Functional Test Case Template

Feature	Test Case	Steps to execute test case	Expected Output	Actual Output	Status	More Information
DDoS Detection (KNN Model)	Verify KNN model correctly classifies traffic	1. Load preprocessed dataset. 2. Train KNN model on training data. 3. Test with unseen network traffic data. 4. Check classification (benign or DDoS).	KNN correctly classifies the majority of benign and DDoS traffic with high accuracy.	KNN classified traffic correctly, but struggled with complex DDoS patterns.	Pass	Model may need further tuning to improve accuracy for complex attack vectors.
DDoS Detection (CNN Model)	Test CNN model's accuracy on detecting DDoS attacks	. Train CNN model using preprocessed network traffic data. 2. Run inference on test dataset. 3. Review precision and recall metrics. 4. Check model's output.	CNN correctly detects DDoS traffic with higher accuracy and recall than KNN.	CNN successfully classified traffic with superior accuracy compared to KNN.	Pass	CNN outperforms KNN but requires significant resources for training.
Feature Selection Impact	Assess the impact of feature selection on model performance	1. Run KNN model with original features. 2. Apply PCA for dimensionality reduction. 3. Re-run KNN and CNN with selected features. 4. Compare performance.	Model performance improves with reduced feature set, especially in speed and accuracy.	Both KNN and CNN models saw improved performance after applying PCA.	Pass	Feature selection significantly enhanced model efficiency and accuracy.
Hybrid Quantum Neural Network (H-QNN)	Test H-QNN's DDoS detection capability using quantum circuits.	1. Prepare traffic data. 2. Run hybrid quantum circuits for feature extraction. 3. Classify traffic using quantum-enhanced layers. 4. Check detection accuracy.	H-QNN provides higher accuracy with faster feature extraction and fewer false positives.	H-QNN performed well, with high accuracy and efficient detection in real-time tests.	Pass	Quantum layer improves classification speed and accuracy but has hardware constraints.