Decision Tree: Attack Detection	
Parameters to choose: max depth = 5, 10, 15, 20, 30, 40, 50, 100, 150, 200 min samples split = 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 2, 3, 4, 5, 6, 7 min samples leaf = 1, 2, 3, 4, 5	**Traditional Machine learning model accuracy: 99.8434%** Running Times seconds: 8524, FPR: 10.04%
	FedAvg accuracy: 99.8527%, Running Times seconds: 154.0514, FPR: 9.5726% First round: IoT device 0 Best Accuracy: 0.998310 FPR: 0.055913 using 'max depth': 40, 'min samples leaf': 3, 'min samples split': 5 IoT device 1 Best Accuracy: 0.997699 FPR: 0.085724 using 'max depth': 10, 'min samples leaf': 4, 'min samples split': 5 IoT device 2 Best Accuracy: 0.999689 FPR: 0.028007 using 'max depth': 10, 'min samples leaf': 1, 'min samples split': 0.1 IoT device 3 Best Accuracy: 0.999099 FPR: 0.083797 using 'max depth': 100, 'min samples leaf': 3, 'min samples split': 3 IoT device 4 Best Accuracy: 0.999220 FPR: 0.073456 using 'max depth': 50, 'min samples leaf': 1, 'min samples split': 7 IoT device 5 Best Accuracy: 0.999882 FPR: 0.083333 using 'max depth': 5, 'min samples leaf': 1, 'min samples split': 3 IoT device 6 Best Accuracy: 0.999091 FPR: 0.033563 using 'max depth': 10, 'min samples leaf': 1, 'min samples split': 7 IoT device 7 Best Accuracy: 0.999201 FPR: 0.021190 using 'max depth': 5, 'min samples leaf': 1, 'min samples split': 3 IoT device 8 Best Accuracy: 0.998341 FPR: 0.139175 using 'max depth': 150, 'min samples leaf': 2, 'min samples split': 7 IoT device 9 Best Accuracy: 0.998414 FPR: 0.060517 using 'max depth': 10, 'min samples leaf': 4, 'min samples split': 7 Second round: Aggregate updates with mean parameters: 'max depth': 39, 'min samples leaf': 2, 'min samples split': 5 IoT Device 0 Accuracy: 0.997822 FPR: 0.099087 IoT Device 1 Accuracy: 0.997357 FPR: 0.110860 IoT Device 2 Accuracy: 0.999414 FPR: 0.111226 IoT Device 3 Accuracy: 0.998819 FPR: 0.111539 IoT Device 4 Accuracy: 0.999023 FPR: 0.134396 IoT Device 5 Accuracy: 0.999825 FPR: 0.000000 IoT Device 6 Accuracy: 0.998789 FPR: 0.066953 IoT Device 7 Accuracy: 0.998868 FPR: 0.062750 IoT Device 8 Accuracy: 0.998145 FPR: 0.159937 IoT Device 9 Accuracy: 0.997864 FPR: 0.100517
	FedGroup accuracy: 99.8661%, Running Times seconds: 153.9543, FPR: 7.7021% First round: same as the first round of FedAvg Second round: **Camera group**: IoT Device 0 and 4, Accuracy: 99.8509% using 'max depth': 45, 'min samples leaf': 2, 'min samples split': 6 **Appliances group**: IoT Device 9, Accuracy: 99.8310% using 'max depth': 10, 'min samples leaf': 4, 'min samples split': 7 **Controller group**: IoT Device 2, Accuracy: 99.9450% using 'max depth': 10, 'min samples leaf': 1, 'min samples split': 0.1 **Energy group**: IoT Device 1, 3, 5, 6, 7, and 8, Accuracy: 99.8638% using 'max depth': 47, 'min samples leaf': 2, 'min samples split': 5

