ONGUARD SAFETY DETECTOR

OBJECTIVE

To design and implement an advanced computer vision-based detection system that leverages YOLOv8 models to automatically assess the safety compliance of individuals in images and videos.

The system detects whether a person is wearing essential protective equipment, such as helmets and vests, and classifies their safety status into three categories: "safe" (wearing both), "partially safe" (wearing either), or "not safe" (wearing neither).

This solution is intended to provide real-time, scalable safety monitoring in hazardous environments, improving workplace safety and reducing the risk of accidents through accurate detection and timely alerts.

DATASET,SPLIT AND PREPROCESSING

Dataset overview

- Total Images: 3002
- Classes:Helmet,Vest(YOLOv8s) Person (YOLOv8n)

Dataset split

- Training set: 78% of total data, 2346 images
- Validation set: 13% of total data, 385 images
- Test set: 9% of total data, 271 images

Dataset preprocessing

- Auto-Orient: Applied to ensure images are correctly aligned based on their EXIF data
- Resize: Images were resized to 640x640 pixels using a stretch technique to fit the input size requirements for the YOLOv8 model.

YOLO MODEL ARCHITECTURE
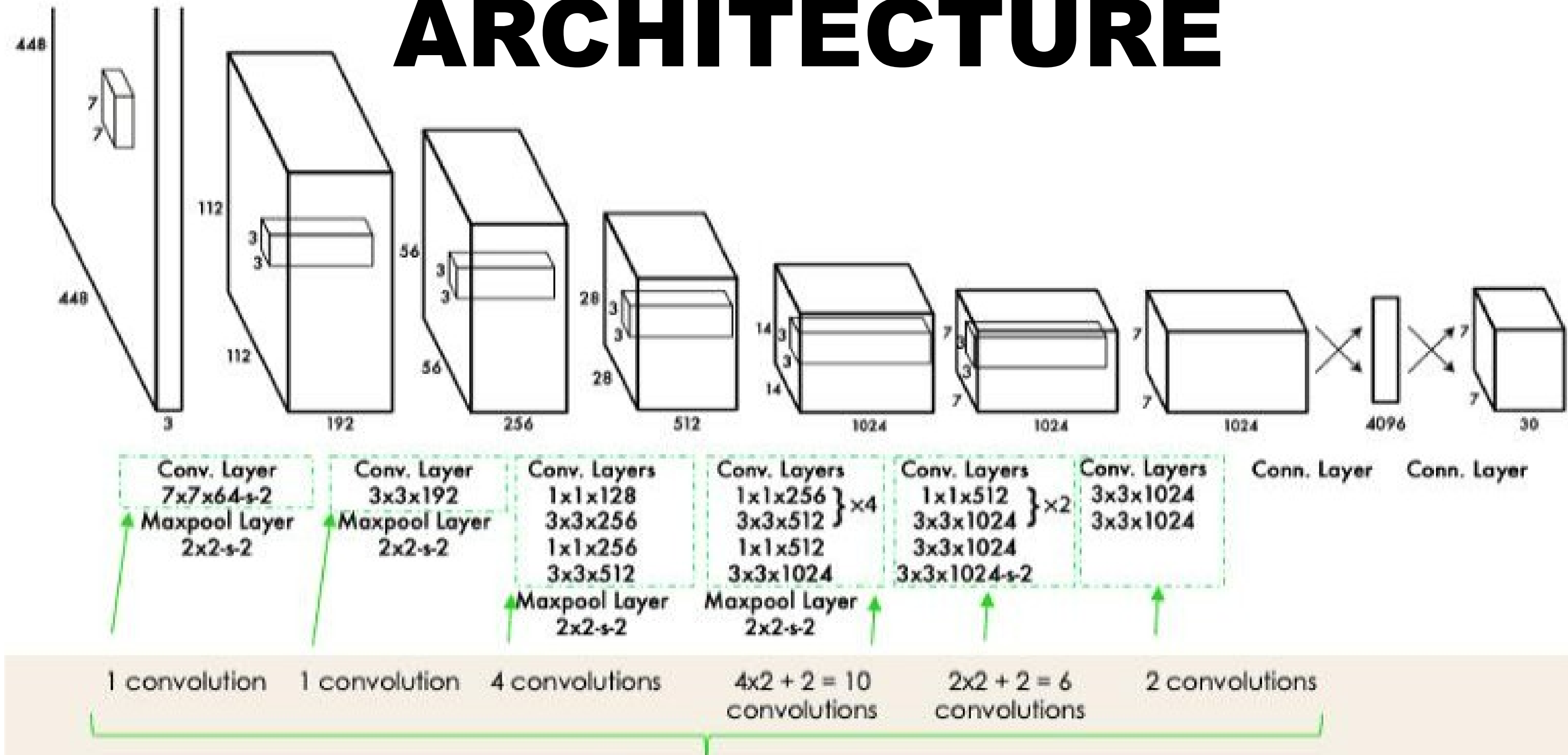
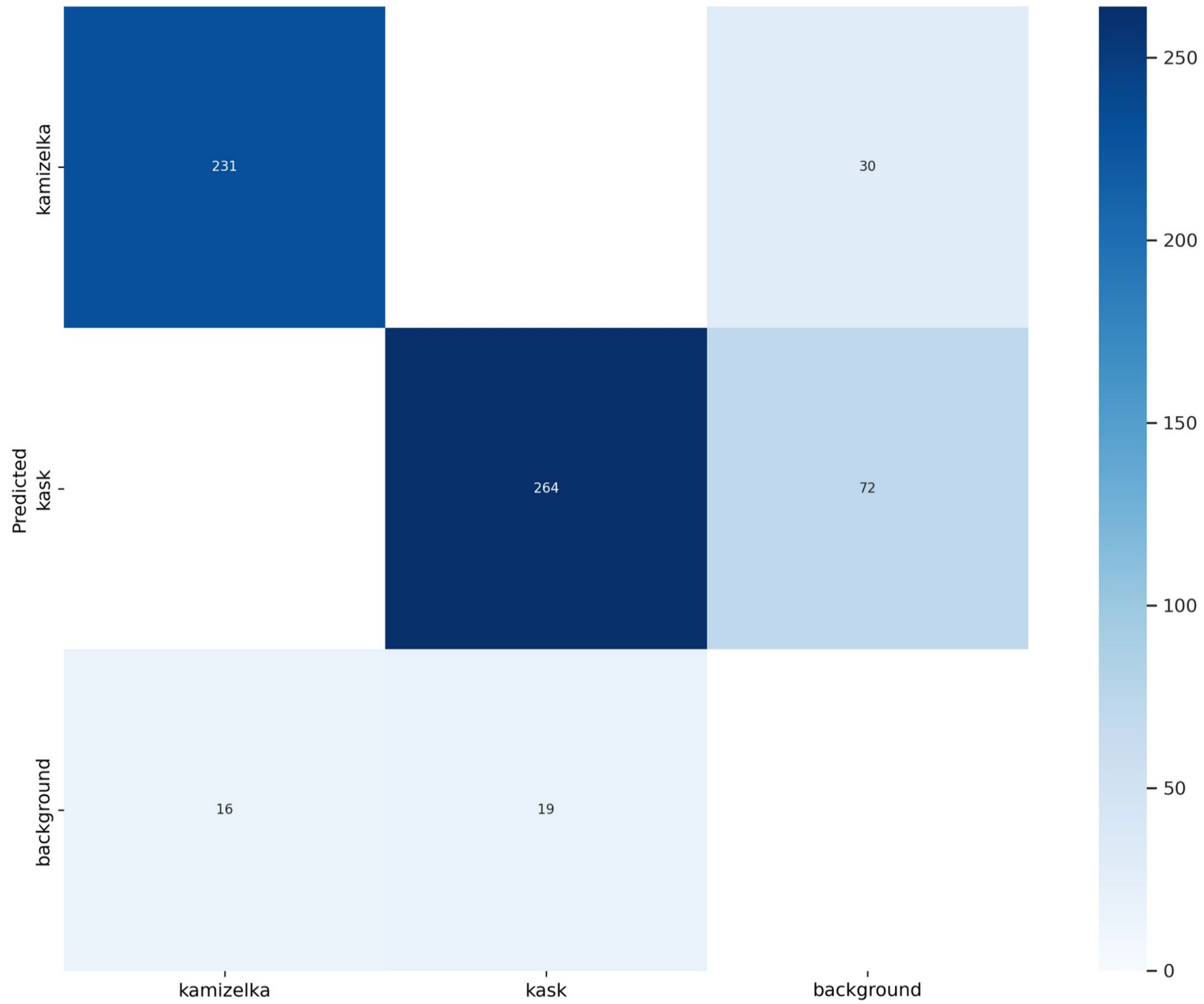**Mean Average Precision (mAP):**
    0.95147

MODEL PERFORMANCE

Recall:
0.88215

Precision:
0.93631

Confusion Matrix

THANK YOU