Healthcare Appointment No-Show Prediction
(Project Report)

Introduction
This project aims to analyze patient appointment data and build a prediction model to determine whether a patient is likely to miss their scheduled healthcare appointment. Missed appointments cause wasted resources, increased waiting times, and reduced efficiency in hospitals. This project combines Python-based machine learning with Power BI visualization to provide insights into factors influencing no-shows.

Abstract
The Healthcare Appointment No-Show Prediction project focuses on using machine learning techniques to classify whether a patient will attend their medical appointment. The dataset includes patient details such as age, gender, appointment day, waiting time, SMS reminders, and more. A Decision Tree Classifier was used to train the model in Python. Power BI was utilized to build an interactive dashboard that helps healthcare providers better understand no-show patterns. The project demonstrates the practical use of analytics in improving medical scheduling efficiency.

Tools Used
1. **Python** – Data cleaning, preprocessing, and machine learning model development.

2. **Pandas & NumPy** – Handling and transforming dataset.

3. **Matplotlib** – Visualization in Python.

4. **Scikit-Learn** – Building the Decision Tree Classifier model.

5. **Power BI** – Dashboard creation, slicers, charts, and KPIs.

6. **VS Code** – Code development environment.

7. **Git & GitHub** – Version control and project hosting.

Steps Involved in Building the Project
1. **Data Collection** – Collected the appointment dataset with patient information.

2. **Data Cleaning** – Removed missing values, corrected data types, and handled inconsistencies.

3. **Feature Engineering** – Calculated waiting time, encoded categorical values, and selected important features.

4. **Model Development** – Built a Decision Tree Classifier to predict no-show behavior.

5. **Model Evaluation** – Tested using accuracy score and classification report.

6. **Dashboard Creation** – Used Power BI to create interactive charts, KPIs, slicers, and filters.

7. **Insights Generation** – Identified key factors like age, waiting days, and SMS reminders influencing no-shows.

8. **Project Deployment** – Uploaded the complete project to GitHub.

Conclusion

This project successfully demonstrates how machine learning and data visualization can help healthcare centers predict appointment attendance and optimize scheduling. The Decision Tree model helps identify important features that influence no-shows, while the Power BI dashboard provides a clear visual summary for decision-making. This system can significantly improve resource management and patient care efficiency.

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