Table A.6: Decision Tree: Attack Detection

Logistic Regression: Attack Detection	
Parameters to choose: C = 0.01, 0.1, 1, 10, 100	**Traditional Machine learning model accuracy: 99.7563%** Running Times seconds: 21375.6019, FPR: 24.4798%
	FedAvg accuracy: 99.7654%, Running Times seconds: 2912.2639, FPR: 20.2837% First round: IoT device 0 Best Accuracy: 0.996143 FPR: 0.234854 using 'C': 0.1 IoT device 1 Best Accuracy: 0.995844 FPR: 0.110688 using 'C': 1 IoT device 2 Best Accuracy: 0.998931 FPR: 0.166839 using 'C': 10 IoT device 3 Best Accuracy: 0.997947 FPR: 0.296582 using 'C': 1 IoT device 4 Best Accuracy: 0.997942 FPR: 0.280559 using 'C': 0.01 IoT device 5 Best Accuracy: 0.999851 FPR: 0.083333 using 'C': 0.1 IoT device 6 Best Accuracy: 0.998057 FPR: 0.250115 using 'C': 1 IoT device 7 Best Accuracy: 0.998905 FPR: 0.083619 using 'C': 0.1 IoT device 8 Best Accuracy: 0.996711 FPR: 0.333476 using 'C': 0.1 IoT device 9 Best Accuracy: 0.996908 FPR: 0.180287 using 'C': 0.01 Second round: Aggregate updates with mean parameters: using 'C': 1.34 IoT Device 0 Accuracy: 0.996020 FPR: 0.110572 IoT Device 1 Accuracy: 0.995777 FPR: 0.110860 IoT Device 2 Accuracy: 0.998877 FPR: 0.166839 IoT Device 3 Accuracy: 0.998006 FPR: 0.296582 IoT Device 4 Accuracy: 0.997897 FPR: 0.280559 IoT Device 5 Accuracy: 0.999851 FPR: 0.083333 IoT Device 6 Accuracy: 0.998057 FPR: 0.250115 IoT Device 7 Accuracy: 0.998885 FPR: 0.073202 IoT Device 8 Accuracy: 0.996688 FPR: 0.333512 IoT Device 9 Accuracy: 0.996610 FPR: 0.180287
	FedGroup accuracy: 99.7691%, Running Times seconds: 2998.8492, FPR: 20.1825% First round: same as the first round of FedAvg Second round: **Camera group**: IoT Device 0 and 4, Accuracy: 99.7093% using 'C': 0.055 **Appliances group**: IoT Device 9, Accuracy: 99.7175% using 'C': 0.01 **Controller group**: IoT Device 2, Accuracy: 99.9028% using 'C': 10 **Energy group**: IoT Device 1, 3, 5, 6, 7, and 8, Accuracy: 99.7753% using 'C': 0.055

Table A.7: Logistic Regression: Attack Detection

Ensemble Learning: Attack Detection	
Parameters to choose: knn n neighbors': 1, 2, 3, 4, 5,	**Traditional Machine learning model accuracy: 99.8490%** Running Times seconds: 33940.1807, FPR: 9.6031%
	FedAvg accuracy: 99.9185% Running Times seconds: 2390, FPR: 9.03% First round: Fine-tuning 'knn n neighbors' Second round: Aggregate updates with mean parameters IoT Device 0 Accuracy: 0.998792 IoT Device 1 Accuracy: 0.998542 IoT Device 2 Accuracy: 0.999314 IoT Device 3 Accuracy: 0.999680 IoT Device 4 Accuracy: 0.999538 IoT Device 5 Accuracy: 0.999857 IoT Device 6 Accuracy: 0.999085 IoT Device 7 Accuracy: 0.999343 IoT Device 8 Accuracy: 0.999165 IoT Device 9 Accuracy: 0.998514
	FedGroup accuracy: 99.9185% Running Times seconds: 2143, FPR: 9.43% First round: same as the first round of FedAvg_EL Second round: Aggregate updates with mean parameters based on groups **Camera group**: IoT Device 0 and 4, Accuracy: 99.91205% **Appliances group**: IoT Device 9, Accuracy: 99.8514% **Controller group**: IoT Device 2, Accuracy: 99.9314% **Energy group**: IoT Device 1, 3, 5, 6, 7, and 8, Accuracy: 99.9278%

