**SugarSense: Diabetes Prediction System**

**Machine Learning Application for Diabetes Risk Prediction**

SugarSense is an intelligent web application that empowers users to assess their diabetes risk (diabetic, prediabetic, or non-diabetic) and receive culturally tailored Indian meal and fitness recommendations. With the integration of AI-driven chat and voice interfaces, SugarSense provides a holistic digital health experience.

**Overview**

In this project, we:

* Predict diabetes status using a machine learning model trained on clinical and behavioral data.
* Generate weekly Indian meal plans and fitness routines tailored to user profiles.
* Integrate text-based and voice-based AI assistants for seamless user interaction.
* Enable user account management and personalized settings.
* Provide downloadable health reports summarizing prediction, diet, and fitness plans.

**Key Features**

**Diabetes Prediction**

* Accepts user inputs: gender, age, BMI, cholesterol, blood pressure, physical/mental health indicators, and more.
* Predicts whether a user is Diabetic, Prediabetic, or Non-Diabetic.
* Uses pre-trained machine learning models for accurate classification.
* Prediction results stored in predict.db.

**Personalized Indian Meal Planning**

* Tailored to age, BMI, gender, and dietary preference (veg/non-veg).
* Weekly plan includes breakfast, lunch, and dinner for each day.
* Incorporates user prediction result into dietary customization.
* Plans stored in meal.db.

**Exercise Recommendations**

* Personalized workout plan based on user's age, BMI, and gender.
* Categories include workout type, duration, and frequency.
* Pulled from exercise.db.

**Chatbot Support**

* AI-based text assistant to answer questions, guide users, and provide health insights.
* Integrates with backend services and database queries.
* Built using Chatbase API.

**Vihaan – Voice Assistant**

* Built using ElevenLabs API.
* Accepts voice commands to run predictions, generate plans, or answer queries.
* Enhances accessibility and user experience.

**PDF Health Report**

* Combines all user data into a comprehensive downloadable report.
* Includes prediction result, personalized meal plan, and exercise plan.
* Generated dynamically and downloadable via the user dashboard.

**User Dashboard & Settings**

* Users can:
  + Edit username/email
  + Change password (securely hashed)
  + View the history of predictions, meals, and workouts
  + Download report.
  + Provide feedback or contact support

**Objectives**

* Enable early prediction and awareness of diabetes conditions.
* Deliver proactive healthcare solutions for diabetes management.
* Empower users with actionable health plans tailored to Indian culture.
* Utilize AI (chat + voice) for accessible and intelligent support.
* Provide transparency and interpretability through downloadable reports.

**Methodology**

1. **User Data Collection**
   * Inputs collected during registration and health prediction.
2. **ML-Based Prediction**
   * Model trained on structured health data to classify users as diabetic, prediabetic, or non-diabetic.
3. **Meal & Exercise Recommendation System**
   * Meal plans generated using API + rules based on demographics and health status.
   * Exercise plans queried from the exercise database.
4. **Chatbot and Voice AI**
   * Chatbot responds to natural language queries.
   * Voice assistant executes key functions using speech commands.
5. **Report Generator**
   * Collates prediction, diet, and fitness data into a well-formatted PDF.

**Database Schema**

**users.db**

* Stores: id, username, email, password, timezone, created\_at

**predict.db**

* Stores prediction input features and result:
  + user\_id, age, bmi, highbp, cholcheck, smoker, etc.
  + prediction result

**meal.db**

* Meal plan per user per day:
  + user\_id, day, breakfast, lunch, dinner, timestamp

**exercise.db**

* Personalized fitness plans:
  + user\_id, workout\_type, frequency, duration, exercises, timestamp

**feedback.db**

* User-submitted feedback:
  + user\_id, feedback

**site.db**

* Contact messages from users:
  + user\_id, name, email, message, timestamp

**Project Structure**

SugarSense/

├── app.py # Main Flask application

├── static/ # Static assets (CSS, JS, Images)

├── templates/ # HTML templates

├── database/ # DB initialization and schema setup

├── users.db # User information

├── predict.db #Diabetes predictions

├── meal.db # Meal plans

├── exercise.db # Fitness plans

├── feedback.db #Feedback

├── site.db #Contact us

├── requirements.txt # Python dependencies

└── README.md # Project documentation

**Getting Started**

**Prerequisites**

* Python 3.8 +
* Install dependencies:

pip install -r requirements.txt

**Usage**

1. **Clone the repository**

git clone <https://github.com/your-username/SugarSense.git>

1. **Navigate to the project directory**

cd SugarSense

1. **Run the Flask app**

python app.py

**Contributing**

We welcome contributions! Please follow the steps below:

1. Fork the repository.
2. Create a new branch:

git checkout -b feature-branch

1. Commit your changes:

git commit -m "Add new feature"

1. Push to your branch:

git push origin feature-branch

1. Submit a pull request.

**License**

This project is licensed under the MIT License.

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* chatbase for AI Chatbot
* [ElevenLabs](https://www.elevenlabs.io/) for voice assistant
* [SQLite](https://www.sqlite.org/index.html) for database support
* All open-source contributors

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