De La Salle University
Gokongwei College of Engineering
Department of Electronics & Computer Engineering

PANEL RECOMMENDATIONS PRIOR TO APPROVAL

TITLE: Non-Destructive Carabao Mango Sorter and Grader based on Physical Characteristics using Machine Learning

Time & Date of Defense: November 8, 2025 Venue of Defense: AG1103

Revisions:

Area of Thesis	Comments from Panel	Required Changes / Additions
Objective & Ground Truth	Panel noted confusion on the *basis of mango size classification* (small/medium/large). Ground truth was unclear.	Clearly define the ground truth reference for mango sizing. State whether classification is based on area, pixel count, bounding box dimensions, or physical calibration (e.g., coin reference).
Size Categorization	Ambiguity in how small, medium, and large are determined. Boundaries between categories not well defined, leading to possible misclassification.	Provide numerical thresholds or ranges for each category (e.g., area in cm² or pixel count). Justify with official references or calibration experiments.
Bounding Box vs. Actual Area	Panel highlighted errors when bounding box area was used (includes background pixels, not just mango).	Revise methodology to use segmented mango area instead of bounding box area. Explain error margins and how segmentation reduces misclassification.
Calibration Method	Use of “piso” (coin) as reference was questioned—panel asked what its connection is to mango sizing.	Clarify calibration method. If using coin reference, explain rationale and accuracy. Otherwise, replace with standardized calibration object or direct measurement.
Consistency of Measurement	Inconsistencies noted in how pixel/area measurements were applied.	Ensure consistent measurement approach across all samples. Document error analysis and tolerance levels.

AI vs. Traditional Methods	Panel stressed that AI (YOLO, CNN) is only for detection/tracking, not for actual size measurement.	Revise methodology section: separate AI detection (classification) from size measurement (OpenCV/area computation). Remove claims that CNN/YOLO directly measure size.
Reference to Prior Work	Panel mentioned earlier works as more accurate.	Add a related works section comparing your method with prior studies. Highlight improvements and justify differences.
Color Space & Image Processing	RGB-only processing criticized; suggested conversion to other color spaces (HSV, HSB, etc.) for better segmentation.	Add experiments using HSV/HSB color space for mango segmentation. Document improvements in accuracy.
Error Analysis	Panel emphasized large errors at category boundaries (small ↔ medium, medium ↔ large).	Include error analysis section: quantify misclassification rates at boundaries, propose tolerance margins.
Methodology Documentation	Panel noted missing or unclear steps in methodology (bounding box drawing, pixel extraction, calibration).	Rewrite methodology with step-by-step workflow: detection → segmentation → area measurement → classification. Include diagrams or flowcharts.
Mechanical/Practical Considerations	Mention of conveyor movement and mechanical variation affecting classification.	Add discussion on how the conveyors and sorter position the mangoes.
Final Recommendation	Panel said AI part is acceptable, but sizing concept is the core issue.	Strengthen sizing methodology section. AI classification can remain, but emphasize accurate sizing as the thesis' main contribution.

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Chair of the Panel of Examiners