Table A.8: Ensemble Learning: Attack Detection

Appendix A.2. Appendix B: Results of models: Attack Type Detection

Decision Tree: Attack Type Detection	
Parameters to choose: max depth = 5, 10, 15, 20, 30, 40, 50, 100, 150, 200 min samples split = 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 2, 3, 4, 5, 6, 7 min samples leaf = 1, 2, 3, 4, 5	**Traditional Machine learning model accuracy: 88.4082%** Running Times seconds: 35.0063, FPR: 0.2651%
	FedAvg accuracy: 93.8953%, Running Times seconds: 10.9335, FPR: 0.3450% First round: Hyperparameters and Fine-tuning Second round: Aggregate updates with mean parameters: 'max depth': 81, 'min samples leaf': 2, 'min samples split': 3 IoT Device 0 Accuracy: 0.885343 FPR: 0.001042 IoT Device 1 Accuracy: 0.917624 FPR: 0.001149 IoT Device 2 Accuracy: 0.956254 FPR: 0.006944 IoT Device 3 Accuracy: 0.919554 FPR: 0.001868 IoT Device 4 Accuracy: 0.875921 FPR: 0.010263 IoT Device 5 Accuracy: 0.914667 FPR: 0.000000 IoT Device 6 Accuracy: 0.935000 FPR: 0.004762 IoT Device 7 Accuracy: 0.914859 FPR: 0.001208 IoT Device 8 Accuracy: 0.855905 FPR: 0.003824 IoT Device 9 Accuracy: 0.888499 FPR: 0.003437
	FedGroup accuracy: 94.8587%, Running Times seconds: 10.9313, FPR: 0.2663% First round: same as the first round of FedAvg Second round: **Camera group**: IoT Device 0 and 4, Accuracy: 91.4581% using 'max depth': 65, 'min samples leaf': 2, 'min samples split': 3 **Appliances group**: IoT Device 9, Accuracy: 91.7320% using 'max depth': 40, 'min samples leaf': 2, 'min samples split': 3 **Controller group**: IoT Device 2, Accuracy: 100.0000% using 'max depth': 10, 'min samples leaf': 1, 'min samples split': 3 **Energy group**: IoT Device 1, 3, 5, 6, 7, and 8, Accuracy: 94.8587% using 'max depth': 106, 'min samples leaf': 2, 'min samples split': 4

Table A.9: Decision Tree: Attack Type Detection

Logistic Regression: Attack Type Detection	
Parameters to choose: C = 0.01, 0.1, 1, 10, 100	**Traditional Machine learning model accuracy: 39.7257%** Running Times seconds: 5442.6151, FPR: 1.3722%
	FedAvg accuracy: 49.5542%, Running Times seconds: 183.2524, FPR: 2.7627% First round: IoT device 0 Best Accuracy: 0.475672 FPR: 0.012224 using 'C': 100 IoT device 1 Best Accuracy: 0.377739 FPR: 0.016092 using 'C': 1 IoT device 2 Best Accuracy: 0.531175 FPR: 0.048611 using 'C': 0.01 IoT device 3 Best Accuracy: 0.360421 FPR: 0.032711 using 'C': 100 IoT device 4 Best Accuracy: 0.451356 FPR: 0.040175 using 'C': 0.01 IoT device 5 Best Accuracy: 0.784667 FPR: 0.000000 using 'C': 10 IoT device 6 Best Accuracy: 0.421944 FPR: 0.042857 using 'C': 10 IoT device 7 Best Accuracy: 0.282076 FPR: 0.034695 using 'C': 1 IoT device 8 Best Accuracy: 0.486789 FPR: 0.015952 using 'C': 0.01 IoT device 9 Best Accuracy: 0.496668 FPR: 0.180287 using 'C': 0.01 Second round: Aggregate updates with mean parameters: using 'C': 22 IoT Device 0 Accuracy: 0.477079 FPR: 0.012224 IoT Device 1 Accuracy: 0.369502 FPR: 0.018391 IoT Device 2 Accuracy: 0.461066 FPR: 0.055556 IoT Device 3 Accuracy: 0.350340 FPR: 0.032784 IoT Device 4 Accuracy: 0.418393 FPR: 0.041842 IoT Device 5 Accuracy: 0.784667 FPR: 0.000000 IoT Device 6 Accuracy: 0.420278 FPR: 0.042857 IoT Device 7 Accuracy: 0.255525 FPR: 0.034695 IoT Device 8 Accuracy: 0.375752 FPR: 0.022563 IoT Device 9 Accuracy: 0.414895 FPR: 0.015360
	FedGroup accuracy: 52.0105%, Running Times seconds: 198.7906, FPR: 2.6341% First round: same as the first round of FedAvg Second round: **Camera group**: IoT Device 0 and 4, Accuracy: 48.4768% using 'C': 50 **Appliances group**: IoT Device 9, Accuracy: 67.8665% using 'C': 0.01 **Controller group**: IoT Device 2, Accuracy: 57.8307% using 'C': 0.01 **Energy group**: IoT Device 1, 3, 5, 6, 7, and 8, Accuracy: 49.5757% using 'C': 20

