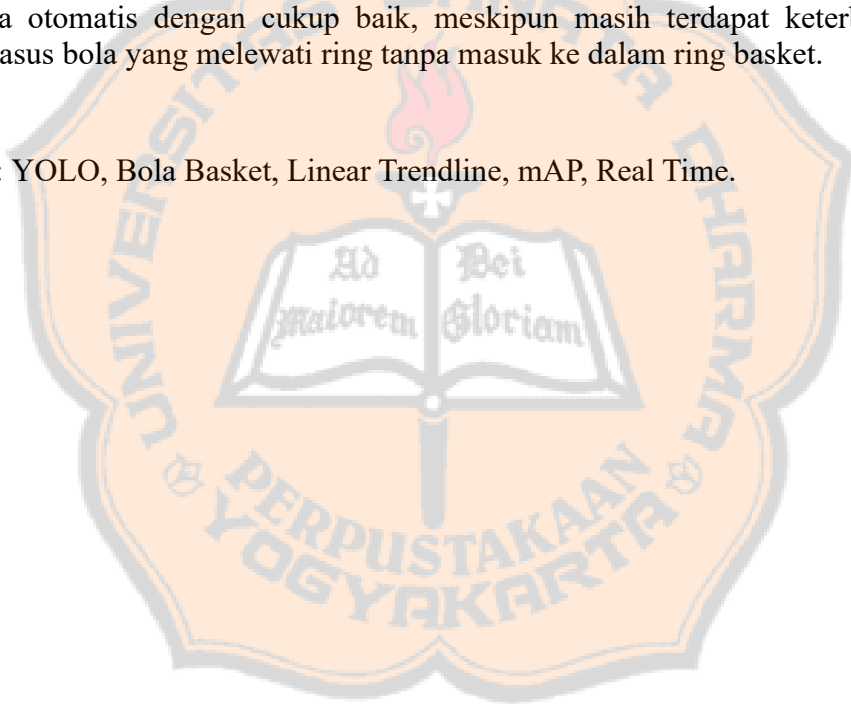


ABSTRAK

Penelitian ini bertujuan untuk mengembangkan sistem deteksi objek guna memantau keakuratan tembakan dalam latihan individu olahraga bola basket secara real time menggunakan algoritma YOLO (You Only Look Once). Sistem ini memanfaatkan model YOLOv8m dan YOLOv9m untuk mendeteksi dua objek utama, yaitu bola basket dan ring basket, serta menerapkan metode linear trendline untuk menganalisis lintasan tembakan. Dataset yang digunakan merupakan dataset hasil pengambilan pribadi yang telah diolah melalui platform Roboflow, mencakup proses labeling, resize, auto orientation, serta pembagian data ke dalam subset pelatihan, validasi, dan pengujian. Evaluasi model dilakukan menggunakan metrik mean Average Precision (mAP) dan F1-Score, serta melalui uji coba video secara real time. Hasil pengujian menunjukkan bahwa model YOLOv9m dengan konfigurasi hyperparameter berupa learning rate sebesar 0.0001 dan momentum sebesar 0.999 memberikan performa terbaik dengan nilai mAP sebesar 0.726 dan akurasi deteksi tembakan 5 dari 7 percobaan. Temuan ini menunjukkan bahwa kombinasi antara algoritma YOLO dan analisis linear trendline mampu mendeteksi dan mengevaluasi keakuratan tembakan bola basket secara otomatis dengan cukup baik, meskipun masih terdapat keterbatasan dalam menangani kasus bola yang melewati ring tanpa masuk ke dalam ring basket.

Kata Kunci: YOLO, Bola Basket, Linear Trendline, mAP, Real Time.



ABSTRACT

This research aims to develop an object detection system to monitor shooting accuracy in individual basketball training in real time using the YOLO (You Only Look Once) algorithm. The system utilizes YOLOv8m and YOLOv9m models to detect two main objects-basketball and hoop-and applies the linear trendline method to analyze shot trajectories. The dataset used is self-collected and processed through the Roboflow platform, including labeling, resizing, auto-orientation, and data splitting into training, validation, and testing subsets. Model evaluation is carried out using mean Average Precision (mAP) and F1-Score metrics, as well as real-time video testing. The results show that the YOLOv9m model, with hyperparameter settings of a learning rate of 0.0001 and momentum of 0.999, achieves the best performance with an mAP score of 0.726 and a shooting detection accuracy of 5 out of 7 attempts. These findings indicate that the combination of the YOLO algorithm and linear trendline analysis is effective in automatically detecting and evaluating basketball shooting accuracy, although limitations remain in handling cases where the ball passes through the hoop without actually scoring.

Keywords: YOLO, Basketball, Linear Trendline, mAP, Real Time.

