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==== Training SVM Models for Each Dataset ====


🔷 Training on NSLKDD dataset...

✅ NSLKDD dataset limited to 100,000 rows.
📊 Class distribution before split: Counter({0: 50001, 1: 49999})
📊 Class distribution after split: Counter({0: 35001, 1: 34999})
✅ Applied SMOTE to balance dataset.
🎯 SVM Accuracy for NSLKDD: 0.9780
              precision    recall  f1-score   support

           0       0.98      0.98      0.98     15000
           1       0.98      0.98      0.98     15000

    accuracy                           0.98     30000
   macro avg       0.98      0.98      0.98     30000
weighted avg       0.98      0.98      0.98     30000


🔷 Training on UNSW_NB15 dataset...

✅ UNSW_NB15 dataset limited to 100,000 rows.
📊 Class distribution before split: Counter({1: 63917, 0: 36083})
📊 Class distribution after split: Counter({1: 44742, 0: 25258})
✅ Applied SMOTE to balance dataset.
🎯 SVM Accuracy for UNSW_NB15: 0.9936
              precision    recall  f1-score   support

           0       0.99      1.00      0.99     10825
           1       1.00      0.99      1.00     19175

    accuracy                           0.99     30000
   macro avg       0.99      0.99      0.99     30000
weighted avg       0.99      0.99      0.99     30000


🔷 Training on KDDCup dataset...

✅ KDDCup dataset limited to 100,000 rows.
📊 Class distribution before split: Counter({12: 65043, 8: 21302, 6:
12519, 11: 495, 3: 260, 10: 207, 7: 74, 0: 53, 14: 30, 13: 9, 4: 2, 1: 2,
5: 2, 2: 1, 9: 1})
📊 Class distribution after split: Counter({12: 45634, 8: 14845, 6: 8727,
11: 331, 3: 188, 10: 144, 7: 55, 0: 42, 14: 21, 13: 8, 1: 2, 5: 2, 2: 1})
⚠️ Skipping SMOTE due to insufficient class samples.
🎯 SVM Accuracy for KDDCup: 0.9987
              precision    recall  f1-score   support
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0	1.00	1.00	1.00	11
3	0.99	0.97	0.98	72
4	0.00	0.00	0.00	2
6	1.00	1.00	1.00	3792
7	0.86	0.95	0.90	19
8	1.00	1.00	1.00	6457
9	0.00	0.00	0.00	1
10	0.98	0.98	0.98	63
11	0.99	0.99	0.99	164
12	1.00	1.00	1.00	19409
13	1.00	1.00	1.00	1
14	0.28	0.89	0.42	9
accuracy			1.00	30000
macro avg	0.76	0.82	0.77	30000
weighted avg	1.00	1.00	1.00	30000

🔷 Training on CICIDS2017 dataset...

✅ CICIDS2017 dataset limited to 100,000 rows.
📊 Class distribution before split: Counter({0: 100000})
⚠️ Detected single-class dataset: CICIDS2017. Using One-Class SVM.
🔍 Anomalies Detected: 9953, Normal Samples: 90047