Table A.10: Logistic Regression: Attack Type Detection

Ensemble Learning: Attack Detection	
Parameters to choose: 'cart max depth': 10, 20, 30, 40 'cart min samples leaf': 1, 2, 3 'cart min samples split': 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0 'knn n neighbors': 1, 2, 3 'knn p': 1, 2	**Traditional Machine learning model accuracy: 99.8490%** Running Times seconds: 33940.1807, FPR: 9.6031%
	FedAvg accuracy: 99.4963% Running Times seconds: 370.6777, FPR: 0.0286% First round: Using Samsung Smart Cam to adjust the level-0 model in the Stacking Ensemble learning then Fine-tuning the parameters Second round: Aggregate updates with mean parameters: using knn n neighbors = 2, knn p = 1, cart max depth = 10, cart min samples split = 0.4, cart min samples leaf = 1 IoT Device 0 Accuracy: 0.989538 FPR: 0.000000 IoT Device 1 Accuracy: 1.000000 FPR: 0.000000 IoT Device 2 Accuracy: 1.000000 FPR: 0.000000 IoT Device 3 Accuracy: 1.000000 FPR: 0.000000 IoT Device 4 Accuracy: 1.000000 FPR: 0.000000 IoT Device 5 Accuracy: 1.000000 FPR: 0.000000 IoT Device 6 Accuracy: 1.000000 FPR: 0.002381 IoT Device 7 Accuracy: 1.000000 FPR: 0.000000 IoT Device 8 Accuracy: 0.983218 FPR: 0.000476 IoT Device 9 Accuracy: 0.945748 FPR: 0.000000
	FedGroup accuracy: 99.6444% Running Times seconds: 341.4309, FPR: 0.0238% First round: same as the first round of FedAvg Second round: **Camera group**: IoT Device 0 and 4, Accuracy: 100.0000% using knn n neighbors = 2, knn p = 1, cart max depth = 10, cart min samples split = 0.1, cart min samples leaf = 1 **Appliances group**: IoT Device 9, Accuracy: 100.0000% using knn n neighbors = 3, knn p = 2, cart max depth = 10, cart min samples split = 1.0, cart min samples leaf = 1 **Controller group**: IoT Device 2, Accuracy: 100.0000% using knn n neighbors = 1, knn p = 1, cart max depth = 10, cart min samples split = 0.1, cart min samples leaf = 1 **Energy group**: IoT Device 1, 3, 5, 6, 7, and 8, Accuracy: 99.4074% using knn n neighbors = 3, knn p = 1, cart max depth = 10, cart min samples split = 0.1, cart min samples leaf = 1

