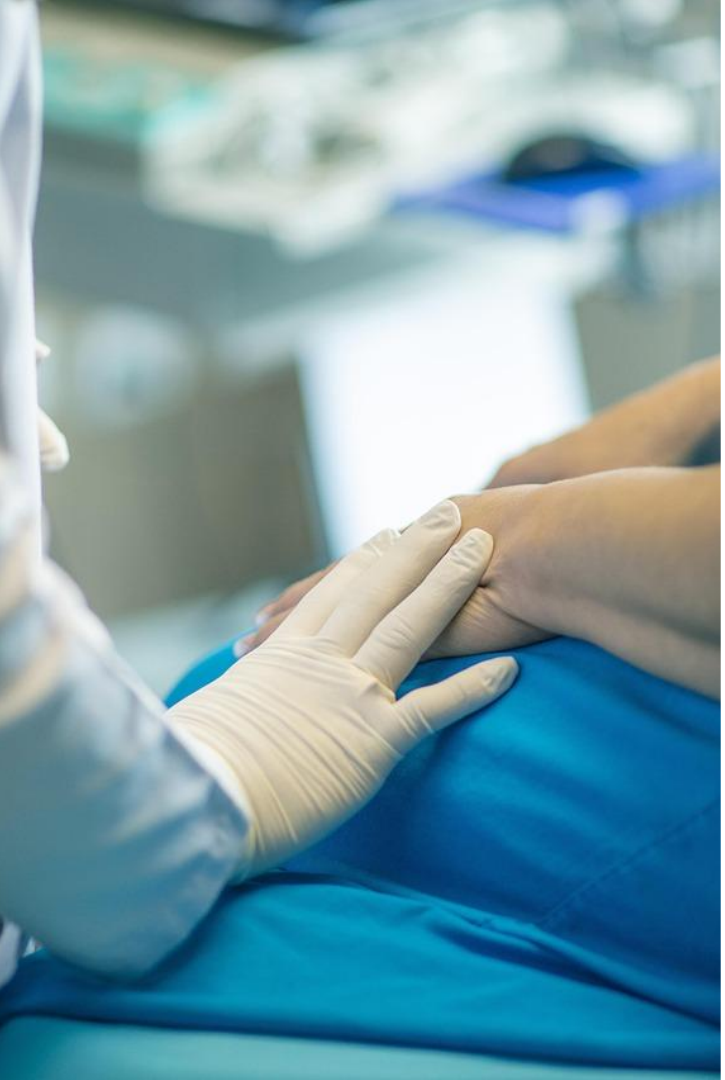
- Develop a model that can predict aspects of patient stay, including duration and risk of death
- By having a better understanding of patient needs, hospitals can plan for resource allocation
- This model will leverage patient information to make accurate predictions

General Objective

Develop Predictive Models capable of accurately predicting patient outcomes. Outcomes predicted will be length of stay, chance of readmission and risk of death. This will be provided through an analytics dashboard and a callable API.

Specific Objectives

- Dummy Hospital: Create a fake hospital with room, patient, and staff records
- Data preparation: Extract and join relevant information from multiple CSV files
- Model Accuracy: Set a baseline of 80% for a successful model
- Hospital Management System: Create a management suite for patient and staff management
- Deploy Model: Integrate the model into the management software



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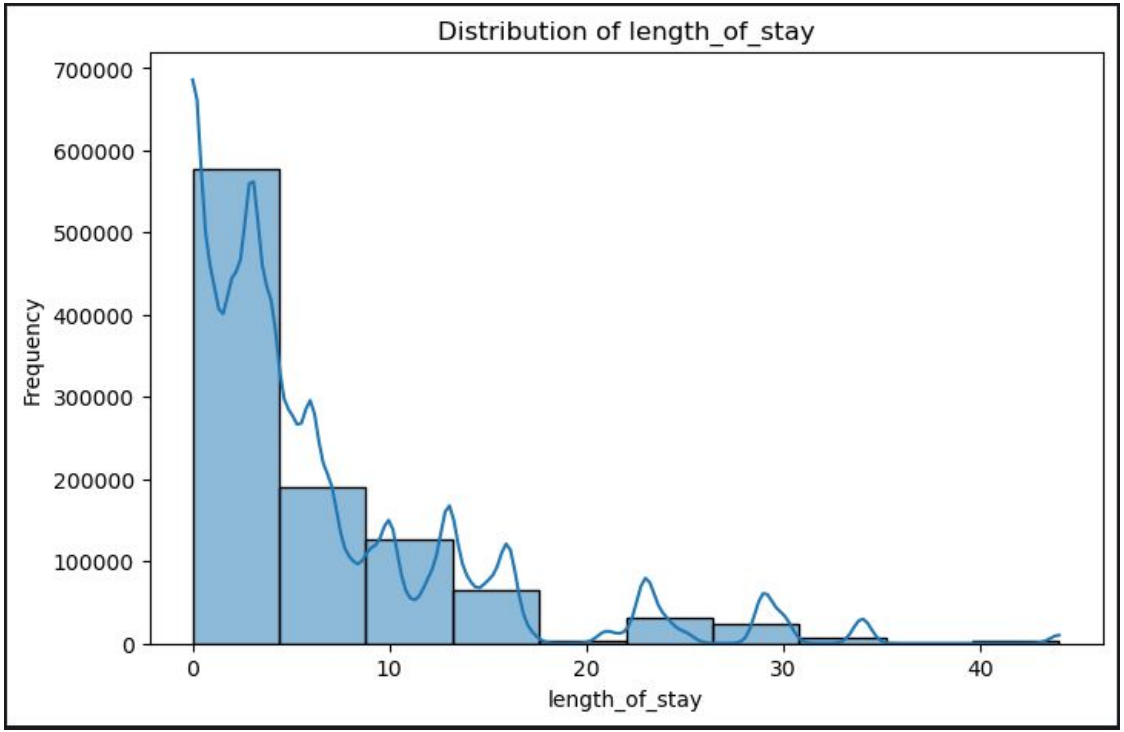
Data Sources

