Appendix B

Table 1: Selected Feature of CM-CIC-IDS2017 Dataset

feature	Feature Importance Score by XGBoost						Similarity	Missclassification
	Layer-1	Layer-2	Layer-3					
			Reconnaissance	Access	DoS	Malware		
bwd_iat_mean	0.008	0.008	0	0.001	0.003	0.003	0.292	0.184
bwd_pkts_s	0.022	0.022	0	0.003	0	0.02	0.199	0.045
flow_duration	0.006	0.006	0.001	0.005	0.042	0.015	0.226	-0.036
flow_iat_mean	0.004	0.004	0	0	0.007	0.001	0.204	-0.024
fwd_act_data_pkts	0.005	0.005	0	0.021	0.054	0.077	0.309	0.339
fwd_iat_mean	0.009	0.009	0.004	0.001	0	0.002	0.203	-0.017
fwd_iat_min	0.021	0.021	0.004	0.01	0.006	0.002	0.257	0.032
fwd_iat_std	0.012	0.012	0.02	0.002	0.001	0.005	0.223	-0.022
fwd_iat_tot	0.023	0.023	0.001	0.001	0	0.001	0.233	-0.037
fwd_pkt_len_std	0.004	0.004	0	0.008	0	0.068	0.297	0.157
pkt_len_max	0.007	0.007	0.002	0.012	0.011	0.001	0.292	0.23
pkt_size_avg	0.14	0.14	0	0.002	0.003	0.011	0.289	0.228
protocol	0.013	0.013	0.002	0.135	0.001	0.025	0.165	0.273
subflow_bwd_pkts	0.008	0.008	0	0.028	0	0.003	0.219	0.137
tot_bwd_pkts	0.005	0.005	0.009	0.031	0.006	0.002	0.22	0.14
tot_fwd_pkts	0.012	0.012	0.001	0.023	0.012	0.03	0.193	-0.051

Table 2: Selected Feature of CM-UNSW-NB15 Dataset

feature	Feature Importance Score by XGBoost						Similarity	Missclassification
	Layer-1	Layer-2	Layer-3					
			Reconnaissance	Access	DoS	Malware		
ackdat	0.006	0.006	0.000	0.001	0.000	0.002	0.373	-0.110
ct_state_ttl	0.273	0.273	0.559	0.012	0.272	0.014	0.454	0.013
dbytes	0.002	0.002	0.000	0.006	0.012	0.011	0.311	-0.060
dintpkt	0.000	0.000	0.007	0.009	0.009	0.017	0.341	-0.092
dmeansz	0.001	0.001	0.005	0.015	0.011	0.016	0.333	-0.034
dpkts	0.000	0.000	0.000	0.003	0.000	0.001	0.282	-0.073
dttl	0.007	0.007	0.001	0.021	0.004	0.000	0.235	-0.110
dwin	0.000	0.000	0.000	0.000	0.003	0.000	0.379	-0.112
proto_udp	0.001	0.001	0.000	0.056	0.000	0.625	0.167	0.732
res_bdy_len	0.002	0.002	0.000	0.001	0.004	0.002	0.240	-0.031
sbytes	0.003	0.003	0.000	0.005	0.042	0.164	0.447	-0.256
service_minus	0.001	0.001	0.000	0.004	0.002	0.000	0.998	-0.685
service_0	0.001	0.001	0.000	0.005	0.000	0.000	0.000	0.000
service_http	0.002	0.002	0.000	0.035	0.004	0.000	0.998	-0.087
service_ssh	0.000	0.000	0.000	0.317	0.000	0.000	0.998	0.000
sintpkt	0.001	0.001	0.001	0.001	0.009	0.004	0.270	-0.087
sload	0.018	0.018	0.001	0.001	0.004	0.001	0.214	0.096
sloss	0.002	0.002	0.000	0.003	0.003	0.009	0.214	-0.080
state_CON	0.016	0.016	0.000	0.001	0.020	0.000	0.000	-0.012
state_FIN	0.000	0.000	0.005	0.000	0.045	0.000	1.000	-0.111
state_REQ	0.010	0.010	0.000	0.000	0.199	0.000	1.000	-0.009
state_RST	0.584	0.584	0.403	0.255	0.035	0.000	0.071	0.000
sttl	0.005	0.005	0.006	0.049	0.006	0.028	1.000	0.008
swin	0.001	0.001	0.000	0.004	0.006	0.025	0.261	-0.112
synack	0.034	0.034	0.000	0.007	0.000	0.002	0.327	-0.102