Project planning

Project Planning: AI/ML for Rotten Fruits and Vegetables Detection

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1. Project Title

AI/ML-Based Detection and Classification of Rotten Fruits and Vegetables

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2. Objective

Develop an automated system using Artificial Intelligence and Machine Learning to detect and classify fruits and vegetables as fresh or rotten to reduce post-harvest losses, ensure food safety, and improve supply chain quality control.

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3. Scope of the Project

- Image-based classification of produce
- Real-time or batch processing
- Web or mobile interface for uploading and detecting rot
- Applicable for use in farms, warehouses, markets, and stores

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4. Key Deliverables

Phase	Deliverable
Requirement Analysis	SRS Document, Use Case Diagram

Dataset Preparation	Curated and labeled image dataset
Model Development	Trained ML/DL model with performance report
UI Development	Web or Mobile Interface
Deployment	Hosted model API / application
Testing & UAT	UAT Report, Bug List, Final Model Accuracy

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5. Project Timeline (Gantt Overview)

Week	Task
1	Problem Definition & Requirements
2	Dataset Collection & Labeling
3-4	Data Preprocessing & Augmentation
5-6	Model Development & Training
7	Model Testing & Optimization
8	UI/UX Interface Design
9	System Integration
10	Deployment & Final Testing

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6. Resources Required

- Software: Python, TensorFlow/PyTorch, OpenCV, Flask
- Hardware: GPU-enabled system or cloud (Colab, AWS, Azure)
- Team Roles:
    - Data Scientist / ML Engineer
    - UI/UX Developer
    - Backend Developer
    - Project Manager
- Tools: Jupyter, Git, Trello/Jira, Google Drive

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7. Risk Management

Risk	Mitigation Strategy
Poor dataset quality	Data cleaning and augmentation
Overfitting	Use validation and regularization
Model performance not satisfactory	Try alternate models or more data
User rejection	Include users in UAT for feedback

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8. Evaluation Metrics

- Accuracy – Model's classification success

- Precision & Recall – How well it detects true rots
- F1 Score – Overall model balance
- Latency – Time to make a prediction
- User Feedback – UAT satisfaction level

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9. Expected Outcomes

- An end-to-end working prototype that:
    - Accepts produce images
    - Detects rotten vs. fresh produce
    - Offers visual and textual results
- Accuracy target: >90%
- Reduced inspection time and spoilage loss

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10. Future Enhancements

- Add object detection (localize rot spots)
- Multi-class classification (mild, medium, fully rotten)
- Multilingual interface
- Integrate with farm equipment or IoT sensors