

Dataset Statistics:

Total Samples: 494021

Total Features: 42

Class Distribution: {'dos': 391458, 'normal': 97278, 'probe': 4107, 'r2l': 1126, 'u2r': 52}

Metrics for Gaussian Naive Bayes:

Training Accuracy: 0.9955543297842193

Training Precision: 0.9985007811494123

Training Recall: 0.9955543297842193

Training F1: 0.9966497700164103

Testing Accuracy: 0.9955063002884469

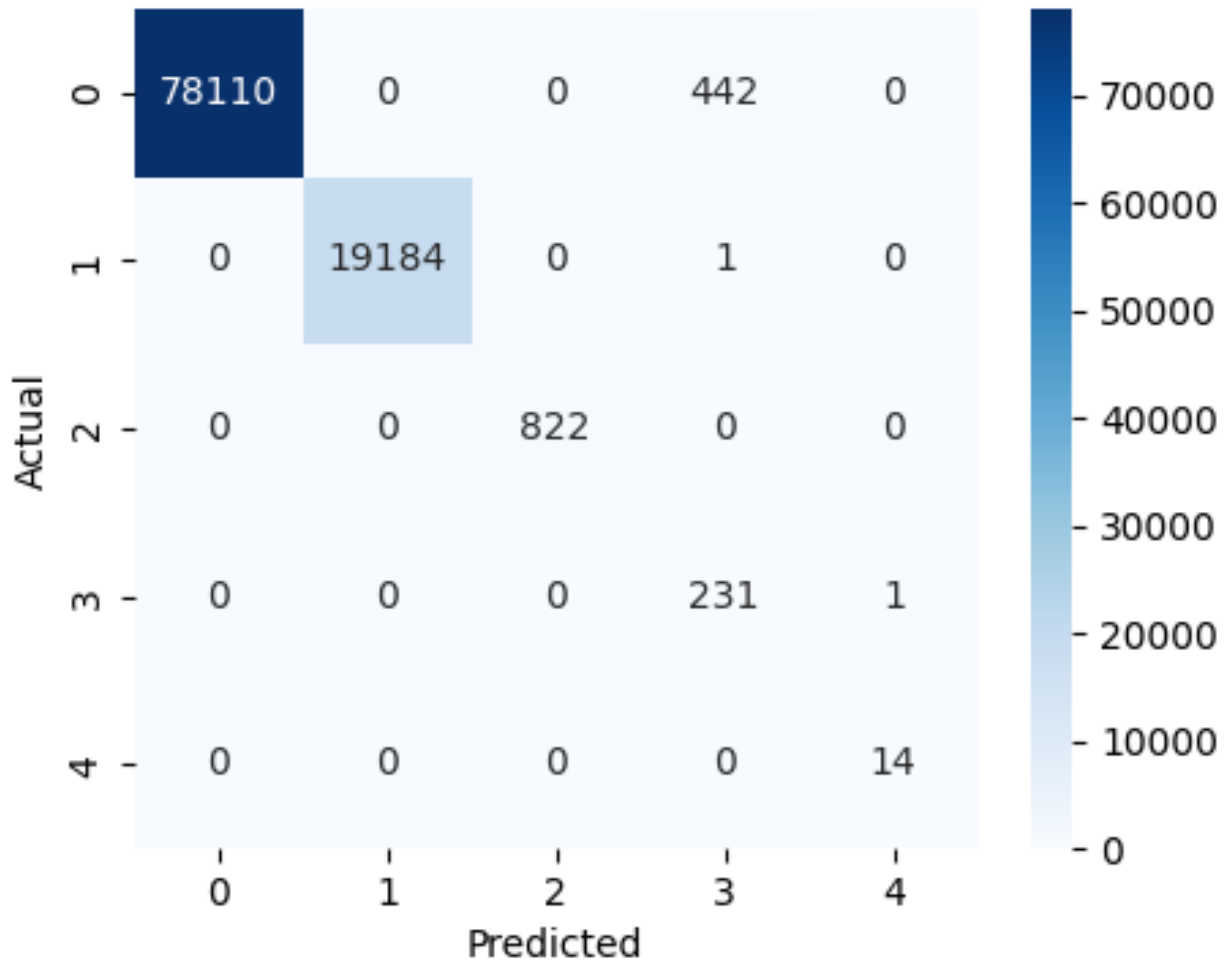
Testing Precision: 0.9984472447728596

Testing Recall: 0.9955063002884469

Testing F1: 0.9965963093305897

Training Time: 0.6805579662322998

Confusion Matrix: Gaussian Naive Bayes



Metrics for Decision Tree:

