ABSTRAK

Penelitian ini membahas pengembangan sistem deteksi objek makanan cepat saji menggunakan algoritma *You Only Look Once (YOLO)* versi 5. Latar belakang penelitian didasari oleh meningkatnya konsumsi makanan cepat saji yang berkontribusi terhadap kasus obesitas akibat kelebihan kalori. Untuk itu, diperlukan sistem yang mampu mendeteksi makanan secara otomatis dan *real-time* sebagai upaya mendukung pengendalian pola konsumsi masyarakat. Metode penelitian meliputi beberapa tahap, yaitu pengumpulan *dataset* makanan cepat saji, anotasi citra dengan *bounding box*, *pre-processing* (*resizing*, augmentasi *brightness*, *blur*, dan *noisy*, serta pembagian *dataset*), pelatihan model menggunakan *YOLOv5s* pada *Google Colaboratory*, serta pengujian dan evaluasi dengan *confusion matrix*. *Dataset* awal sebanyak 345 gambar dari empat kelas objek (burger, kebab, donat, dan fried chicken) ditingkatkan melalui augmentasi hingga 945 gambar. Hasil pelatihan menunjukkan model mampu mendeteksi objek dengan akurasi yang cukup baik. Rata-rata akurasi model mencapai 85%, dengan rincian burger 86%, donat 91%, fried chicken 82%, dan kebab 83%. Nilai *mean Average Precision (mAP)* pada ambang batas *Intersection over Union (IoU)* 0,5 tercatat sebesar 76,5%. Kesimpulan dari penelitian ini adalah algoritma *YOLOv5* efektif digunakan untuk deteksi objek makanan cepat saji secara *real-time* dan berpotensi dikembangkan lebih lanjut sebagai sistem estimasi kalori makanan berbasis *computer vision.*

Kata Kunci: *computer vision, deep learning, deteksi objek, makanan cepat saji, YOLOv5*

ABSTRACT

This study discusses the development of a fast-food object detection system using the You Only Look Once (YOLO) version 5 algorithm. The background of this research is the increasing consumption of fast food, which contributes to obesity caused by excessive calorie intake. Therefore, a system that can automatically and real-time detect food is needed to support efforts in controlling dietary patterns. The research method consisted of several stages, including collecting a dataset of fast-food images, annotating images with bounding boxes, pre-processing (resizing, brightness augmentation, blurring, and adding noise, as well as splitting the dataset), training the model using YOLOv5s on Google Colaboratory, and testing and evaluating it with a confusion matrix. The initial dataset contained 345 images of four object classes (burger, kebab, donut, and fried chicken), which were augmented to 945 images. The training results show that the model is capable of detecting objects with fairly good accuracy. The average accuracy achieved was 85%, with detailed results: burger 86%, donut 91%, fried chicken 82%, and kebab 83%. The mean Average Precision (mAP) at an Intersection over Union (IoU) threshold of 0.5 was recorded at 76.5%. It can be concluded that the YOLOv5 algorithm is effective for real-time fast-food object detection and has the potential to be further developed into a calorie estimation system based on computer vision.

Keywords: *computer vision, deep learning, object detection, fast food, YOLOv5*