ABSTRACT

Handwriting in Arabic poses unique challenges in the automatic recognition process due to the complexity of its letters, their connected nature, and the variation in individual writing styles. This issue is particularly important to address in the context of document digitisation and technology-based educational applications. This study aims to develop an Arabic handwriting detection system using the You Only Look Once (YOLO) technique, a deep learning-based object detection approach known for its speed in real-time object recognition. This research is limited to the detection of individual letters in handwriting, not the recognition of whole words or sentences.

The method used involves several main stages, starting with the collection of a manually labelled Arabic handwriting dataset. Next, the model is trained using the YOLOv9 architecture with parameters adjusted to optimise it for Arabic letter characteristics. The model is trained to detect and classify individual letters in handwriting images. After training, an evaluation is conducted using metrics such as mean Average Precision (mAP), precision, and recall to measure the system's performance. In this process, data augmentation is also performed to improve the model's generalisation to various forms of handwriting.

The results of this study show that the use of YOLO is effective in detecting Arabic handwriting with fairly high accuracy, especially under varying lighting and background conditions. The developed system is capable of performing fast and accurate detection and has the potential to be further developed in OCR (Optical Character Recognition) applications for the Arabic language. This research is expected to serve as a first step in the development of more complex Arabic handwriting recognition systems in the future.

Keywords: YOLO, Handwriting, OCR, Arabic language.