

ABSTRACT

Watermelon, known by its Latin name (Citrullus lanatus), is one of the fruit-bearing plants that grows as a vine and belongs to the family of cucurbits (Cucurbitaceae). Watermelon has several types that can be distinguished. Based on a Google Form survey, there were 60 respondents with an average score of 70.83. From these results, it can be concluded that many respondents can identify fruits as either watermelon or non-watermelon, but they do not know the specific types of watermelon. Watermelons are generally considered ripe within a range of 70-100 days from the planting period, depending on the variety. There are various ways to determine the ripeness of a watermelon, one of which is by examining the stem end of the fruit. However, determining the ripeness of a watermelon can only be done by an experienced individual. Therefore, this research is highly needed for the general public who are unfamiliar with the classification of watermelon types and ripeness. The research results in the development of an Android-based application.

This application is based on object detection using image processing of watermelon fruits. The image processing technique used is deep learning, where the images are labeled and annotated using Roboflow to generate the dataset. The obtained dataset will be trained using the YOLOv5 method to obtain the model to be used. The developed application will be intended for Android, and the programming language used is Flutter, with coding done in Visual Studio Code. There are three types of watermelon required for the classification: seeded watermelon, seedless watermelon, and baby watermelon. As for ripeness, seedless watermelons with different ripeness levels are needed, ranging from the pre-ripe stage (approximately up to 10 days before ripening) to overripe stage (approximately up to 7 days past ripening).

The research involves two dataset entries. For the classification work, the first dataset contains 112 images, and the second contains 757 images. The roboflow processing obtained a good mAP percentage from the second dataset, which is 92.8%. The YOLOv5 processing achieved a good mAP percentage of 93.98%. For the ripeness work, the first dataset contains 199 images, and the second contains 1989 images. The roboflow processing obtained a good mAP percentage from the second dataset, which is 99%. The YOLOv5 processing achieved a good mAP percentage of 97.83%. For the application, the percentage of correct detection is 88.57% for classification and 95% for ripeness.

Keywords: Watermelon, Yolov5, Deep Learning, Visual Studio Code, Roboflow