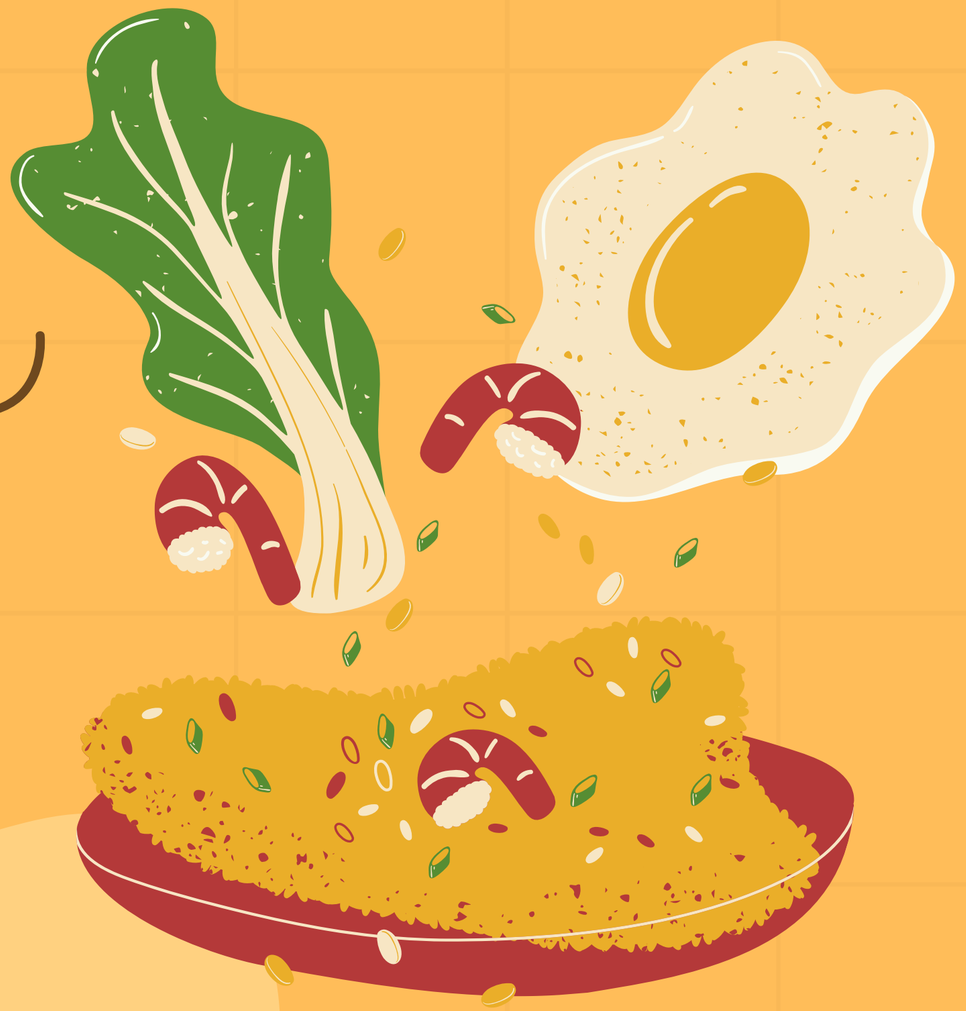
Indonesian Food Detection



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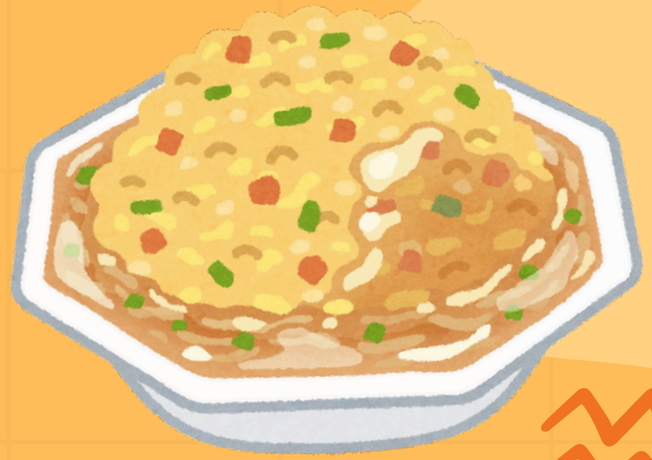
Latar Belakang

The immense culinary diversity of Indonesia, rooted in the variety of ethnic groups and menus from over 17,000 islands, creates a significant challenge for regional food detection. This difficulty is compounded by variations within a single food type (batagor) and the similarity between different dishes (Soto Banjar and Soto Ayam).

