Project Report: Healthcare Appointment No-Show Prediction

Introduction

In healthcare systems, missed appointments disrupt clinical workflows and reduce service efficiency. This project focuses on predicting whether patients will miss their appointments using historical data, with the aim of improving appointment scheduling and resource utilization.

Abstract

This project addresses the challenge of medical appointment no-shows by building a machine learning model to forecast patient attendance. The model is trained using features such as SMS reminders, patient age, and appointment day. Alongside model development, the project also includes a Power BI dashboard to deliver actionable insights and support scheduling optimization strategies.

Tools Used

- Python (pandas, scikit-learn)
- Power BI (for interactive visualizations)
- Jupyter Notebook

Steps Involved in Building the Project

1. Data Import & Cleaning
- Loaded appointment data from Kaggle
- Cleaned column names, handled missing values, and corrected data types

2. Exploratory Analysis
- Identified key trends such as higher no-show rates among younger patients
- Analyzed the effect of SMS reminders and day of the week on attendance

3. Model Training
- Built and trained a Decision Tree classifier using scikit-learn
- Evaluated model using accuracy and confusion matrix

Project Report: Healthcare Appointment No-Show Prediction

4. Dashboard Creation

- Designed Power BI dashboards highlighting trends, no-show patterns, and recommendations
- Visualized metrics like attendance rate by age, weekday, and SMS reminder status

5. Recommendations

- Suggested targeted SMS reminders and rescheduling strategies for high-risk no-show patients

Conclusion

The model achieved a solid performance in predicting appointment no-shows and was further enhanced through Power BI dashboards that provide valuable insights for healthcare administrators. Implementing these tools can improve scheduling efficiency and reduce missed appointments.

Deliverables

- Predictive Decision Tree Model
- Interactive Power BI Insight Dashboard
- Optimization Recommendations Report