

MedEase

AI-Powered Prediction of Readmission Of Patients within hospitals

Presented by Group 8

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Problem Statement

- Hospital readmissions within 30 days of discharge pose significant challenges to healthcare systems, leading to increased costs and diminished patient outcomes.
- Accurately predicting which patients are at high risk of readmission is essential for implementing timely interventions.
- Traditional methods often fall short in identifying these patients effectively, necessitating advanced predictive models to enhance healthcare delivery and reduce unnecessary readmissions.

Motivation

- Reducing hospital readmissions is a critical objective for healthcare providers, as it directly impacts patient well-being and healthcare expenditures.
- By leveraging AI-powered predictive models, healthcare systems can proactively identify high-risk patients, allowing for targeted interventions that improve patient care and optimize resource utilization. Implementing such models aligns with broader goals of enhancing healthcare quality and efficiency.



Our Progress

01

We have conducted a thorough literature review, and seen the scope of this area

02

We have identified relevant datasets for our use case , and done some basic data preprocessing

03

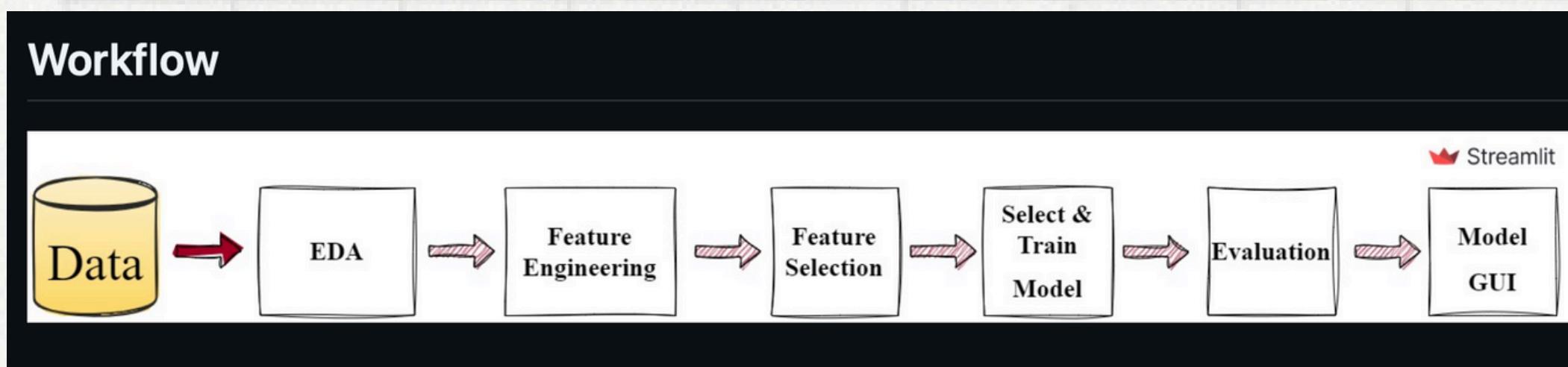
We are currently in the and feature selection and feature engineering stage and ML model development Stage

We are also making an interactive GUI using Streamlit

How does our data look like

Dataset Overview:

- **Source:** The dataset comprises de-identified patient records from 130 U.S. hospitals, collected over a period from 1999 to 2008.
- **Volume:** It includes over 100,000 records, each representing a unique hospital admission.
- **Features:** The dataset contains 50 attributes, encompassing:
- **Patient Demographics:** Age, gender, and race.
- **Admission Details:** Type of admission (emergency, urgent, elective), discharge disposition, and admission source.
- **Medical History:** Primary and secondary diagnoses, comorbidities, and number of previous hospitalizations.
- **Treatment Information:** Procedures performed, medications prescribed, and length of stay.
- **Outcome:** Indicator of readmission within 30 days.



1. Data Preprocessing: Clean and prepare the healthcare data, handling missing values, encoding categorical variables, and ensuring data quality and consistency.

3. Model Building: Develop a machine learning or statistical model capable of predicting the likelihood of hospital readmission within 30 days.

2. Feature Engineering: Create relevant features from the available data, including patient demographics, medical history, previous hospitalizations, and other clinically relevant factors.

4. Model Evaluation: Assess the performance of the predictive model using standard binary classification evaluation metrics such as accuracy, precision, recall, F1-score, ROC curve, and AUC.

5. Create an interactive GUI using Streamlit

Mind map

Future Steps

- Integrate patient-reported outcomes for personalized risk assessment.
- Combine EHR, wearable, and imaging data for multimodal insights.
- Explore new deep learning architectures for enhanced accuracy.
- Collaborate with clinicians for seamless integration into workflows.

Citations

- "Application of machine learning in predicting hospital readmissions: a scoping review of the literature"
Binns, D. (2021). BMC Medical Research Methodology, 21(1), 1–10.
(<https://doi.org/10.1186/s12874-021-01284-z>)
- "An Interpretable Deep-Learning Framework for Predicting Hospital Readmissions From Electronic Health Records"
Liu, J., et al. (2023). arXiv preprint arXiv:2310.10187.
(<https://doi.org/10.48550/arXiv.2310.10187>)