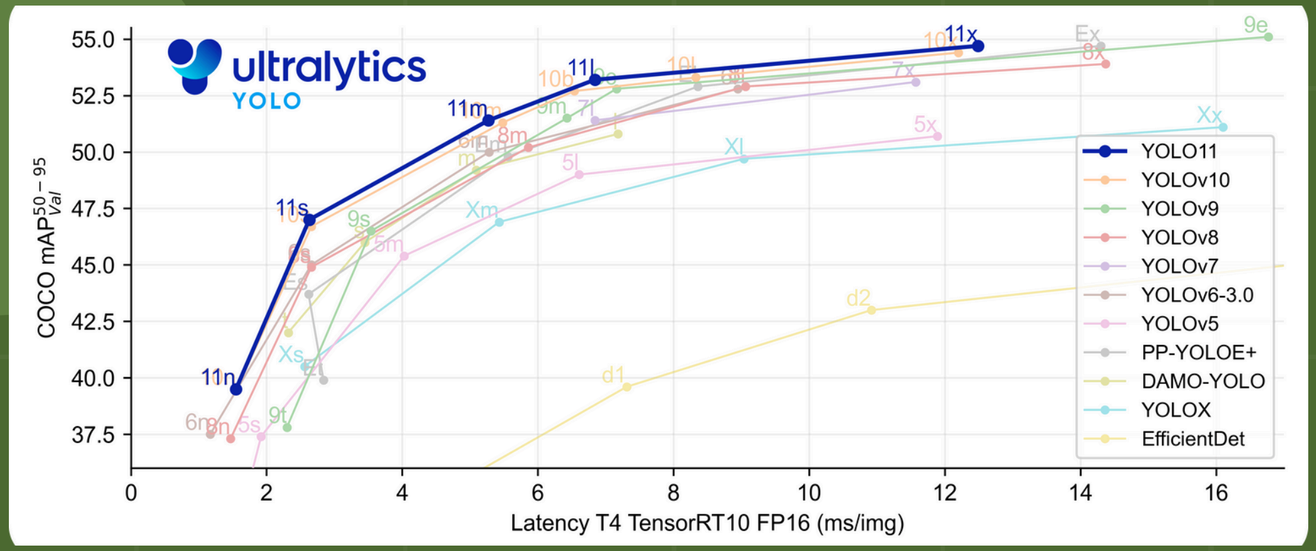
This task requires a food detection system that is trained on extensive datasets to categorize these food types. Furthermore, it must be capable of accurately locating and bounding multiple dishes within a single, complex plate (nasi tumpeng). Overcoming this problem will open up opportunities for detecting the nutrition and calories of each individual menu item.

