AI-Powered Nutrition Analyzer For Fitness Enthusiasts

Milestone 1: Project Initialization and Planning Phase

Fitness-conscious individuals often struggle to monitor nutritional intake accurately. Manual logging is error-prone and time-consuming. This project proposes an Al-powered nutrition analyzer that identifies food items from images and predicts their nutritional content using transfer learning and a nutrition database. It enables real-time, image-based food logging and calorie tracking to support fitness goals and dietary plans

Activity 1: Define Problem Statement

A fitness enthusiast aims to track and monitor daily nutritional intake accurately and efficiently. However, manual food logging proves time-consuming and often inaccurate due to forgotten entries or incorrect data. The lack of tools to analyze food from images leads to frustration, demotivation, and uncertainty about staying on track with the fitness and diet plan.

Activity 2: Project Proposal (Proposed Solution)

The proposed project, "AI-Powered Nutrition Analyzer for Fitness Enthusiasts," aims to leverage machine learning and computer vision to accurately assess and track nutritional intake from food images. Utilizing a rich dataset of food types, portion sizes, and nutritional values, the project intends to develop a predictive model that automates diet logging and nutritional analysis. This initiative aligns with the goal of empowering fitness enthusiasts by reducing manual effort, minimizing errors, and providing personalized dietary insights—ultimately enhancing health outcomes, user engagement, and adherence to fitness plans.

Activity 3: Initial Project Planning

Initial Project Planning for the AI-Powered Nutrition Analyzer focuses on outlining key objectives, defining the project scope, and identifying primary users such as fitness enthusiasts and diet-conscious individuals. This phase includes setting timelines, allocating resources, and formulating a strategic approach for integrating machine learning and image recognition. The team also gains a clear understanding of the food image dataset, defines analysis goals, and maps out the data processing workflow. Effective initial planning ensures a structured and efficient development process, paving the way for accurate nutritional tracking and enhanced user experience.

Milestone 2: Data Collection and Preprocessing Phase

The Data Collection and Preprocessing Phase involves executing a plan to gather a comprehensive food image dataset through skillWallet, ensuring data quality through verification and consistency checks. Preprocessing tasks include image resizing, normalization, augmentation, and labeling to prepare the data for accurate nutritional

analysis. This phase is essential for building a robust foundation for exploratory analysis and the development of effective machine learning models.

Activity 1: Data Collection Plan, Raw Data Sources Identified, Data Quality Report

The dataset for **"AI-Powered Nutrition Analyzer for Fitness Enthusiasts"** is sourced from SkillWallet. It includes a wide variety of food categories along with corresponding nutritional values. Data quality is ensured through thorough validation, image-label consistency checks, and adherence to ethical guidelines, establishing a reliable foundation for accurate nutritional prediction and analysis.

Activity 2: Data Quality Report

The Data Quality Report Template will summarize data quality issues from the selected source, including severity levels and resolution plans. It will aid in systematically identifying and rectifying data discrepancies.

Activity 3: Data Exploration and Preprocessing

The images will be preprocessed by resizing, normalizing, augmenting, denoising, adjusting contrast, detecting edges, converting color space, cropping, batch normalizing, and whitening data. These steps will enhance data quality, promote model generalization, and improve convergence during neural network training, ensuring robust and efficient performance across various computer vision tasks.

Milestone 3: Model Development Phase

The Model Development Phase entails building a predictive model for nutritional analysis based on food images. It involves strategic feature extraction, evaluating and selecting suitable models (such as CNN, MobileNetV2, and VGG16), initiating model training, and rigorously validating performance. This phase ensures accurate recognition of food items and estimation of nutritional values, enabling reliable and automated dietary tracking for fitness enthusiasts.

Activity 1: Model Selection Report

In the model selection report for future deep learning and computer vision projects, various architectures, such as CNNs or RNNs, will be evaluated. Factors such as performance, complexity, and computational requirements will be considered to determine the most suitable model for the task at hand.

Activity 2: Initial Model Training Code, Model Validation and Evaluation Report

The initial model training code will be showcased in the future through a screenshot. The model validation and evaluation report will include a summary and training and validation performance metrics for multiple models, presented through respective screenshots.

Milestone 4: Model Optimization and Tuning Phase

The Model Optimization and Tuning Phase involves refining deep learning models to achieve optimal performance in food recognition and nutritional analysis. This includes implementing

optimized model code, fine-tuning hyperparameters such as learning rate, dropout, and dense units, and comparing performance metrics across models. The final model is selected based on its accuracy, efficiency, and ability to generalize well, ensuring reliable results for end users.

Activity 1: Hyperparameter Tuning Documentation And Final Model Selection Justification

The Model Optimization and Tuning Phase involves refining neural network models for peak performance. It includes optimized model code, fine-tuning hyperparameters, comparing performance metrics, and justifying the final model selection for enhanced predictive accuracy and efficiency.