Table A.11: Ensemble Learning: Attack Detection

Ensemble Learning: Attack Type Detection Detail 1	
Parameters to choose: 'knn n neighbors': 1, 2, 3, 4, 5, 10, 15, 19 'cart criterion': 'gini', 'entropy' 'bayes var smoothing': 1e-7, 1e-08, 1e-09, 1e-10, 1e-11, 1e-12, 1e-13, 1e-14	**FedAvg_EL accuracy: 99.8941%** Running Times seconds: 4447.7158, FPR: 4.7904% First round: IoT Device 0 Best: 0.998792 using Direct or Reflection: 'bayes var smoothing': 1e-13, 'cart criterion': 'gini', 'knn n neighbors': 2; Type of attack: 'bayes var smoothing': 1e-10, 'cart criterion': 'gini', 'knn n neighbors': 3; Rate of attack: 'bayes var smoothing': 1e-13, 'cart criterion': 'gini', 'knn n neighbors': 3; Layer of attack: 'bayes var smoothing': 1e-13, 'cart criterion': 'entropy', 'knn n neighbors': 4. IoT Device 1 Best: 0.998542 using Direct or Reflection: 'bayes var smoothing': 1e-13, 'cart criterion': 'gini', 'knn n neighbors': 3; Type of attack: 'bayes var smoothing': 1e-12, 'cart criterion': 'gini', 'knn n neighbors': 2; Rate of attack: 'bayes var smoothing': 1e-14, 'cart criterion': 'gini', 'knn n neighbors': 3; Layer of attack: 'bayes var smoothing': 1e-09, 'cart criterion': 'entropy', 'knn n neighbors': 3. IoT Device 2 Best: 0.999314 using Direct or Reflection: 'bayes var smoothing': 1e-07, 'cart criterion': 'entropy', 'knn n neighbors': 10; Type of attack: 'bayes var smoothing': 1e-11, 'cart criterion': 'entropy', 'knn n neighbors': 4; Rate of attack: 'bayes var smoothing': 1e-13, 'cart criterion': 'entropy', 'knn n neighbors': 1; Layer of attack: 'bayes var smoothing': 1e-12, 'cart criterion': 'entropy', 'knn n neighbors': 5. IoT Device 3 Best: 0.999680 using Direct or Reflection: 'bayes var smoothing': 1e-10, 'cart criterion': 'entropy', 'knn n neighbors': 3; Type of attack: 'bayes var smoothing': 1e-13, 'cart criterion': 'gini', 'knn n neighbors': 5; Rate of attack: 'bayes var smoothing': 1e-7, 'cart criterion': 'gini', 'knn n neighbors': 3; Layer of attack: 'bayes var smoothing': 1e-14, 'cart criterion': 'gini', 'knn n neighbors': 4. IoT Device 4 Best: 0.999538 using Direct or Reflection: 'bayes var smoothing': 1e-14, 'cart criterion': 'gini', 'knn n neighbors': 3; Type of attack: 'bayes var smoothing': 1e-14, 'cart criterion': 'entropy', 'knn n neighbors': 4; Rate of attack: 'bayes var smoothing': 1e-9, 'cart criterion': 'gini', 'knn n neighbors': 3; Layer of attack: 'bayes var smoothing': 1e-11, 'cart criterion': 'gini', 'knn n neighbors': 4. IoT Device 5 Best: 0.999857 using Direct or Reflection: 'bayes var smoothing': 1e-12, 'cart criterion': 'gini', 'knn n neighbors': 15; Type of attack: 'bayes var smoothing': 1e-12, 'cart criterion': 'gini', 'knn n neighbors': 10; Rate of attack: 'bayes var smoothing': 1e-11, 'cart criterion': 'gini', 'knn n neighbors': 3; Layer of attack: 'bayes var smoothing': 1e-12, 'cart criterion': 'entropy', 'knn n neighbors': 10. IoT Device 6 Best: 0.999085 using Direct or Reflection: 'bayes var smoothing': 1e-8, 'cart criterion': 'entropy', 'knn n neighbors': 2; Type of attack: 'bayes var smoothing': 1e-13, 'cart criterion': 'entropy', 'knn n neighbors': 3; Rate of attack: 'bayes var smoothing': 1e-8, 'cart criterion': 'gini', 'knn n neighbors': 2; Layer of attack: 'bayes var smoothing': 1e-14, 'cart criterion': 'gini', 'knn n neighbors': 3. IoT Device 7 Best: 0.999343 using Direct or Reflection: 'bayes var smoothing': 1e-11, 'cart criterion': 'gini', 'knn n neighbors': 4; Type of attack: 'bayes var smoothing': 1e-11, 'cart criterion': 'entropy', 'knn n neighbors': 4; Rate of attack: 'bayes var smoothing': 1e-8, 'cart criterion': 'gini', 'knn n neighbors': 4; Layer of attack: 'bayes var smoothing': 1e-14, 'cart criterion': 'entropy', 'knn n neighbors': 1.