Dataset



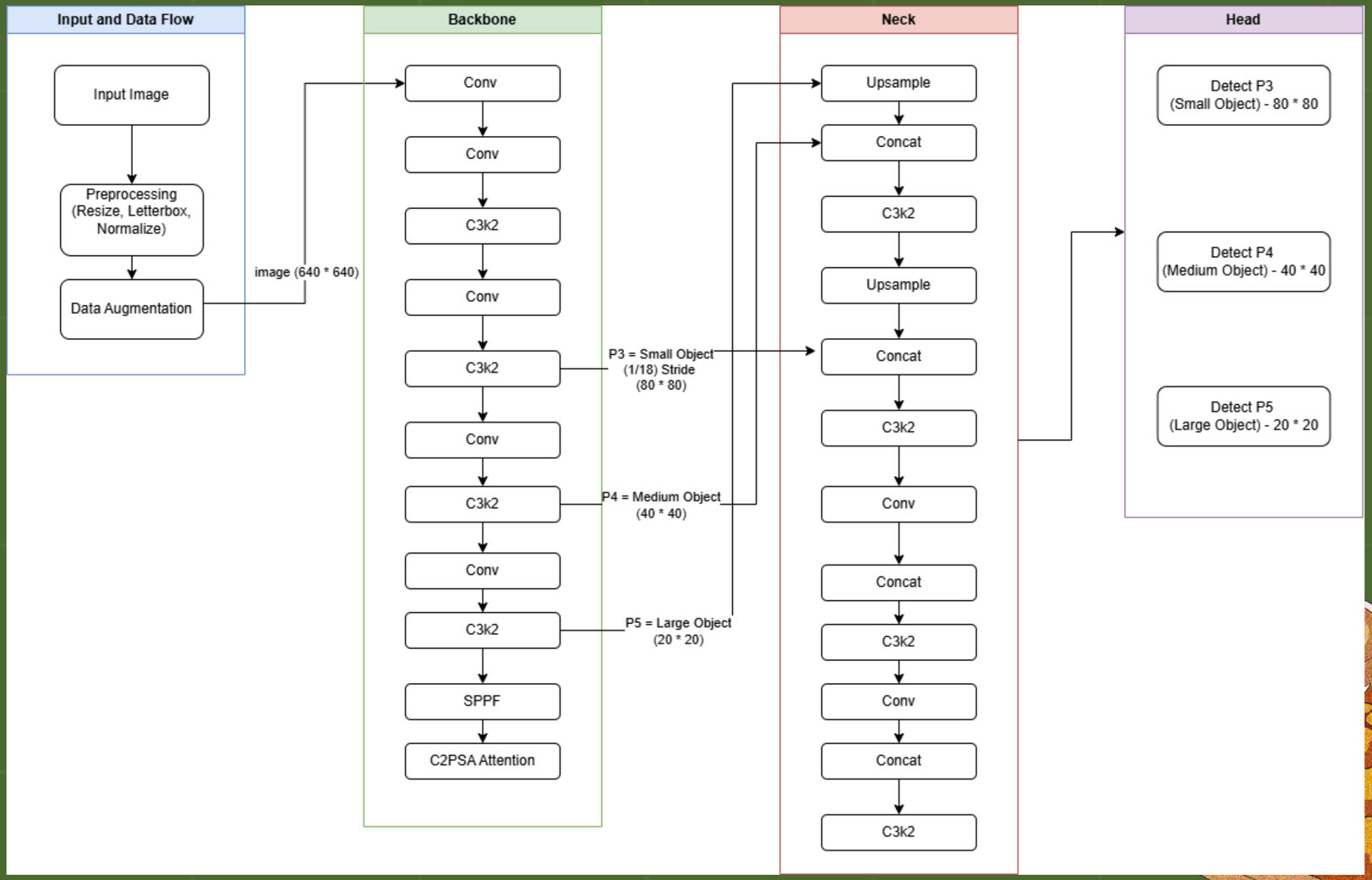
This dataset was collected from various open-source sources, primarily from platforms like Roboflow and Kaggle, utilizing 15 different public data collections. The dataset encompasses 42 distinct classes of Indonesian dishes. The data Pre-processing phase included Structural Consistency Fix to ensure data format uniformity, conversion of Segmentation annotations into Bounding Boxes suitable for the YOLO format, and a Label Cleaning & Validation stage to guarantee label accuracy. Finally, the data was prepared for model training through a Train-Test Split process.

