

ALETHEIA

Symbolizing accurate fruit quality detection

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General Description

Manual fruit inspections are slow and inconsistent, leading to quality issues in exports. An AI-driven system can automate defect detection, ripeness assessment, and quality classification to ensure compliance with export standards.

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Objective

Create an AI-based solution for real-time fruit quality checks, integrating seamlessly with packing lines to improve accuracy and efficiency.



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Proposed Solution

AI-based system for real-time fruit quality checks.

Integration of hardware (ESP32, sensors) and AI tools (YOLOv8, TensorFlow).

Parameters analyzed: size, shape, color, weight, volume, temperature.



System Architecture

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Sensors capture physical data (weight, temperature, size).

Cameras with computer vision detect visual parameters (shape, color).

YOLOv8 identifies and classifies fruits; TensorFlow evaluates ripeness and defects.

Backend (FastAPI/Flask) processes data; React-based dashboard displays results.



Benefits of the Solution

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Accuracy: High precision in defect detection and classification.

Efficiency: Faster inspections compared to manual methods.

Scalability: Handles batch and individual fruit processing effectively.



Reducing Wastage

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Early detection of defects prevents damaged fruits from entering the supply chain.

Example: Identifying overripe or defective mangoes before packaging¹².

Sorting fruits into export-grade and local-market categories minimizes rejection rates³.

AI-driven grading ensures optimal use of resources by reducing human error and avoiding unnecessary discards⁴.

Real-time monitoring enables better inventory management, preventing spoilage during storage or transport³.



Expected Outcomes

Enhanced quality control ensures compliance with export standards.

Reduced rejection rates improve profitability for growers and exporters.

Streamlined processes lead to faster sorting and grading.

Lower food waste contributes to sustainability goals.

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Future Scope



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- Expand the system to other fruits and vegetables beyond the current scope.
- Incorporate chemical composition analysis (e.g., sugar content) for advanced classification.
- Develop portable devices for on-site quality checks in farms or warehouses.

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**Thank
you**

