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**HEALTHCARE APPOINTMENT NO-SHOW PREDICTION AND OPTIMAL RECOMMENDATIONS :**

## **INTRODUCTION:**

Missing healthcare appointments gives burden to medical systems ,water resources and healthcare delay. So to address this issue, this project aims to build a predictive model that forecasts whether a patient will attend the medical appointment and using business intelligence tools to identify patterns and suggest scheduling strategies.

## **ABSTRACT:**

This project uses data cleaning and data visualization to predict and analyze patient appointment no-shows. A decision tree classifier was developed using python sklearn to identify patterns based on variables such as age , gender, sms received and day of the week . The outcome are visualised in power BI to understand the trends and support healthcare providers in minimizing no-shows through data-driven recommendations.

## **TOOLS USED:**

**PYTHON:** Data preprocessing, Training and Testing the model(Scikitlearn, Pandas, NumPy, Matplotlib)

**Power BI :** Data Visualization, dashboarding, visual analytics

**JUPYTER NOTEBOOK:** Exploratory data analysis

**CSV:** Data storage and formatting

**Word:** Final interpretations of data visualization

## **STEPS INVOLVED:**

### **1. Data Collection & Cleaning**

- Loaded medical appointment dataset
- Handled missing/null values
- Encoded categorical variables (e.g., gender: 0 = Female, 1 = Male)
- Renamed no-show column to actual

## **2. Feature Engineering**

- Created age bins (e.g., 0–18, 19–30, etc.)
- Derived binary actual (yes → 1, no → 0)
- Created derived columns like PredictionResult for model evaluation

## **3. Model Building (Python)**

- Used a Decision Tree Classifier
- Split data into train-test sets
- Evaluated using accuracy, precision, recall, confusion matrix

## **4. Power BI Dashboard Creation**

- Imported cleaned dataset
- Built visuals:
  - Bar charts (no-show by gender, age group)
  - Pie chart (no-show distribution)
  - Heatmaps (weekday vs no-shows)
  - Slicers and filters for interactivity

## **5. Insight Extraction & Optimization Recommendations**

- Identified key trends:
  - Young adults and Mondays had higher no-show rates
  - SMS reminders helped moderately
- Proposed operational strategies (e.g., targeted reminders, overbooking)

## **CONCLUSION:**

This project successfully predicted patient no-shows using a decision tree classifier and visualized insights through Power BI. The combination of machine learning and business intelligence enables healthcare providers to take proactive steps toward reducing no-show rates, optimizing appointment slots, and improving patient care efficiency.