

Model Development Phase Template

Date	2 Oct 2024
Team ID	739648
Project Title	Guardianeye:Yolo-Based Smart Helmet Detection System For Enhanced Safety in Real-Time
Maximum Marks	10 Marks

Initial Model Training Code, Model Validation and Evaluation Report


For Railway Sentry's YOLO V5 model training, we configure the model with annotated track images, adjust hyperparameters, and initiate training. Validation and evaluation employ metrics like precision, recall, and mAP to ensure reliable worker detection accuracy.

Initial Model Training Code (5 marks):

```
from ultralytics import YOLO

model = YOLO('yolov5s.pt')
results = model.train(data="/content/drive/MyDrive/helmet/Hard-Hat-Sample-1/data.yaml", epochs=100)
```

Model Validation and Evaluation Report (5 marks):

Model	Summary	Training and Validation Performance Metrics																																								
Model 1	<pre>results = model.val(data="/content/drive/MyDrive/helmet/Hard-Hat-Sample-1/data.yaml", epochs=100);</pre> <p>Ultralytics 8.3.39 Python-3.10.12 torch-2.5.1+cu121 CUDA:0 (Tesla T4, 15102MiB) YOLOv5s summary (fused): 193 layers, 9,112,697 parameters, 0 gradients, 23.8 GFLOPs val: Scanning /content/drive/MyDrive/helmet/Hard-Hat-Sample-1/valid/labels.cache... 20 images, 0 backgrounds, 0 corrupt: 100% 20/20 [00:00:00.00, 2.61it/s]</p> <table><thead><tr><th>Class</th><th>Images</th><th>Instances</th><th>BoxP</th><th>R</th><th>mAP50</th><th>mAP50-95</th><th>100%</th></tr></thead><tbody><tr><td>all</td><td>20</td><td>65</td><td>0.985</td><td>0.6</td><td>0.647</td><td>0.472</td><td></td></tr><tr><td>head</td><td>3</td><td>18</td><td>0.981</td><td>0.889</td><td>0.979</td><td>0.7</td><td></td></tr><tr><td>helmet</td><td>17</td><td>45</td><td>0.974</td><td>0.911</td><td>0.963</td><td>0.716</td><td></td></tr><tr><td>person</td><td>1</td><td>2</td><td>1</td><td>0</td><td>0</td><td>0</td><td></td></tr></tbody></table> <p>Speed: 0.2ms preprocess, 18.4ms inference, 0.0ms loss, 1.6ms postprocess per image Results saved to runs/detect/train302</p>	Class	Images	Instances	BoxP	R	mAP50	mAP50-95	100%	all	20	65	0.985	0.6	0.647	0.472		head	3	18	0.981	0.889	0.979	0.7		helmet	17	45	0.974	0.911	0.963	0.716		person	1	2	1	0	0	0		
Class	Images	Instances	BoxP	R	mAP50	mAP50-95	100%																																			
all	20	65	0.985	0.6	0.647	0.472																																				
head	3	18	0.981	0.889	0.979	0.7																																				
helmet	17	45	0.974	0.911	0.963	0.716																																				
person	1	2	1	0	0	0																																				