Data Acquisition & Preprocessing

Flutter Camera Package

Image Picker | **Google ML Kit**

Data Acquisition & Preprocessing
- Users scan a food label or take a picture of a dish.
- The image is processed using OCR (Optical Character Recognition) to extract text from labels or AI-based food detection for dishes.

Image Picker

Feature Extraction

Tesseract OCR | **OpenCV**

Pandas | **NumPy**

Feature Extraction
- Extract ingredient lists, nutritional values, and allergens from labels.
- For dishes, identify food components and estimate caloric content using a deep learning model.

AI-Powered Analysis

Google Gemini API

Flask | **TensorFlow**

AI-Powered Analysis
- Uses Google Gemini APIand machine learning models to: Identify macronutrients (carbs, proteins, fats).
- Provide dietary recommendations based on nutritional content.
- Applies loss functions, activation functions, and optimization algorithms for accurate classification.

Storage & Tracking

Django REST Framework | **Seaborn**

SQLite | **Matplotlib**

Storage & Tracking
- Saves user data for meal history and nutrition tracking.
- Users can track daily intake, trends, and deficiencies.

Performance Evaluation

TensorBoard | **SciPy**

Google Analytics

Performance Evaluation
Uses performance metrics, sample databases, and user feedback to improve accuracy. Compares predicted vs. actual intake for better caloric and nutrient estimation.

Nutrify follows a structured flow: User scans food, AI extracts nutritional data, Google Gemini API analyzes, insights are stored & tracked, AI provides recommendations, and system improves via feedback.