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CICIoMT2024: A Multi-Protocol Dataset for Assessing IoMT Device Security

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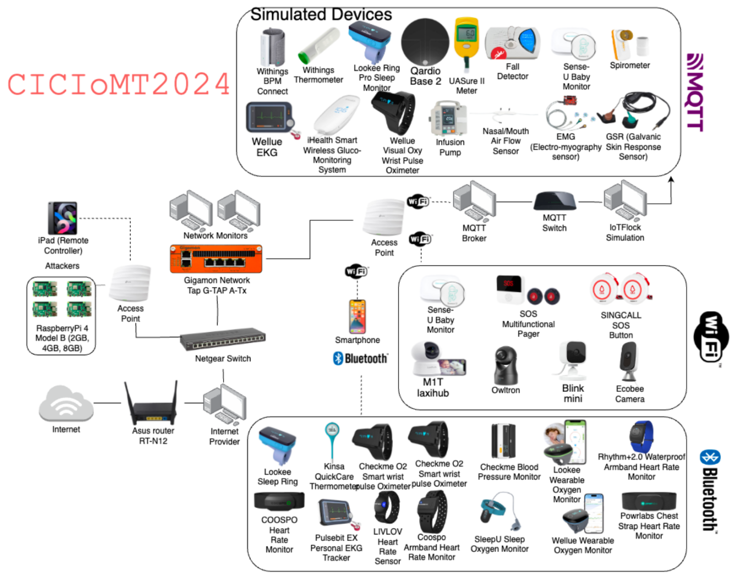
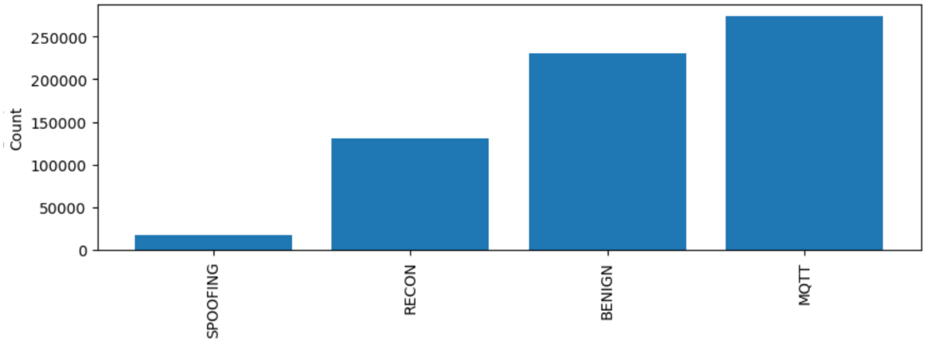
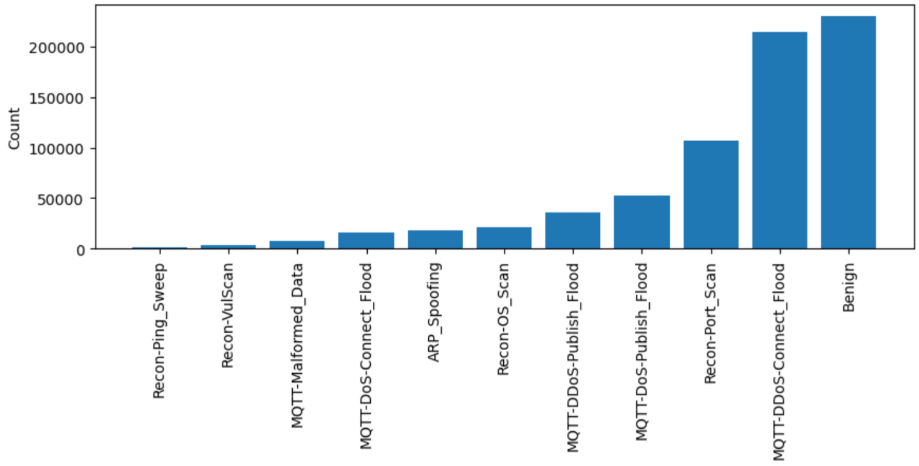
The main goal of this research is to propose a realistic benchmark dataset to enable the development and evaluation of IoMT security solutions. To accomplish this, 18 attacks were executed against an IoMT testbed composed of 40 IoMT devices (25 real devices and 15 simulated devices), considering the plurality of protocols used in healthcare (e.g., Wi-Fi, MQTT, and Bluetooth). These attacks are categorized into five classes: DDoS, DoS, Recon, MQTT, and spoofing. This effort aims to establish a baseline complementary to the state-of-the-art contributions and supports researchers in investigating and developing new solutions to make healthcare systems more secure using different mechanisms (e.g., machine learning - ML).


CICIoMT2024
Simulated Devices
Withings BPM Connect
Withings Thermometer
Lookee Ring Pro Sleep Monitor
Qardio Base 2
UASure II Meter
Fall Detector
Sense-U Baby Monitor
Spirometer
Wellue EKG
iHealth Smart Wireless Gluco-Monitoring System
Wellue Visual Oxy Wrist Pulse Oximeter
Infusion Pump
Nasal/Mouth Air Flow Sensor
EMG (Electro-myography sensor)
GSR (Galvanic Skin Response Sensor)
MQTT
iPad (Remote Controller)
Attackers
RaspberryPi 4 Model B (2GB, 4GB, 8GB)
Access Point
Network Monitors
Gigamon Network Tap G-TAP A-Tx
Netgear Switch
Access Point
MQTT Broker
MQTT Switch
IoTFlock Simulation
Smartphone
Bluetooth
Internet
Asus router RT-N12
Internet Provider
Sense-U Baby Monitor
SOS Multifunctional Pager
SINGCALL SOS Button
M1T laxihub
Owltron
Blink mini
Ecobee Camera
WiFi
Lookee Sleep Ring
Kinsa QuickCare Thermometer
Checkme O2 Smart wrist pulse Oximeter
Checkme O2 Smart wrist pulse Oximeter
Checkme Blood Pressure Monitor
Lookee Wearable Oxygen Monitor
Rhythm+2.0 Waterproof Armband Heart Rate Monitor
COOSPO Heart Rate Monitor
Pulsebit EX Personal EKG Tracker
LIVLOV Heart Rate Sensor
Coospo Armband Heart Rate Monitor
SleepU Sleep Oxygen Monitor
Wellue Wearable Oxygen Monitor
Powrlabs Chest Strap Heart Rate Monitor
Bluetooth