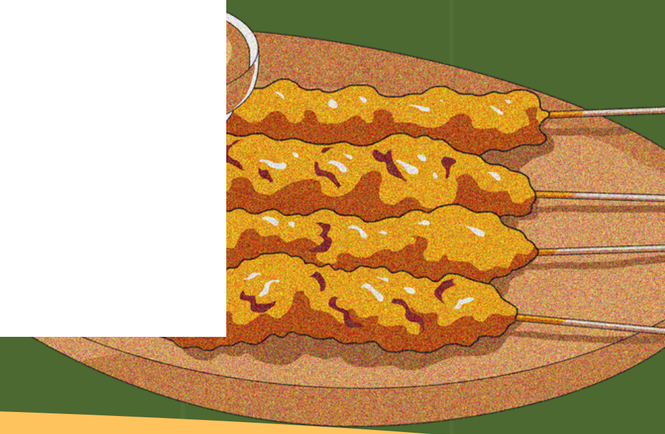
Model YOLO11



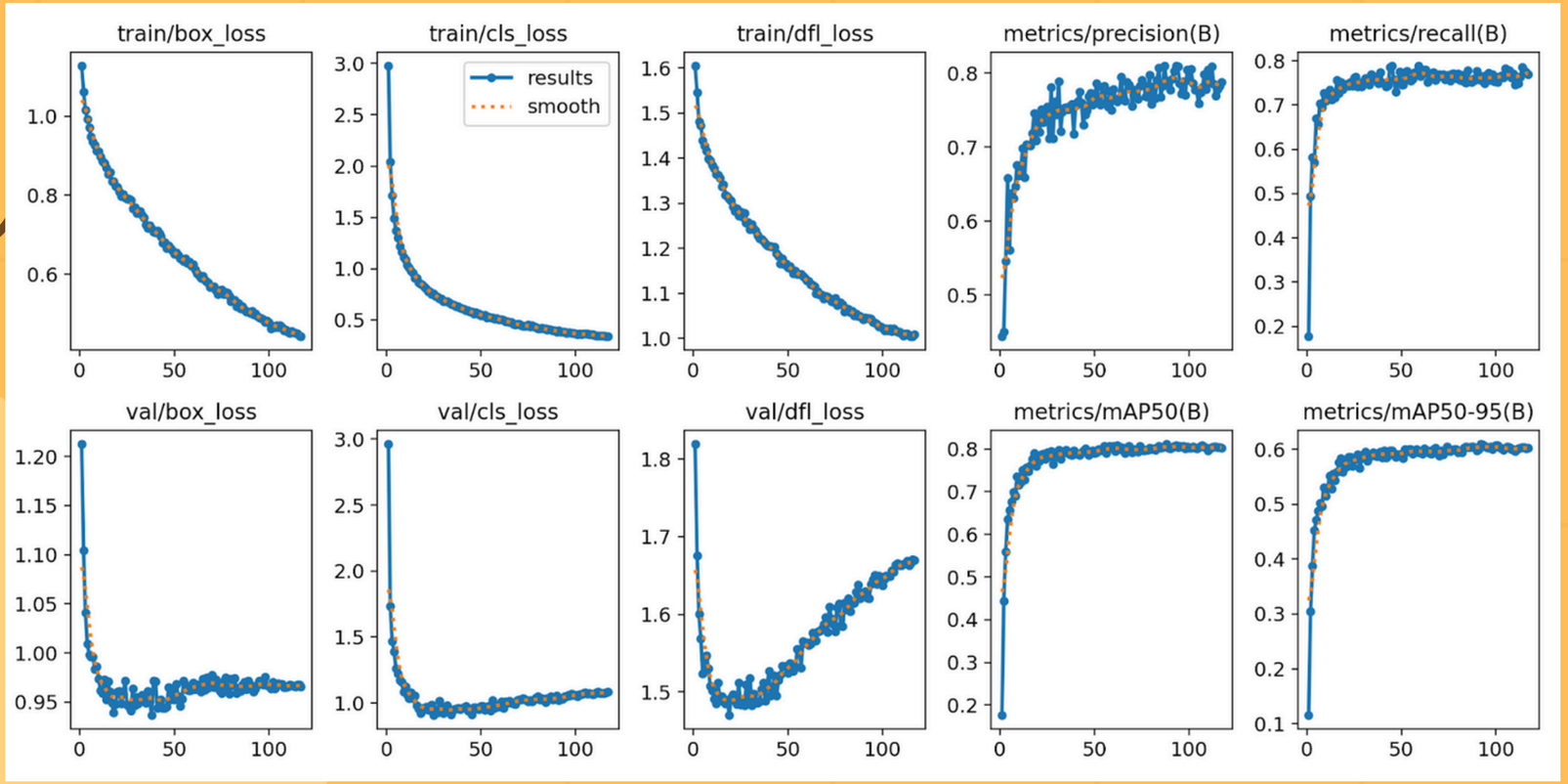
YOLO has generally proven to be one of the effective choices for fast project detection in a single forward pass. Although the YOLOv11 version is still new, it boasts a high mAP score. Therefore, we chose YOLOv11 because it possesses critical architectural advantages, such as the use of optimization blocks like C3k2 Blocks and a Decoupled Prediction Head, which enhance feature extraction quality, allowing the model to achieve the current best accuracy. This architecture provides a solid foundation for detecting the unique dishes in our food classes.

