🩺 Glucose Guard – Diabetes Risk Prediction Web App

Glucose Guard is a machine learning-based healthcare application designed to predict the risk of type 2 diabetes using patient health metrics.
This project was developed using Python, Streamlit, and scikit-learn as part of a graduation project for the DEPI 'Digital Egypt Pioneers Initiative' supported by the MCIT 'Ministry of Communications and Information Technology'.

📌 Project Overview

This project leverages real-world diabetes data and machine learning algorithms to:

- Perform data exploration and visualization.
- Build and evaluate prediction models.
- Deploy an interactive web app for real-time diabetes risk prediction.

The app provides doctors and users with an intuitive interface to input patient data and receive instant feedback with visual analytics.

🚀 App Features

- Developed using **Streamlit** for real-time prediction.
- Trained with **Random Forest** and other ML models.
- Input data includes age, BMI, HbA1c, glucose level, comorbidities, etc.
- Live prediction with probability and confidence metrics.
- Feature importance visualization using Plotly.
- Downloadable prediction report.

📂 Repository Structure

```
📂 project/
│
├── app.py                          # Streamlit web app
├── Diabetes Dataset Eda.ipynb      # EDA notebook (Exploratory Data Analysis)
├── Diabetes Dataset Prediction-1.ipynb  # ML modeling notebook
├── diabetes_dataset.csv            # Original dataset
├── Diabetes_model.pkl              # Trained Random Forest model
├── scaler.pkl                      # Preprocessing scaler
├── selector.pkl                    # Feature selector
├── requirements.txt                # Python dependencies
```

💡 How to Run the App

1. **Install dependencies**:

```
pip install -r requirements.txt
```

2. **Run the Streamlit app**:

```
streamlit run app.py
```

3. **Open in browser**:

Go to http://localhost:8501

🧪 Sample Inputs Used in the App

- Age
- BMI
- HbA1c Level
- Blood Glucose Level
- Gender
- Race
- Hypertension / Heart Disease
- Location Frequency
- Derived metrics: Age * BMI, Comorbidity Count

🛠️ Technologies Used

- Python
- Streamlit
- scikit-learn
- pandas, numpy
- Plotly
- Joblib

👥 Team Members

- Esraa Mostafa El Tohamy
- Abanoup Emad Masry
- Alaa El Said El Hadidy
- Ahmed Osama El Ghareeb