Model Optimization and Tuning Phase Template

Date	8 Sep 2024
Team ID	team-740082
Project Title	Real-time Bone Fracture Detection with YOLO-V8 Using X-ray Images
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
YOLOv8l	`#resize images` `resized_images = [cv2.resize(img, (640, 640)) for img in images]` `# Display a resized image as a sample` `plt.imshow(cv2.cvtColor(resized_images[0], cv2.COLOR_BGR2RGB))` `plt.axis('off')` `plt.show()`

YOLOv8l	``` #normalisation normalized_images = [img / 255.0 for img in resized_images] # Display a normalized image as a sample plt.imshow(normalized_images[0]) plt.axis('off') plt.show() ```

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
YOLOv8l	The **YOLOv8l** model was chosen for its ability to handle complex object detection tasks with high precision and recall. Its deeper and wider architecture enables it to capture fine details and subtle patterns, making it well-suited for detecting fractures in X-ray images where precision is critical. Additionally, YOLOv8l balances accuracy and speed effectively, ensuring reliable performance in real-time applications. Despite its higher computational demands, its superior performance on high-resolution data and complex datasets makes it the ideal choice for tasks requiring advanced object detection capabilities.