**GLYCOSNAP PROJECT ROADMAP**

**Project Overview**

GlycoSnap is a food recognition application that utilizes a pretrained YOLOv8 model for detecting and identifying various food items. The goal is to estimate portion sizes and glycemic load based on recognized foods, assisting users in making informed dietary choices.

**Phases and Timeline**

**Phase 1: Research & Planning (Week 1-2)**

* Define feature requirements:
  + Depth estimation integration.
  + Expanded food dataset coverage.
  + Meal Plan system.
  + Educational Chatbot.
* Investigate suitable models, datasets, and APIs for each feature.

**Phase 2: Dataset Collection & Annotation (Week 3-6)**

* Expand dataset by adding new food categories (e.g., region-specific dishes).
* Label and annotate new images (bounding boxes, segmentation masks, depth calibration data).
* Set up a structured repository for data storage and processing.

**Phase 3: Model Development & Training (Week 7-10)**

* **Depth Estimation Model Integration:**
  + Select and integrate a depth estimation model (e.g., MiDaS, DPT).
  + Incorporate into a test environment and validate against real-world data.
* **YOLOv8 Model Training:**
  + Incorporate new annotated data.
  + Perform hyperparameter tuning and evaluate model performance.
  + Integrate depth-based portion size estimation.
* **Glycemic Load Calculation:**
  + Merge portion estimation with nutritional data.

**Phase 4: Backend & API Development (Week 11-13)**

* Develop API endpoints to handle food recognition, depth estimation, and glycemic load calculations.
* Integrate with meal planning and chatbot components.

**Phase 5: Frontend Development (Week 14-16)**

* Develop user interface for food recognition, meal planning, and chatbot interactions.

**Phase 6: Testing & Debugging (Week 17-19)**

* Conduct unit, integration, and end-to-end testing.
* Validate features like depth estimation and chatbot responses.
* Gather user feedback for iterative improvements.

**Phase 7: Deployment & Finalization (Week 20-22)**

* Deploy the application to cloud services.
* Optimize performance and ensure compliance with security/privacy standards.
* Prepare documentation and user guides.

**Phase 8: Maintenance & Future Enhancements (Ongoing)**

* Monitor analytics to track feature usage.
* Implement user feedback and feature expansions.
* Explore advanced AI-driven personalization.

**Key Challenges & Mitigation Strategies:**

* **Portion Size Estimation:** Explore machine learning approaches or external tools to enhance accuracy.
* **Dataset Limitations:** Continuously expand and refine dataset through user contributions.
* **Model Performance:** Regularly retrain and fine-tune the model.

**Expected Outcome:**

* A functional food recognition system with glycemic load estimation.
* Integrated features like meal planning and a chatbot.
* A user-friendly platform for dietary management.

**Future Enhancements:**

* Support for barcode-based food recognition.
* Advanced meal recommendation algorithms.
* Expansion of dataset for improved recognition accuracy

**Conclusion:**

This roadmap outlines the structured development of GlycoSnap, incorporating AI-driven food recognition, depth estimation, and user-centric features. By following this approach, we aim to create a robust dietary management tool.