Training Accuracy: 1.0

Training Precision: 1.0

Training Recall: 1.0

Training F1: 1.0

Testing Accuracy: 0.9999190324376297

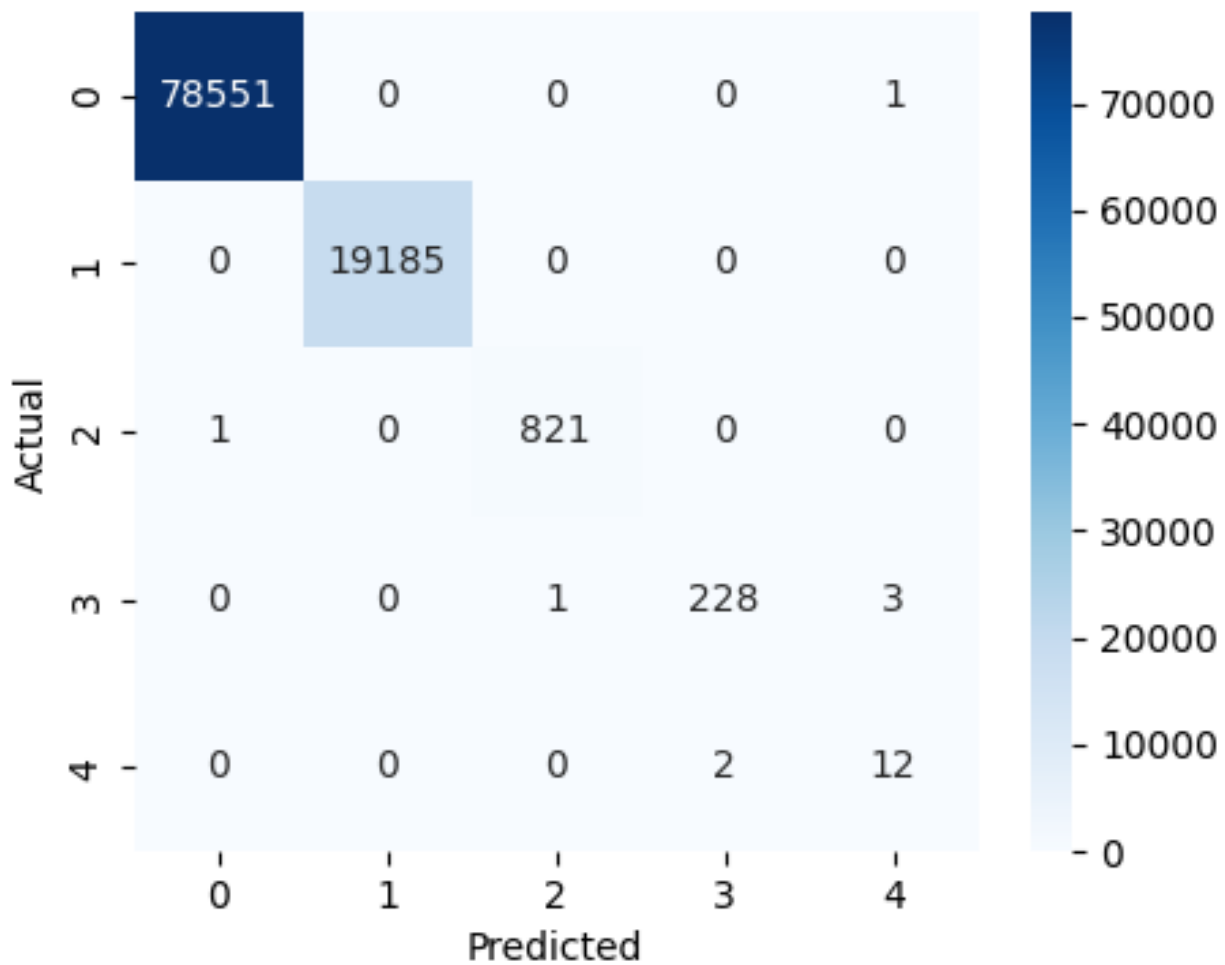
Testing Precision: 0.9999239168938379

Testing Recall: 0.9999190324376297

Testing F1: 0.9999209251858409

Training Time: 4.206192493438721

Confusion Matrix: Decision Tree



Metrics for Random Forest:

