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Smart Vision-BasedFruit Grading and Sorting System using Machine Learning

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Abstract: *The post-harvest fruit industry often struggles with maintaining uniform quality, reduce dependency on manual labors, and minimizing losses cause by inefficient sorting processes. Conventional manual grades is slow, inconsistent, and inadequate for large-scale operations. To overcame these limitation, a Smart Fruit Grading and Sorting System is propose, which employs machine learning and computer vision techniques. This system utilizes deep learning models to automatically evaluates fruit quality based on characteristics such as size, colour, ripeness, and surface defects. By integrating tools like OpenCV, TensorFlow/PyTorch, and edge computing devices the framework captures real-time images of fruits moving on a conveyor belt, classifies them into specific quality categorie, and trigger automated sorting mechanisms accordingly.*

Keywords: Fruit grading, Sorting framework, Computer vision, Machine learning,OpenCV

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