


Model Optimization and Tuning Phase Template

Date	15 November 2024
Team ID	739930
Project Title	Fireguardian yolov8 Empowered wildfire smoke surveillance
Maximum Marks	10 Marks

Model Optimization and Tuning Phase

The Model Optimization and Tuning Phase involves refining neural network models for peak performance. It includes optimized model code, fine-tuning hyperparameters, comparing performance metrics, and justifying the final model selection for enhanced predictive accuracy and efficiency.

Hyperparameter Tuning Documentation (8 Marks):

Model	Tuned Hyperparameters
YOLOv8n	<pre>!yolo task=detect mode=train model=yolov8n.pt data=/content/Wildfire-Smoke-1/data.yaml epochs=51 imgsz=256</pre> <p>Transferred 319/355 items from pretrained weights</p> <p>TensorBoard: Start with 'tensorboard --logdir runs/detect/train4', view at http://localhost:6006/</p> <p>Freezing layer 'model.22.dfl.conv.weight'</p> <p>AMP: running Automatic Mixed Precision (AMP) checks with YOLOv8n...</p> <p>WARNING Δ NMS time limit 0.550s exceeded</p> <p>AMP: checks passed </p> <p>train: Scanning /content/Wildfire-Smoke-1/train/labels... 516 images, 0 background, 0 corrupt: 100% 516/516 [00:00<00:00 2122.00</p>

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
	<p>The FireGuardian system integrates advanced YOLOv8 AI with satellite imagery, drones, and ground-based sensors for precise and realtime wildfire smoke detection. This innovative solution addresses</p>

YOLOv8n

critical challenges in wildfire management, enabling early detection, accurate localization, and actionable insights.

Key features include smoke and heat anomaly detection, geotagging, smoke density analysis, and temporal trend monitoring. The system's multi-source data aggregation ensures comprehensive situational awareness, while language and response efficiency features support global adaptability and rapid emergency response.