

Model Optimization and Tuning Phase Template

Date	24 SEPTEMBER 2024
Team ID	SWTID1727151090
Project Title	Classification of Arrhythmia by Using Deep Learning with 2-D ECG Spectral Image Representation
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
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CNN	<pre> # Import required libraries from tensorflow.keras.models import Sequential from tensorflow.keras.layers import Conv2D, MaxPooling2D, Flatten, Dense # Define the CNN model model = Sequential() model.add(Conv2D(32, kernel_size=(3, 3), activation='relu', input_shape=(128, 128, 1))) model.add(MaxPooling2D(pool_size=(2, 2))) model.add(Flatten()) model.add(Dense(128, activation='relu')) model.add(Dense(1, activation='sigmoid')) # Hyperparameter grid for tuning param_grid = { 'batch_size': [16, 32, 64], 'epochs': [10, 20, 50], 'optimizer': ['adam', 'sgd'], 'learning_rate': [0.001, 0.01, 0.1] } print("CNN Hyperparameter Tuning Grid:", param_grid) </pre>

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
CNN	CNNs were chosen for arrhythmia classification because they excel at processing 2D ECG spectrograms, automatically learning relevant features from the data. They handle large datasets efficiently, training faster than RNNs. Their proven success in medical image classification and robustness to noise make them ideal for this task.