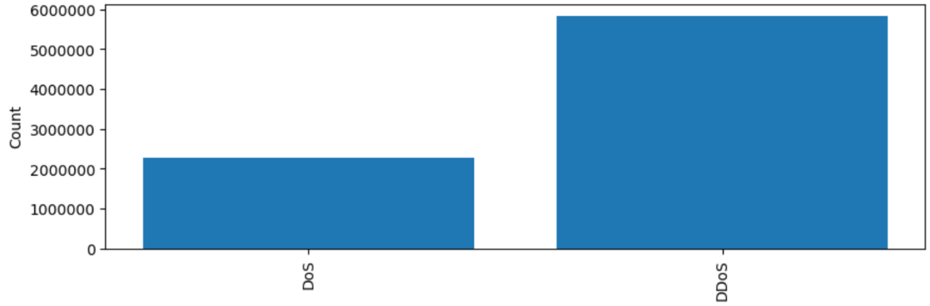
Class	Category	Attack
BENIGN	-	-
ATTACK	SPOOFING	ARP Spoofing
	RECON	Ping Sweep
		Recon VulScan
		OS Scan
		Port Scan
	MQTT	Malformed Data
		DoS Connect Flood
		DDoS Publish Flood
		DoS Publish Flood
		DDoS Connect Flood
	DoS	DoS TCP
		DoS ICMP
		DoS SYN
		DoS UDP
	DDoS	DDoS SYN
		DDoS TCP
		DDoS ICMP
		DDoS UDP



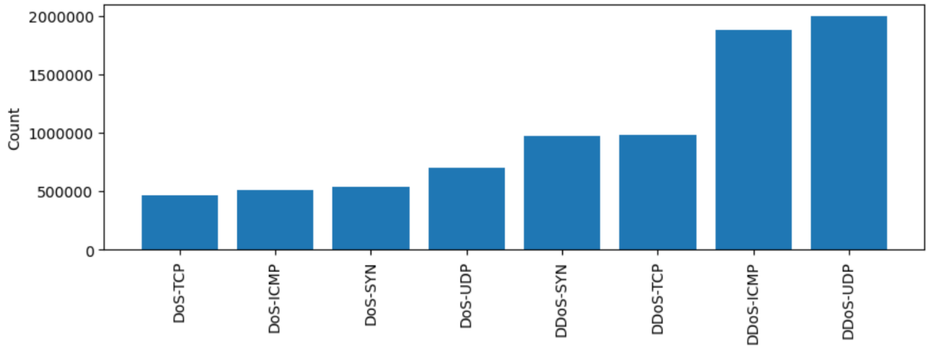
(a) Categorical Classification



(b) Multicalss Classification



(a) Categorical Classification



(b) Multicalss Classification

#	Feature	Description
1	Header Length	Mean of the Header Lengths of the Transport Layer
2	Time-To-Live	Time-To-Live
3	Rate	Speed of packet transmission within a window in packets/sec
4	fin flag number	Proportion of packets with FIN flags in the window
5	syn flag number	Proportion of packets with SYN flags in the window
6	rst flag number	Proportion of packets with RST flags in the window
7	psh flag number	Proportion of packets with PSH flags in the window
8	ack flag number	Proportion of packets with ACK flags in the window
9	ece flag number	Proportion of packets with ECE flags in the window
10	cwr flag number	Proportion of packets with CWR flags in the window
11	syn count	Count of Syn flag occurrences in packets
12	ack count	Count of Ack flag occurrences in packets
13	fin count	Count of Fin flag occurrences in packets
14	rst count	Count of Rst flag occurrences in packets
15	IGMP	Average no. of IGMP packets in the window
16	HTTPS	Average no. of HTTPS packets in the window
17	HTTP	Average no. of HTTP packets in the window
18	Telnet	Average no. of Telnet packets in the window
19	DNS	Average no. of DNS packets in the window
20	SMTP	Average no. of SMTP packets in the window
21	SSH	Average no. of SSH packets in the window
22	IRC	Average no. of IRC packets in the window
23	TCP	Average no. of TCP packets in the window
24	UDP	Average no. of UDP packets in the window
25	DHCP	Average no. of DHCP packets in the window
26	ARP	Average no. of ARP packets in the window
27	ICMP	Average no. of ICMP packets in the window
28	IPv	Average no. of IPv packets in the window
29	LLC	Average no. of LLC packets in the window
30	Tot Sum	Total packet length within the aggregated packets (window)
31	Min	Shortest packet length within the aggregated packets (window)
32	Max	Longest packet length within the aggregated packets (window)
33	AVG	Mean of the packet length within the aggregated packets (window)
34	Std	Standard deviation of the packet length within the aggregated packets (window)
35	Tot Size	(Avg.) Length of the Packet
36	IAT	Interval mean between the current and previous packet in the window
37	Number	Total number of packets in the window
38	Variance	Variance of the packet lengths in the window
39	Protocol Type	Mode of protocols found in the window