Project_3

Analyzing Patient Health Records to Identify Factors Influencing Hospital Readmission Rates

Project Overview

Hospital readmissions are a significant concern in healthcare, impacting patient outcomes and increasing healthcare costs. This project aims to analyse a diverse dataset of patient health records to identify factors that contribute to hospital readmissions. By leveraging Python's data analysis and visualization capabilities, we will uncover patterns and relationships between patient demographics, medical history, treatment plans, and readmission rates.

Objectives

1. Load the data into a Python environment using pandas.
2. Handle missing or inconsistent data entries, particularly in categorical variables like 'Race' and 'Gender'.
3. Convert categorical variables into appropriate formats for analysis.
4. Create a binary variable for readmission (e.g., 1 for readmitted within 30 days, 0 otherwise).
5. **Demographic Analysis:**
    - Analyze the distribution of patients across different age groups, genders, and races.
    - Examine the relationship between demographics and readmission rates.
6. **Clinical Analysis:**
    - Investigate the impact of the number of lab procedures, medications, and diagnoses on readmission.
    - Analyze the effect of specific treatments or medication changes on patient outcomes.
7. **Admission Analysis:**
    - Assess how admission types and discharge dispositions correlate with readmission rates.
    - Evaluate the length of hospital stay in relation to readmission.
8. **Data Visualization:**
    - Visualize distributions of demographic and clinical variables.
    - Develop plots to compare numerical variables across readmission statuses.
    - Display correlations between various factors and readmission rates.
    - Generate plots to identify potential patterns or outliers in the data.
9. **Impact of HbA1c Testing on Readmission Rates:**
    - Evaluate how performing an HbA1c test during hospitalization influences 30-day readmission rates.
10. **Influence of Discharge Disposition on Patient Outcomes:**
    - Analyze how different discharge dispositions affect the likelihood of 30-day readmissions.
11. **Effect of Time in Hospital on Medication Changes and Readmission:**
    - Investigate the relationship between the length of hospital stay, changes in medication during the stay, and subsequent readmissions.

12. **Association Between Number of Diagnoses and Readmission Likelihood:**
    - Examine how the total number of diagnoses impacts the probability of a patient being readmitted within 30 days.
13. **Role of Medical Specialty in Patient Readmission:**
    - Investigate whether the specialty of the attending physician influences 30-day readmission rates.
14. **Correlation Between Laboratory Procedures and Readmission:**
    - Assess how the number of laboratory procedures conducted during a hospital stay relates to the likelihood of readmission.
15. **Impact of Emergency Visits on Subsequent Readmissions:**
    - Analyze how the number of emergency visits in the year prior to hospitalization affects 30-day readmission rates.
16. **Effect of Age and Gender on Treatment Outcomes:**
    - Explore how age and gender influence treatment outcomes and readmission rates.
17. **Insights and Recommendations:**
    - Summarize key findings from the analysis, highlighting significant predictors of hospital readmission.
    - Provide actionable recommendations for healthcare providers to reduce readmission rates, such as targeted interventions for high-risk groups or adjustments in treatment protocols.
    - Suggest areas for further research, like exploring the impact of social determinants on readmission or developing predictive models for readmission risk.