Training Accuracy: 1.0

Training Precision: 1.0

Training Recall: 1.0

Training F1: 1.0

Testing Accuracy: 0.9999797581094074

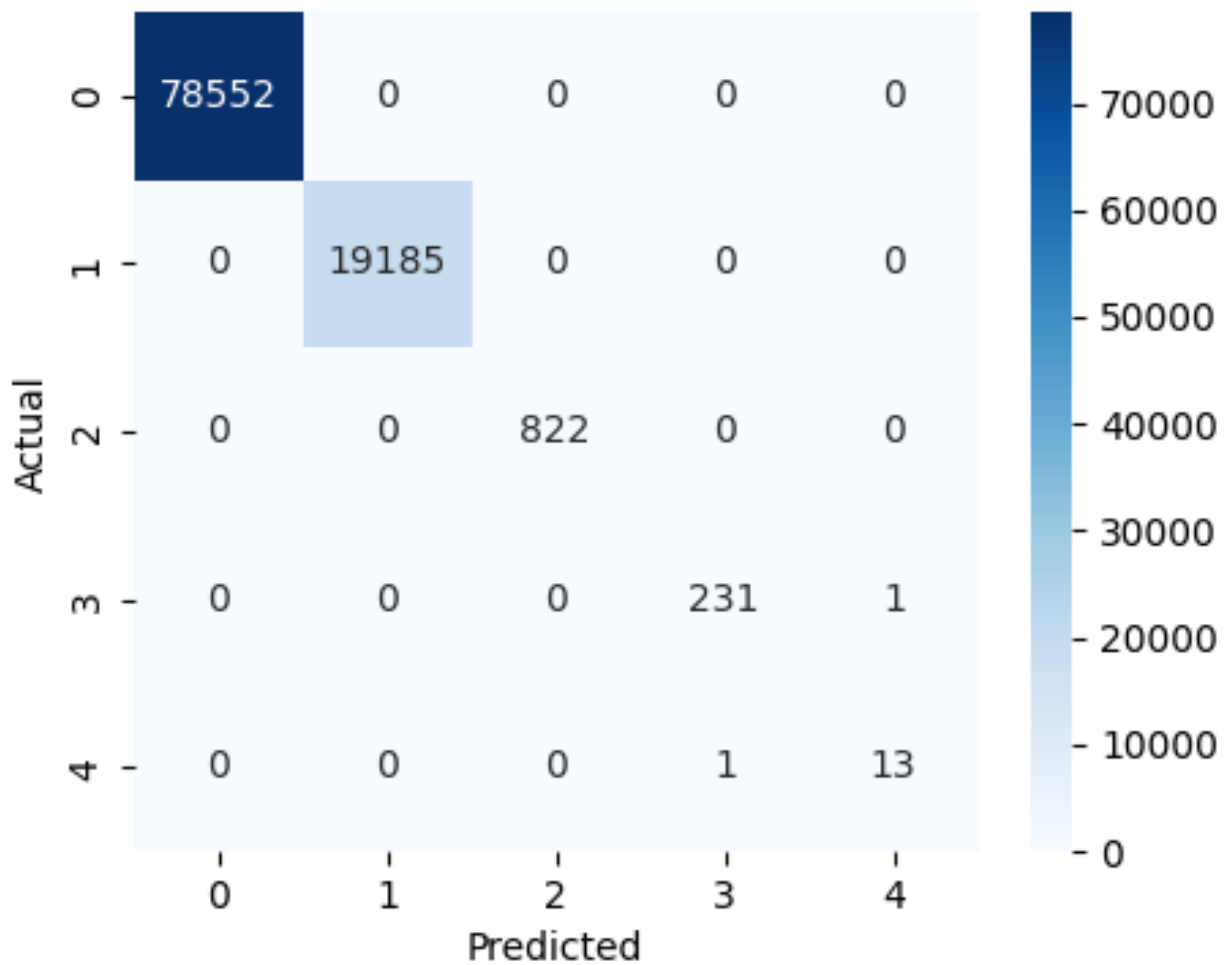
Testing Precision: 0.9999797581094074

Testing Recall: 0.9999797581094074

Testing F1: 0.9999797581094074

Training Time: 22.242615222930908

Confusion Matrix: Random Forest



Metrics for Gradient Boosting:

Training Accuracy: 1.0

Training Precision: 1.0

Training Recall: 1.0

Training F1: 1.0

Testing Accuracy: 1.0

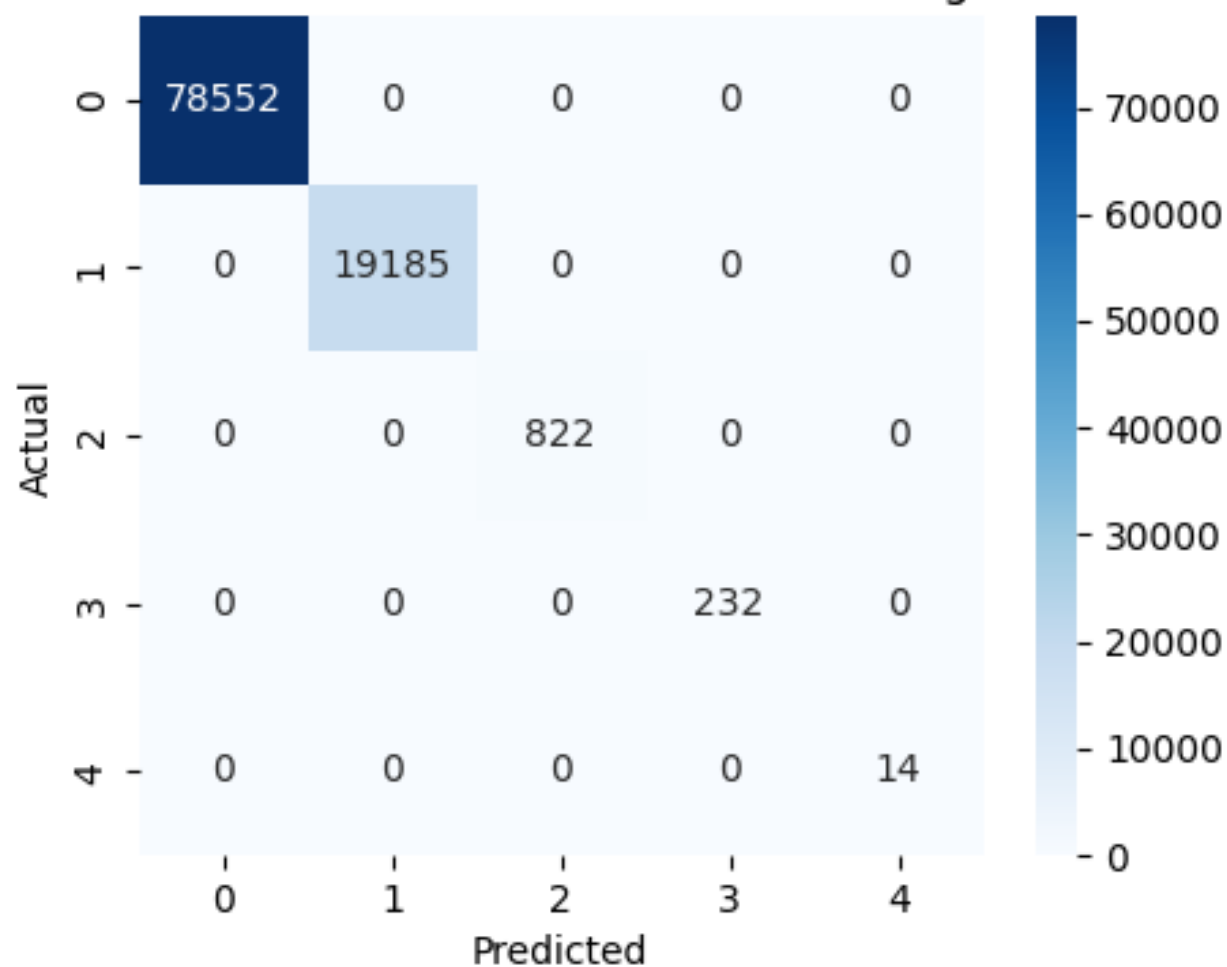
Testing Precision: 1.0

Testing Recall: 1.0

Testing F1: 1.0

Training Time: 596.2259058952332

Confusion Matrix: Gradient Boosting



Metrics for SVM:

Training Accuracy: 1.0

Training Precision: 1.0

Training Recall: 1.0

Training F1: 1.0

Testing Accuracy: 1.0

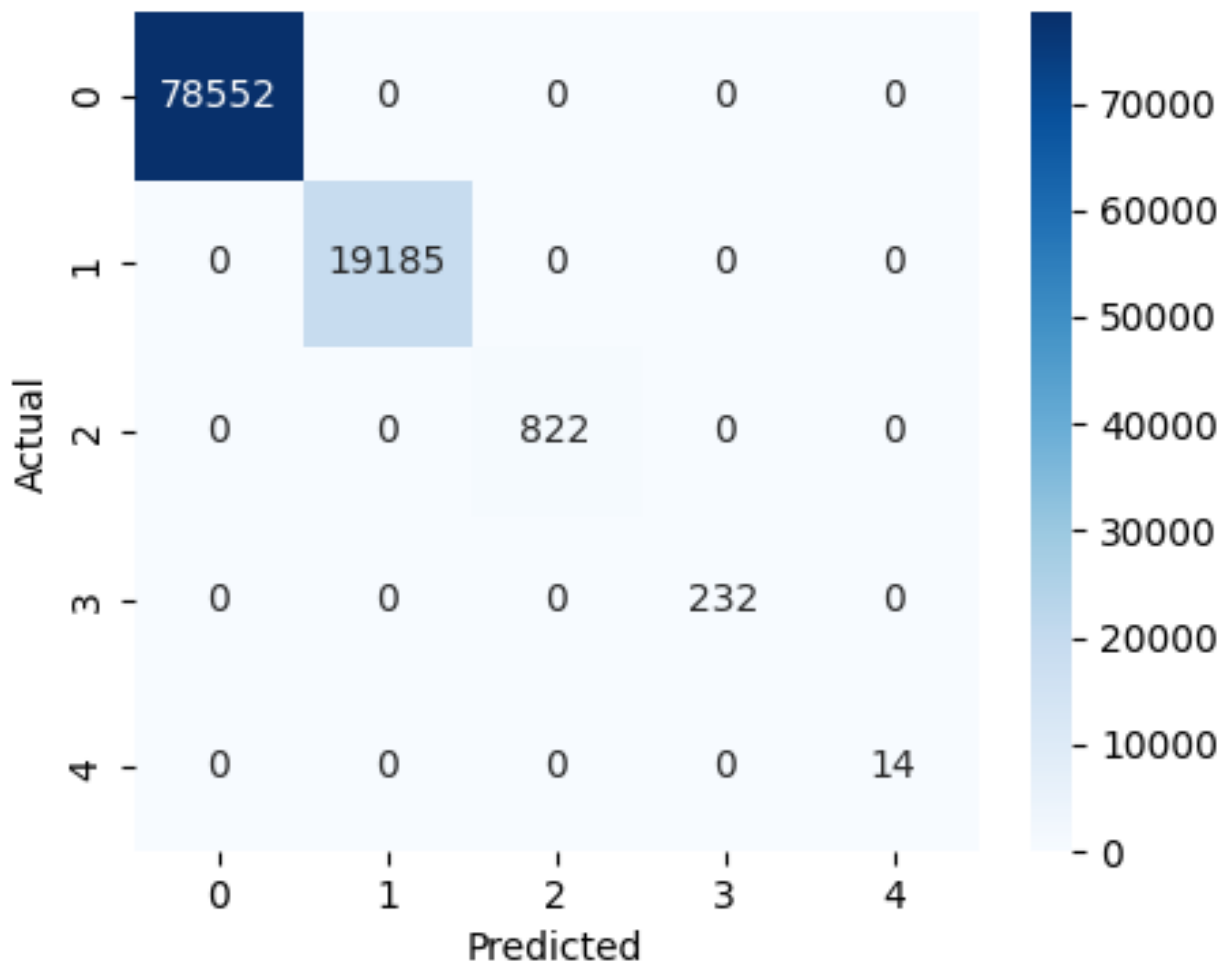
Testing Precision: 1.0

Testing Recall: 1.0

Testing F1: 1.0

Training Time: 130.7721037864685

Confusion Matrix: SVM



Metrics for Logistic Regression:

Training Accuracy: 0.9998203514027773

Training Precision: 0.9997251647296683

Training Recall: 0.9998203514027773

Training F1: 0.9997726247083958

Testing Accuracy: 0.9998178229846668

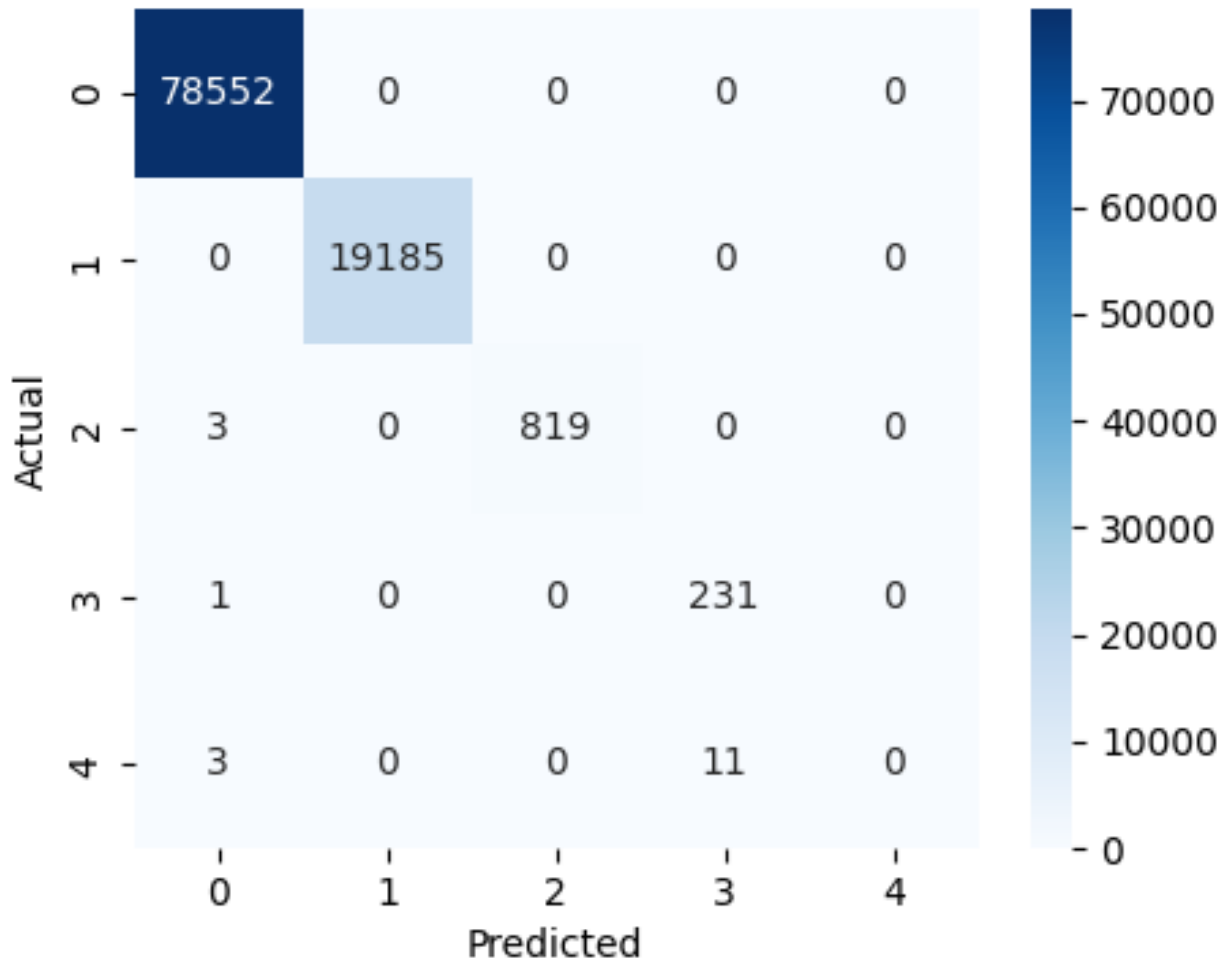
Testing Precision: 0.9996807364929868

Testing Recall: 0.9998178229846668

Testing F1: 0.9997482313242126

Training Time: 1.293996810913086

Confusion Matrix: Logistic Regression



Metrics for Neural Network:

Training Accuracy: 1.0

Training Precision: 1.0

Training Recall: 1.0

Training F1: 1.0

Testing Accuracy: 1.0

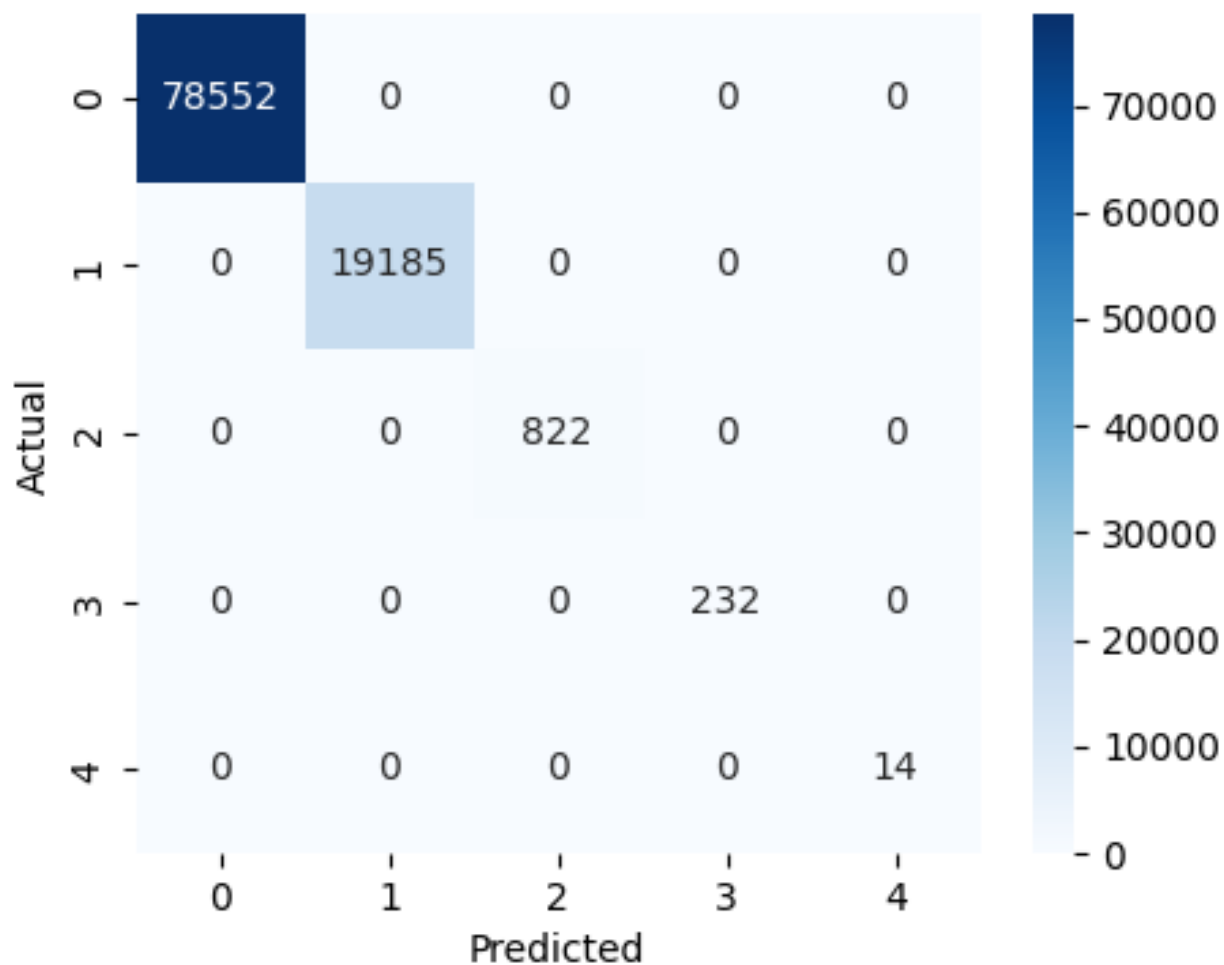
Testing Precision: 1.0

Testing Recall: 1.0

Testing F1: 1.0

Training Time: 174.17101526260376

Confusion Matrix: Neural Network



Feature Importances (Tree-Based Models Only):

