ABSTRACT

Early detection of cervical pre-cancer plays on important role in reducing mortality in women due to cervical cancer, especially in developing countries such as Indonesia. VIA or Visual Inspection of Acetic Acid examination is an effective method due to its high sensitivity and affordable cost. However, this examination still faces several challenges, one of which is subjectivity in the interpretation of results. This study aims to develop a deep learning-based intelligent system using the YOLO (You Only Look Once) model to improve the accuracy and efficiency of early detection of cervical cancer through IVA examination images.

The system designed involves of the process of pre-trained, training, and testing images using the optimized YOLO model. Training and testing data in this study were obtained from secondary data of Hasan Sadikin Hospital, Bandung City. The YOLO model was chones because of its ability to detect objects in real-time with a fairly high level of accuracy. This research will conduct a comparison between two versions of the old and the latest YOLO models, namely YOLOv7 with YOLOv11. This is done to see the evolution of the performances of two models.

The test results show that the YOLOv11 model is superior in various evaluation matrices. YOLOv11 has a precision value of 0.75, recall 0.81, mAP50 0.84, mAP50:95 0.60, and F1-Score 0.74. Meanwhile, the YOLOv7 model has a precision value of 0.63, recall 0.82, mAP50 0.64, mAP50:95 0.39, and F1-Score 0.70. This study shows that early detection of cervical precancer through the IVA method can be improved by implementing a deep learning-based system, especially using the YOLOv11 model. Compared to YOLOv7, YOLOv11 has superior performance in detecting lesions in cervical precancer. This is evidenced by the evaluation matrix values obtained. The use of YOLOv11 has the potential to reduce subjectivity in the interpretation of IVA method results and increase the accuracy of previous models, as well as efficiency in early detection of cervical precancer.

Kata Kunci: *Cervival cancer, YOLO, VIA*