01 MIMIC-IV Clinical Database: Provides comprehensive clinical information on patients

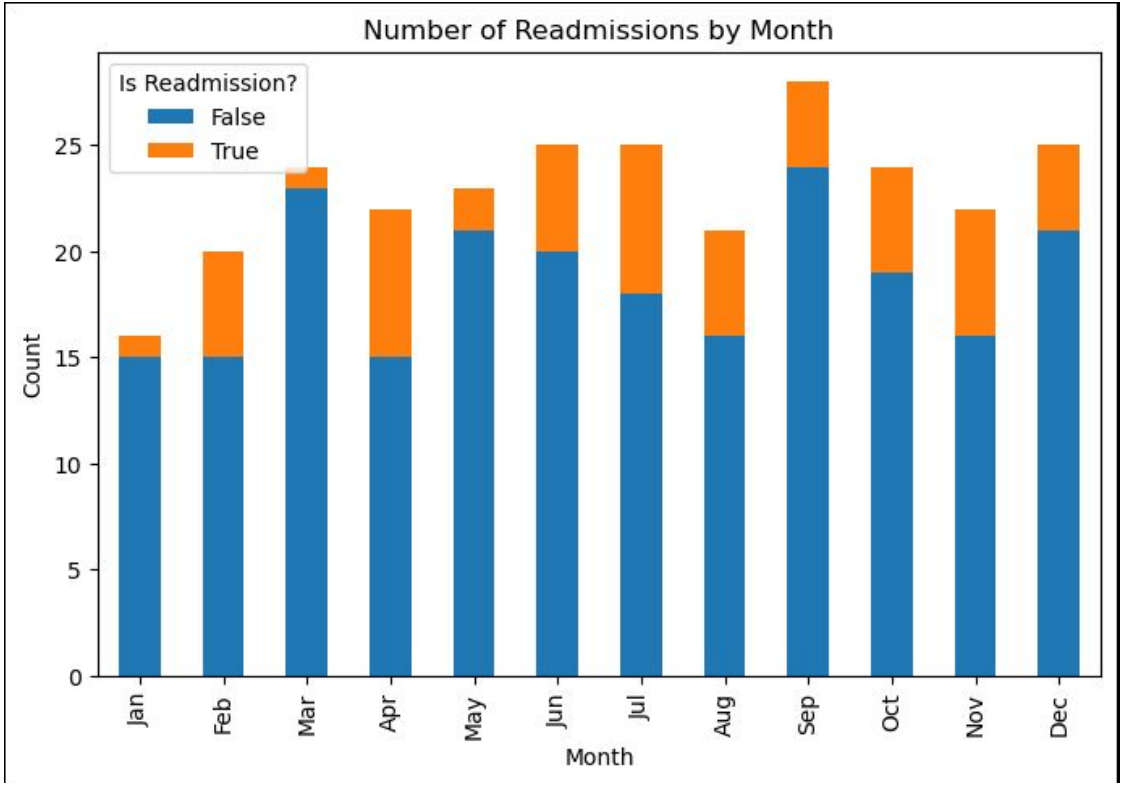
02 It contains data from patients admitted to Beth Israel Deaconess Medical Center

EDA Length of Stay Findings



On examining the distribution of the length of stay variable we found the vast majority of stays were 5 days or less.

EDA Readmission Findings



The readmission variable shows no discernible patterns in terms of seasonality or raw numbers.