Table A.12: Ensemble Learning: Attack Type Detection Detail 1

Ensemble Learning: Attack Type Detection Detail 2	
Parameters to choose: 'knn n neighbors': 1, 2, 3, 4, 5, 10, 15, 19 'cart criterion': 'gini', 'entropy' 'bayes var smoothing': 1e-7, 1e-08, 1e-09, 1e-10, 1e-11, 1e-12, 1e-13, 1e-14	**FedAvg_EL accuracy: 99.8941%** Running Times seconds: 4447.7158, FPR: 4.7904% First round: IoT Device 8 Best: 0.999165 using Direct or Reflection: 'bayes var smoothing': 1e-7, 'cart criterion': 'entropy', 'knn n neighbors': 2; Type of attack: 'bayes var smoothing': 1e-13, 'cart criterion': 'entropy', 'knn n neighbors': 2; Rate of attack: 'bayes var smoothing': 1e-12, 'cart criterion': 'entropy', 'knn n neighbors': 5; Layer of attack: 'bayes var smoothing': 1e-13, 'cart criterion': 'entropy', 'knn n neighbors': 2. IoT Device 9 Best: 0.998514 using Direct or Reflection: 'bayes var smoothing': 1e-14, 'cart criterion': 'entropy', 'knn n neighbors': 2; Type of attack: 'bayes var smoothing': 1e-11, 'cart criterion': 'entropy', 'knn n neighbors': 3; Rate of attack: 'bayes var smoothing': 1e-13, 'cart criterion': entropy', 'knn n neighbors': 2; Layer of attack: 'bayes var smoothing': 1e-8, 'cart criterion': 'entropy', 'knn n neighbors': 3. Second round: using Aggregate updates with mean parameters Direct or Reflection: 'baye var smoothing': 1e-11, 'cart criterion': 'gini, 'knn n neighbors': 5; Type of attack: 'bayes var smoothing': 1e-12, 'cart criterion': 'entropy', 'knn n neighbors': 4; Rate of attack: 'bayes var smoothing': 1e-11, 'cart criterion': 'gini', 'knn n neighbors': 3; Layer of attack: 'bayes var smoothing': 1e-12, 'cart criterion': 'entropy', 'knn n neighbors': 4. IoT Device 0: 0.998810, IoT Device 1: 0.998828, IoT Device 2: 0.999343, IoT Device 3: 0.999609, IoT Device 4: 0.999538, IoT Device 5: 0.999914, IoT Device 6: 0.998971, IoT Device 7: 0.999165, IoT Device 8: 0.999201, IoT Device 9: 0.998485

Table A.13: Ensemble Learning: Attack Type Detection Detail 2

Ensemble Learning: Attack Type Detection Detail 2	
Parameters to choose: knn n neighbors': 1, 2, 3, 4, 5, 10, 15, 19 'cart criterion': 'gini', 'entropy' 'bayes var smoothing': 1e-7, 1e-08, 1e-09, 1e-10, 1e-11, 1e-12, 1e-13, 1e-14	**FedGroup accuracy: 99.8878%** Running Times seconds: 4431.1258, FPR: 5.2349% First round: same as the first round of FedAvg_EL Second round: Camera group: IoT Device 0 and 4, Accuracy: 0.9991205 using Direct or Reflection: 'bayes var smoothing': 1e-14, 'cart criterion': 'gini', 'knn n neighbors': 3 Type of attack: 'bayes var smoothing': 1e-12, 'cart criterion': 'gini', 'knn n neighbors': 4 Rate of attack: 'bayes var smoothing': 1e-11, 'cart criterion': 'gini', 'knn n neighbors': 3 Layer of attack: 'bayes var smoothing': 1e-12, 'cart criterion': 'gini', 'knn n neighbors': 4 Appliances group: IoT Device 9, Accuracy: 0.998514 using Direct or Reflection: 'bayes var smoothing': 1e-14, 'cart criterion': 'entropy', 'knn n neighbors': 2 Type of attack: 'bayes var smoothing': 1e-11, 'cart criterion': 'entropy', 'knn n neighbors': 3 Rate of attack: 'bayes var smoothing': 1e-13, 'cart criterion': 'entropy', 'knn n neighbors': 2 Layer of attack: 'bayes var smoothing': 1e-8, 'cart criterion': 'entropy', 'knn n neighbors': 3 Controller group: IoT Device 2, Accuracy: 0.999314 using Direct or Reflection: 'bayes var smoothing': 1e-07, 'cart criterion': 'entropy', 'knn n neighbors': 10 Type of attack: 'bayes var smoothing': 1e-11, 'cart criterion': 'entropy', 'knn n neighbors': 4 Rate of attack: 'bayes var smoothing': 1e-13, 'cart criterion': 'entropy', 'knn n neighbors': 1 Layer of attack: 'bayes var smoothing': 1e-12, 'cart criterion': 'entropy', 'knn n neighbors': 5 Energy group: IoT Device 1,3,5,6,7 and 8, Accuracy: 0.99927767 using Direct or Reflection: 'bayes var smoothing': 1e-10, 'cart criterion': 'gini', 'knn n neighbors': 5 Type of attack: 'bayes var smoothing': 1e-12, 'cart criterion': 'gini', 'knn n neighbors': 3 Rate of attack: 'bayes var smoothing': 1e-11, 'cart criterion': 'gini', 'knn n neighbors': 4 Layer of attack: 'bayes var smoothing': 1e-13, 'cart criterion': 'gini', 'knn n neighbors': 5

Table A.14: Ensemble Learning: Attack Type Detection Detail 3