ABSTRACT

The Telkom University Surabaya Rooftop Farming Center is an urban farming-based agricultural innovation in an academic environment. Currently, this farm uses SmartFarming technology based on the Internet of Things to assist in farm and livestock management, such as monitoring plant and livestock growth. One of the challenges in the livestock sector is related to egg quality, which is an important factor in increasing revenue and customer satisfaction. Therefore, detecting egg quality is crucial for improving sales revenue and customer satisfaction.

This study aims to develop a web-based application capable of detecting egg quality using the YOLOv5 algorithm. The research steps include collecting image datasets, preprocessing data to enhance image quality, and training the model using the YOLOv5 model. The YOLOv5 model trained to detect egg quality will be evaluated using performance metrics such as accuracy, precision, recall, and mean average precision to ensure its ability to assess egg quality. Additionally, the web application being developed will undergo testing using black-box testing methods. This testing is conducted to ensure that all functions within the application align with specifications.

The output of this research is a web application capable of automatically detecting chicken egg quality using the YOLOv5 model. The system is built using the Waterfall method and utilizes Laravel and Flask. Out of the three model variants tested, YOLOv5m was selected because it provided the best results with a mean average precision (mAP@0.5) of 0.95, recall of 0.94, and precision of 0.91. Black-box testing showed that all application features functioned according to specifications. This research demonstrates that YOLOv5 can be functionally implemented in a web-based egg quality detection system.

Keywords: *Rooftop Farming Center, Deep Learning, YOLOv5*, *Waterfall*