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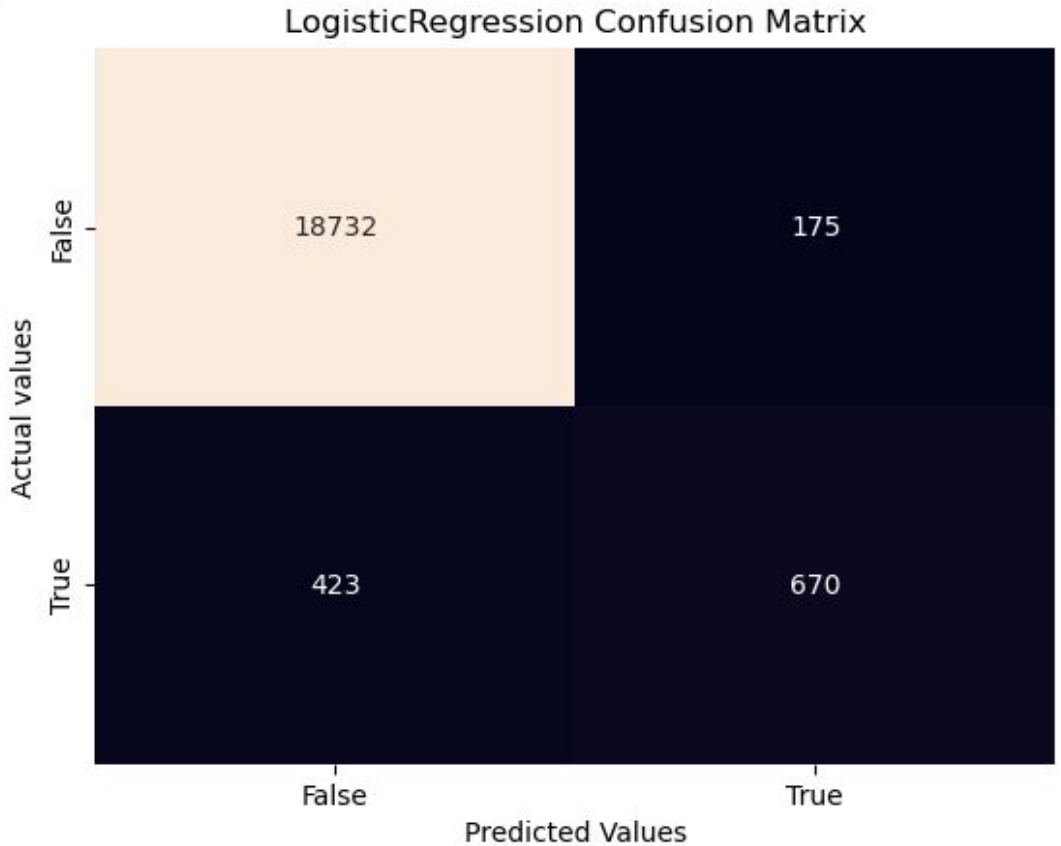
Models

- **Length of Stay**: Random Forest Regression Model that explains 78% of the variance in the target variable
- **Death Prediction**: Logistic Regression Model with 98% classification accuracy
- **Readmissions**: Random Forest Classifier with 84% accuracy

Readmission Model

The readmission model shows good accuracy in predicting the variable. Despite the class imbalance, it is still able to predict both classes well.

Death Model

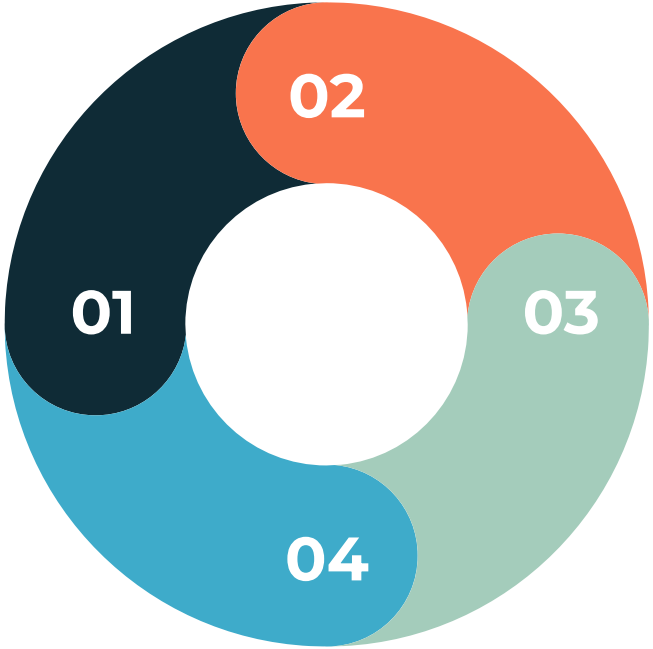


The death model was very accurate in its predictions showing 97% accuracy. Even with the class imbalance of the True class, it still performs well in all classifications.

Conclusion

The CHOP Model demonstrates the potential of predictive models in healthcare

Improves patient outcomes and optimizes resource allocation



Historical data provides actionable insights for informed decision-making

CHOP dashboard provides useful metrics for hospital administrators

Recommendations

- **Training data:** The models were trained on a small subset of the data (less than 1%). Using the full dataset would lead to even more accuracy on predictions.
- **Expanding Features:** Including additional features such as patient lifestyle factors to improve prediction accuracy.
- **Number of predictions:** More models can be trained to predict additional outcomes. This would give a more complete picture of the patient's stay.
- **Personnel training:** Administrators will have to be trained to use the system and showcase how it can be of help to their operations.

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Thank you for your time