Model Architechture



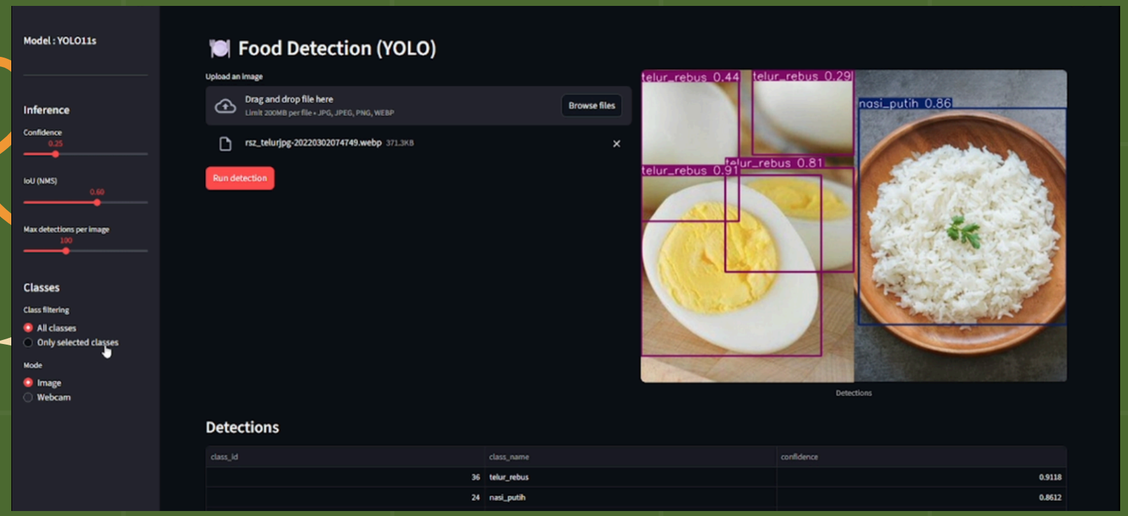


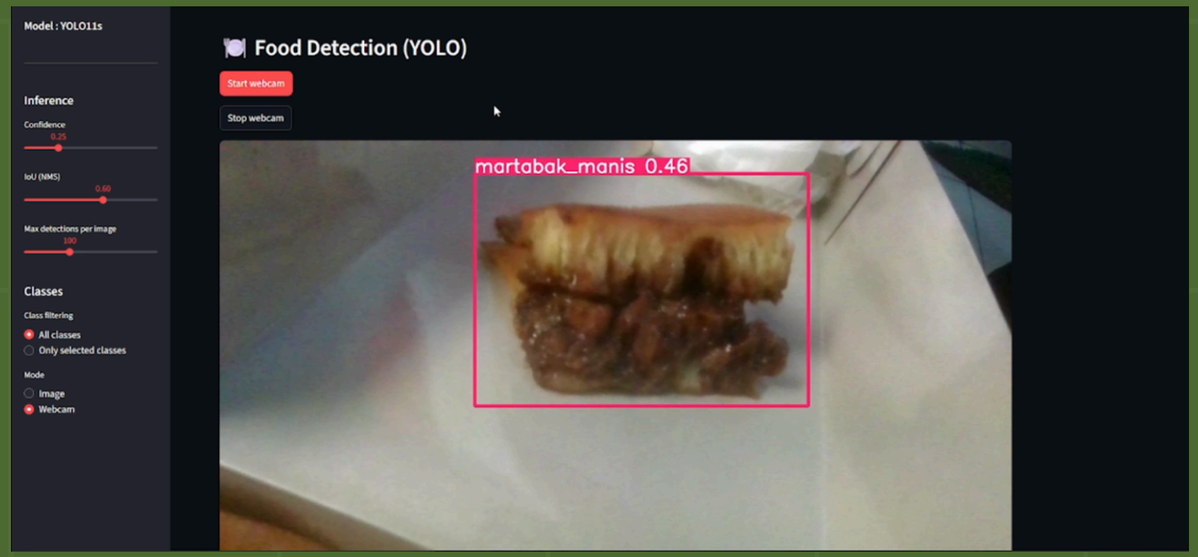
Evaluation



Evaluation Metrics	Results
Precision (mP)	0.8007
Recall (mR)	0.7602
mAP@0.5	0.809
mAP@0.5:0.95	0.7799