Model: Decision Tree

dst_host_count: 0.0287

same_srv_rate: 0.0164

src_bytes: 0.0032

protocol_type: 0.0006

duration: 0.0001

num_root: 0.0000

count: 0.0000

srv_diff_host_rate: 0.0000

dst_host_error_rate: 0.0000

root_shell: 0.0000

flag: 0.0000

srv_serror_rate: 0.0000

num_failed_logins: 0.0000

diff_srv_rate: 0.0000

hot: 0.0000

service: 0.0000

num_outbound_cmds: 0.0000

dst_bytes: 0.0000

land: 0.0000

wrong_fragment: 0.0000

urgent: 0.0000

logged_in: 0.0000

num_compromised: 0.0000

su_attempted: 0.0000

num_file_creations: 0.0000

num_shells: 0.0000

num_access_files: 0.0000

is_host_login: 0.0000

is_guest_login: 0.0000

srv_count: 0.0000

serror_rate: 0.0000

rerror_rate: 0.0000

srv_rerror_rate: 0.0000

dst_host_srv_count: 0.0000

dst_host_same_srv_rate: 0.0000

dst_host_diff_srv_rate: 0.0000

dst_host_same_src_port_rate: 0.0000

dst_host_srv_diff_host_rate: 0.0000

dst_host_serror_rate: 0.0000

dst_host_srv_serror_rate: 0.0000

dst_host_srv_rerror_rate: 0.0000

target: 0.0000

Model: Random Forest

num_outbound_cmds: 0.1482

service: 0.0786

urgent: 0.0766

is_host_login: 0.0575

dst_host_same_srv_rate: 0.0512

same_srv_rate: 0.0493

srv_serror_rate: 0.0245

rerror_rate: 0.0216

dst_host_srv_count: 0.0200

srv_rerror_rate: 0.0193

dst_host_rerror_rate: 0.0148

dst_host_count: 0.0138

dst_host_srv_serror_rate: 0.0133

dst_host_same_src_port_rate: 0.0108

diff_srv_rate: 0.0102

protocol_type: 0.0081

srv_diff_host_rate: 0.0063

dst_host_diff_srv_rate: 0.0046

dst_host_serror_rate: 0.0044

land: 0.0038

hot: 0.0038

duration: 0.0034

dst_host_srv_diff_host_rate: 0.0028

srv_count: 0.0024

is_guest_login: 0.0020

count: 0.0019

src_bytes: 0.0019

serror_rate: 0.0010

num_access_files: 0.0004

wrong_fragment: 0.0001

num_compromised: 0.0001

num_failed_logins: 0.0000

root_shell: 0.0000

flag: 0.0000

num_root: 0.0000

su_attempted: 0.0000

dst_host_srv_rerror_rate: 0.0000

logged_in: 0.0000

dst_bytes: 0.0000

num_file_creations: 0.0000

num_shells: 0.0000

target: 0.0000

Model: Gradient Boosting

num_outbound_cmds: 0.0063

dst_host_count: 0.0040

protocol_type: 0.0014

dst_host_diff_srv_rate: 0.0001

src_bytes: 0.0000

same_srv_rate: 0.0000

duration: 0.0000

srv_diff_host_rate: 0.0000

is_guest_login: 0.0000

service: 0.0000

dst_host_error_rate: 0.0000

srv_serror_rate: 0.0000

is_host_login: 0.0000

error_rate: 0.0000

diff_srv_rate: 0.0000

dst_host_srv_diff_host_rate: 0.0000

urgent: 0.0000

land: 0.0000

dst_host_serror_rate: 0.0000

srv_count: 0.0000

serror_rate: 0.0000

flag: 0.0000

dst_host_srv_serror_rate: 0.0000

dst_host_same_srv_rate: 0.0000

hot: 0.0000

dst_host_srv_count: 0.0000

dst_host_same_src_port_rate: 0.0000

dst_bytes: 0.0000

wrong_fragment: 0.0000

num_failed_logins: 0.0000

logged_in: 0.0000

num_compromised: 0.0000

root_shell: 0.0000

su_attempted: 0.0000

num_root: 0.0000

num_file_creations: 0.0000

num_shells: 0.0000

num_access_files: 0.0000

count: 0.0000

srv_error_rate: 0.0000

dst_host_srv_error_rate: 0.0000

target: 0.0000