**🥗 Diet Recommendation System — Project Overview**

**🌟 Aim / Purpose of the Project**

The goal of this project is to build a **personalized diet recommendation system** based on an individual’s health metrics, lifestyle, and dietary constraints. By analyzing patient data, the system aims to:

* Recommend appropriate **diet plans** tailored to disease type, BMI, age, activity level, etc.
* Identify patterns and correlations between **health conditions** and **lifestyle factors** (e.g., caloric intake, physical activity).
* Provide **data-driven insights** to improve long-term health outcomes and adherence to nutrition plans.

The end goal is to create a model that can predict or recommend suitable diet plans using machine learning — based on user input.

**✅ What We've Done So Far**

1. **Dataset Selection**
   * Downloaded a rich, medical-lifestyle dataset from Kaggle (1000 rows, clean structure).
   * Columns include: Age, Gender, BMI, Disease\_Type, Severity, Caloric Intake, Activity Level, Dietary\_Restrictions, and Diet\_Recommendation.
2. **Initial Preprocessing**
   * Checked for missing values; fields like Disease\_Type, Dietary\_Restrictions, and Allergies had nulls — assumed missing info means “none”.
   * Cleaned the dataset and filled nulls accordingly.
3. **Exploratory Data Analysis (EDA)**
   * Explored relationships between **BMI and Disease Type**, color-coded by Severity.
   * Analyzed feature importance and considered health → behavior → disease pathways:
     + Hypothesis 1: Factors like Caloric Intake, Activity Level, etc. → abnormal BMI → Disease.
     + Hypothesis 2: Lifestyle → biometrics (Cholesterol, BP, Glucose) → Disease → Diet Recommendation.
4. **Plotted Key Visuals**
   * Boxplots and stripplots for **BMI vs Disease Type**, split by **Severity** and **Gender**.
   * Derived insights like overlapping BMI ranges across severities — implying multivariate dependencies.

**🚀 Where We’re Heading**

1. **Deep Dive into Relationships**
   * Continue visualizing relationships between Age, Activity Level, Caloric Intake, Cholesterol, etc. against Disease\_Type, Severity, and BMI.
2. **Label Encoding / Feature Engineering**
   * Prepare data for ML: convert categorical variables (e.g., Gender, Disease\_Type, Preferred\_Cuisine) into numerical formats.
3. **Build Predictive Models**
   * Create baseline classifiers for predicting Diet\_Recommendation (e.g., Decision Trees, Random Forests, or XGBoost).
   * Compare performance metrics like accuracy, F1-score, and interpret feature importance.
4. **Integrate Personalization Logic**
   * Consider adding logic for:
     + Dietary restrictions
     + Allergies
     + Cuisine preferences
     + Exercise commitment
5. **Stretch Goal: Web App / Dashboard**
   * (Optional) Build a basic UI that allows users to input their health data and get diet recommendations dynamically.