# Fruit Recognition Using a YOLOv8 Deep-Learning Model

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***Abstract*—This undergraduate thesis investigates fruit recognition with a YOLOv8 deep-learning model. Visual classification can support identification of fruit categories from images. The student studies deep learning and YOLOv8, prepares labelled fruit images, trains a recognition model, and demonstrates predictions on selected test images. The thesis presents training and validation figures and example detection results, then reports that a fruit-recognition program was built. The source does not establish performance across changing camera conditions, unseen orchards, or a real retail environment; its conclusion calls for more advanced study. The contribution is a documented student study or prototype whose stated scope can guide further testing.**

***Index Terms*—fruit recognition, YOLOv8, deep learning, image detection**

## I. Introduction

Visual classification can support identification of fruit categories from images. This thesis investigates fruit recognition with a YOLOv8 deep-learning model. It begins from a practical engineering need and explains the technologies and workflow chosen for the case. The objective is to document a student implementation or comparative investigation, together with the evidence available in the manuscript. Broader operational or economic effects require separate measurements and are not assumed from the existence of a prototype [1]. Earlier ICTU student work on related designs is included here for context [2], [3]. Related published studies provide context for the subject and methods [4], [5], [6], [7], [8], [9], [10]. These contextual works were selected for this English summary; they are not asserted to appear in the original thesis bibliography.

## II. Methods

The student studies deep learning and YOLOv8, prepares labelled fruit images, trains a recognition model, and demonstrates predictions on selected test images. The source is summarized through its stated design, implementation material, examples, and conclusion. Features shown in the manuscript are distinguished from proposals for later development. This review does not add a new experiment, fill missing measurements with estimates, or treat a planned capability as an observed result. The source thesis remains the provenance for the reported work [1].

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## III. Results

The thesis presents training and validation figures and example detection results, then reports that a fruit-recognition program was built. The report's screens, configurations, examples, or measurements constitute the evidence for this summary. A capability described only as a design intention is not counted as a validated operational outcome. No additional performance, adoption, financial, or safety figure has been introduced here. The result is interpreted within the scope of the student's documented setup [1].

## IV. Discussion

The source does not establish performance across changing camera conditions, unseen orchards, or a real retail environment; its conclusion calls for more advanced study. Further work could document dataset splits and class balance, report class-wise accuracy on an independent test set, and evaluate lighting and occlusion effects. These limitations affect how the evidence should be read. The current manuscript can support understanding of the design and reported demonstration, while independent tests would be needed for stronger claims. Any later deployment should document its environment and separate observed outcomes from intended benefits [1].

## V. Conclusion

The thesis documents fruit recognition with a YOLOv8 deep-learning model. The thesis presents training and validation figures and example detection results, then reports that a fruit-recognition program was built. The source does not establish performance across changing camera conditions, unseen orchards, or a real retail environment; its conclusion calls for more advanced study. Further work could document dataset splits and class balance, report class-wise accuracy on an independent test set, and evaluate lighting and occlusion effects. Accordingly, the present contribution is a source-grounded account of the student work and its tested or illustrated scope. Claims about broader effectiveness should be assessed in later work using explicit evaluation conditions [1].

## References

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