Model Development Phase Template

Date	18 March 2025
Team ID	739945
Project Title	Virtual Eye – Lifeguard for Active Swimming Drowning Detection
Maximum Marks	10 Marks

Initial Model Training Code, Model Validation and Evaluation Report

The initial model training code for Virtual Eye: Active Swimming Drowning Detection uses the YOLOv3 architecture, trained on a dataset of swimming and drowning images. The training pipeline involves loading a pre-trained model, defining custom data via a yaml file, and training it using the Ultralytics training framework. During training, no manual preprocessing was applied, as YOLO's data loader internally handles image resizing, normalization, and augmentation. The model was trained over 70+ epochs with adjustable confidence thresholds to improve detection quality. Model validation and evaluation metrics were generated by the Ultralytics framework. These metrics help quantify the model's ability to detect drowning scenarios under varied lighting, motion, and angle conditions. The evaluation is visualized via automated plots and detection overlays on test images.

Initial Model Training Code (5 marks):

```
from ultralytics import YOLO

#Loading the model
model = YOLO('yolov5s.pt')

print("Model loaded Successfully")
```

```
#Training the model
results = model.train(
    data="/content/data.yaml",
    epochs=100,
    imgsz=640,
    augment=True,
    patience=20
)
```

```
#validating the model
model.val(data = "/content/data.yaml")

# Predict on a test image
model.predict(
    "/content/test/images/-Clipchamp-_mp4-11_jpg.rf.0c2b48fcd0dc1741baded48d49546814.jpg",
    save=True,
    imgsz=320,
    conf=0.6
)
```

Model Validation and Evaluation Report (5 marks):

Model	Summary	Training and Validation Performance Metrics

Model 1	YOLOv5 for Drowning Detection The model is a convolutional neural network (CNN)-based object detection system using the YOLO (You Only Look Once) architecture. It was pre-trained on COCO dataset and fine-tuned on a custom dataset containing annotated images of swimmers and drowning individuals. YOLO is chosen for its real-time detection capability, low inference time, and high accuracy, making it well-suited for life-critical applications such as drowning detection in swimming pools.	`from ultralytics import YOLO`
		
		`#Loading the model`
		`model = YOLO('yolov5s.pt')`
		
		`print("Model loaded Successfully")`