

Healthcare Predictive Analysis

Using predictive modeling to reduce hospital readmissions for diabetic patients.

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Presenter Designation



Healthcare Predictive Analysis

1 Introduction & Problem Statement

Overview of the issues surrounding hospital readmissions.

2 Dataset Overview

Details about the dataset used for analysis.

3 Methodology: Data Cleaning & EDA

Steps taken for data cleaning and exploratory data analysis.

4 Machine Learning Models

Overview of the machine learning models utilized.

5 Results & Dashboard

Presentation of results and the dashboard created.

6 Conclusion & Future Work

Summary of findings and future research directions.

Reducing Diabetic Readmissions

1 High Readmission Rates

High readmission rates for diabetic patients place significant strain on healthcare systems, indicating a need for improved post-discharge care.

2 30-Day Readmissions

30-day readmissions serve as a critical metric, revealing gaps in patient care after discharge that require attention.

3 Predictive Modeling

Implementing predictive modeling can help identify patients at risk of readmission, enabling targeted interventions and support.

4 Data-Driven Interventions

Utilizing data-driven interventions can effectively reduce readmissions by addressing specific patient needs and improving care continuity.

5 Improved Patient Outcomes

By reducing readmissions, healthcare providers can enhance patient outcomes, leading to better health and recovery post-discharge.

6 Cost Reduction

Lowering readmission rates not only improves health but also helps in reducing overall healthcare costs, benefiting both providers and patients.

Data Cleaning & Preprocessing



Before Data Cleaning

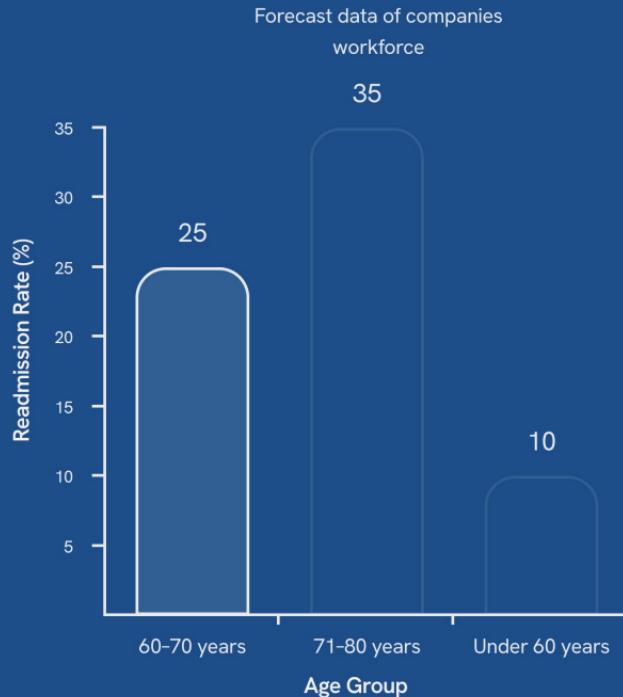
- Missing Values:** High incidence of missing lab results.
- Outliers:** Significant data anomalies detected.
- Cardinality:** Numerous unique values in categorical variables.



After Data Cleaning

- Missing Values:** Imputed using 'No Test' for lab results.
- Outliers:** Outliers removed or corrected.
- Cardinality:** Categorical variables encoded to 0/1.

Readmission Insights from EDA



35

Readmission rate for 71-80 years

Patients aged 71 to 80 years have a **readmission rate of 35%**, which is significantly higher than younger cohorts.

Patients undergoing more **lab procedures** tend to have **longer hospital stays**, highlighting a need for efficiency in lab processes.
Correlation with lab procedures

Longer stays with more labs



Model Performance Overview

Model	Accuracy
Random Forest	88.76% (Best)
XGBoost	88.03%
Neural Network	89% (without SMOTE)

Interactive Dashboard Insights



Readmission Risk

Analyzes readmission risk based on patient demographics, enabling targeted interventions for high-risk groups.



Lab Procedures Trends

Tracks trends in lab procedures and medication usage, helping to identify patterns that affect patient care.



Real-Time Predictions

Provides real-time predictions on patient outcomes, allowing healthcare professionals to make informed decisions swiftly.



Data-Driven Decisions

Empowers healthcare teams to leverage data for improving patient outcomes and reducing unnecessary readmissions.

Future of Healthcare Analytics

1

Impact of Predictive Models

Identified key risk factors such as **age** and **lab procedures** that contribute to hospital readmissions.

2

Proactive Patient Care

The model assists hospitals in implementing **proactive care** strategies to reduce readmission rates among diabetic patients.

3

Model Deployment

Next steps include deploying the model as a **vital hospital tool** to enhance patient management and care delivery.

4

Feature Expansion

Future developments will focus on including additional features like **socioeconomic data** to provide a more comprehensive analysis.

5

Data-Driven Decisions

Encourages hospitals to utilize **data-driven** decisions for improving overall healthcare outcomes and resource allocation.

6

Collaboration with IT

Plan for collaboration with IT departments to ensure smooth **integration** of the predictive model into existing hospital systems.

7

Patient-Centric Approach

Ultimately aims to adopt a more **patient-centric approach** in managing diabetic patients' health and reducing readmissions.

Acknowledgments and Thanks

Special thanks to our mentor and data sources for their support.





Questions & Feedback Welcome

Feel free to reach out for any inquiries or further discussions.