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**Project Title:**

# FoodVision: Automated Food Detection Using YOLOv8

Course: AAI3001 Deep Learning and Computer Vision Tri 1 2024

## Background

Food recognition systems are crucial for dietary monitoring and nutritional analysis.

YOLOv8 represents state-of-the-art in real-time object detection.

Dataset includes 55 different food classes with emphasis on fruits and vegetables.

Previous approaches faced challenges with real-world food detection accuracy.

## Objectives

Develop a robust food detection system using YOLOv8.

Achieve high accuracy in multi-class food detection.

Optimize model performance for real-world applications.

Create a system capable of detecting multiple food items in a single image.

## Methodology/Proposed Approach

**Model Architecture**:

- Base model: YOLOv8n (nano version)
- Input size: 640x640 pixels
- Batch size: 32
- Learning rate: 3e-4
- Training epochs: 45

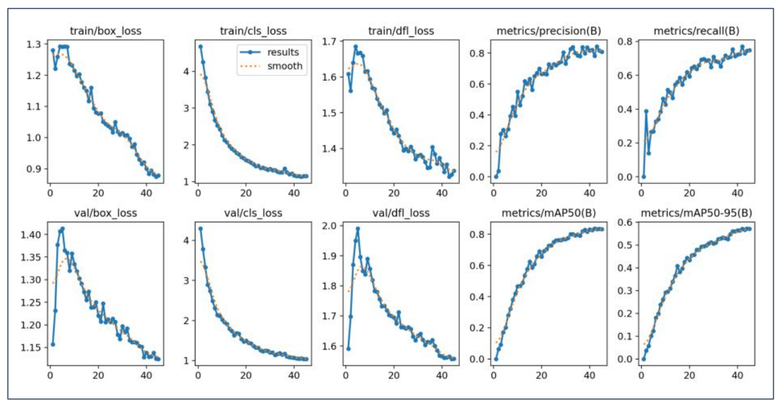
**Dataset**:

- 55 food classes
- Structured training and validation sets
- Data augmentation using mosaic technique
- Self-curated & annotated

## Results and Analysis

**Performance Metrics:**

- mAP50: ~0.8 (80% accuracy at 50% IoU)
- Precision: ~0.8
- Recall: ~0.75




**Key Findings:**

- Successful detection of multiple food items in single image.
- High confidence scores for clear, well-lit images.
- Model shows robust performance across different food categories

## Conclusions and Reflection

**Achievements:**

- Successfully implemented YOLOv8 for food detection
- Deploy prototype on cloud
- Photo taking function to use web app on mobile

**Future Work:**

- Expand dataset to include more food categories
- Implement portion size estimation
- Optimize model for mobile deployment

**References:**

https://huggingface.co/spaces/nightey3s/aai3001_final_project/tree/main
https://nightey3s-aai3001-final-project.hf.space/