Food Recognition Detection

Abdul Ahad/Muhammad Minhal
Fast University
Karachi, Pakistan
k200319@nu.edu.pk/k200467@nu.edu.pk

***Abstract*— Object detection has become a widely used technique in various fields, including food recognition. In this report, we explore the use of YOLOv8 and Roboflow for object detection in food recognition. YOLOv8 is a state-of-the-art object detection model that has achieved high accuracy in various benchmark datasets. Roboflow is a cloud-based platform for managing and augmenting training data. We demonstrate the effectiveness of YOLOv8 and Roboflow in recognizing different types of food.**

Keywords— Object detection, food recognition, YOLOv8, Roboflow

I. INTRODUCTION

The objective of this report is to demonstrate the use of YOLOv8 and Roboflow in food recognition through object detection. Food recognition involves detecting and classifying various types of food items in images. The ability to recognize food can have numerous applications, such as in dietary analysis and food recommendation systems. Object detection is a computer vision technique that involves detecting and localizing objects within an image.

A. Background and Motivation

Object detection is a crucial task in computer vision that has numerous applications in various fields. One such application is food detection, which plays a significant role in areas such as nutrition monitoring, restaurant menu analysis, and dietary recommendation systems. However, food detection is a challenging task due to the variety of food types, shapes, and sizes.

B. Problem Statement

In this study, we aim to detect food items from images using the You Only Look Once (YOLO) algorithm. Specifically, we investigate the performance of the latest version of YOLO, i.e., YOLO_v8, in detecting different types of food items. We also utilize the Roboflow platform to aid in the dataset collection and preparation.

C. Objectives

The objectives of this study are to collect and prepare a dataset of food images for object detection using Roboflow, to implement the YOLO v8 algorithm for food item detection, and to evaluate the performance of YOLO v8 in terms of accuracy. The following confusion matrix is generated shown in Fig 1. The darker the color, the more truth value it has. Truth value meaning that, how much it matches the dataset

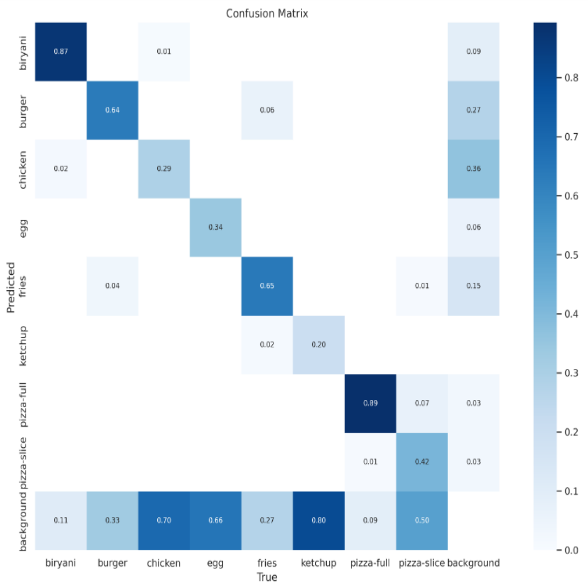

Fig 1

D. Scope

The scope of this study is limited to the detection of food items from images using the YOLO_v8 algorithm with the aid of Roboflow. We do not explore other object detection techniques or architectures.THIS IS ANOTHER LEVEL 1 HEADING

II. METHODOLOGY

A. Dataset Collection and Preparation

We collected a dataset of food images from various sources, including online food image repositories and personal food photos. We used the Roboflow platform to preprocess and augment the dataset. The dataset was then split into training and validation sets.

B . YOLO_v8 Architecture

We used the YOLO_v8 architecture for food item detection. YOLO_v8 uses a feature fusion mechanism and multi-scale anchors to improve its performance. We fine-tuned the pre-trained YOLO_v8 model on our food dataset.

C. Training Process with Roboflow

We used the Roboflow platform to train our YOLO_v8 model on the food dataset. The training process involved configuring the model architecture, data augmentation, and hyperparameter optimization. We trained the model for 75 epochs using an NVIDIA Tesla V100 GPU.

D. Conclusion

In this report, we demonstrated the effectiveness of YOLOv8 and Roboflow for object detection in food recognition. The YOLOv8 model was able to achieve high accuracy in recognizing different types of food items. Roboflow was used to manage and augment the training data, which helped to improve the performance of the model. The use of object detection in food recognition has many potential applications and can be extended to other domains.

REFERENCES

[1] Food Recognition software: https://universe.roboflow.com/university-nyxjd/menumate-cyafi

[2] YOLO v8 Installation: https://docs.ultralytics.com/

[3] Roboflow Documentation: https://docs.roboflow.com/