Demo


Model : YOLO11s
Inference
Confidence
0.25
IoU (NMS)
0.60
Max detections per image
100
Classes
Class filtering
All classes
Only selected classes
Mode
Image
Webcam
Food Detection (YOLO)
Upload an image
Drag and drop file here
Limit 200MB per file • JPG, JPEG, PNG, WEBP
Browse files
rsz_telurjpg-20220302074749.webp 371.3KB
Run detection
telur_rebus 0.44
telur_rebus 0.29
nasi_putih 0.86
telur_rebus 0.91
telur_rebus 0.81
Detections
Detections
class_id
class_name
confidence
36
telur_rebus
0.9118
24
nasi_putih
0.8612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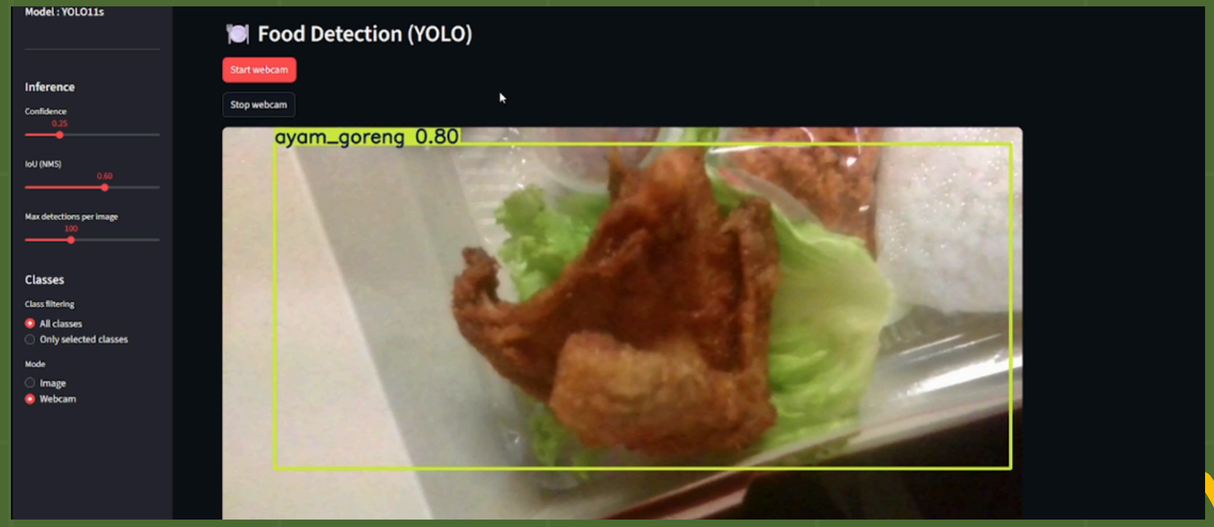
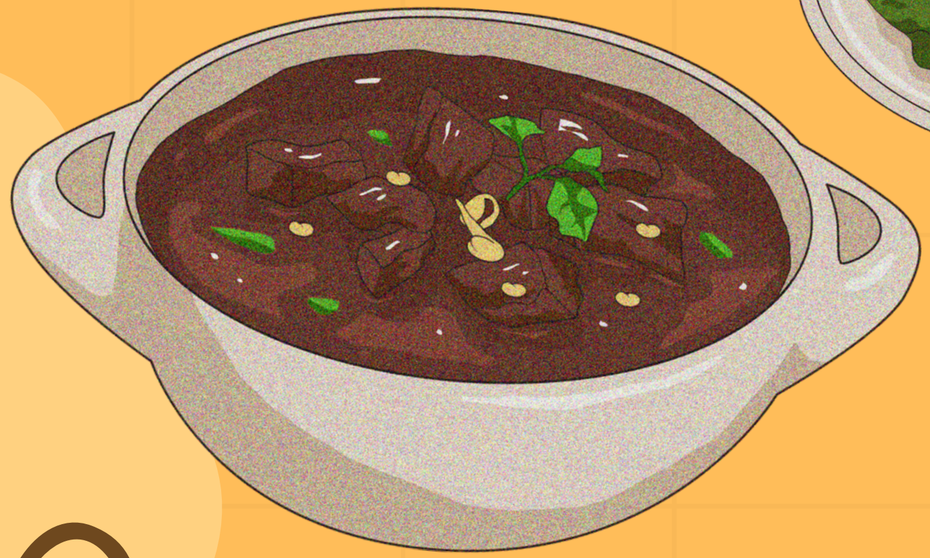
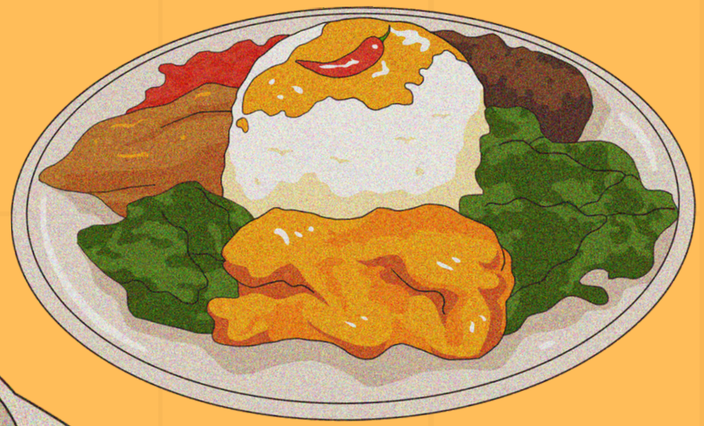
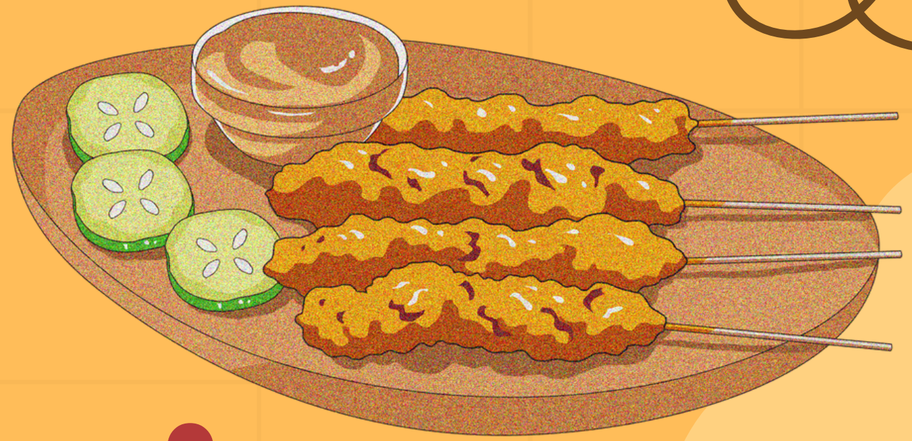
Inference
Confidence
0.25
IoU (NMS)
0.60
Max detections per image
100
Classes
Class filtering
All classes
Only selected classes
Mode
Image
Webcam
Food Detection (YOLO)
Start webcam
Stop webcam
martabak_manis 0.46


Model : YOLO11s
Inference
Confidence
0.25
IoU (NMS)
0.60
Max detections per image
100
Classes
Class filtering
All classes
Only selected classes
Mode
Image
Webcam
Food Detection (YOLO)
Start webcam
Stop webcam
ayam_goreng 0.80







Reflection

Overall, this project provided valuable insights into dataset preparation, model selection, and the practical challenges of applying computer vision techniques to culturally diverse food domains. It also opens opportunities for future improvements, such as expanding the dataset and enhancing model performance under more varied conditions.

THANK YOU!