

2024 Cyber Awareness and Research Symposium (CARS 2024)

**Grand Forks, North Dakota, USA
28-29 October 2024**



IEEE Catalog Number: CFP24UW5-POD
ISBN: 979-8-3503-8642-4

**Copyright © 2024 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP24UW5-POD
ISBN (Print-On-Demand):	979-8-3503-8642-4
ISBN (Online):	979-8-3503-8641-7

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Feasibility of Machine Learning-Enhanced Detection for QR Code Images in Email-based Threats	1
<i>Jason Ford, Hala Strohmier Berry</i>	
Empowering Shared Mobility Vehicle Riders, Stopping Scams: A Cyber Kill Chain and Awareness Approach to QRishing on College Campuses	10
<i>Frank Offei Gyimah, Ernest Ofori-Mensah, Henrietta Boowuo, Sakhi Aggrawal</i>	
Exploring Machine Learning with FNNs for Identifying Modified DGAs Through Noise and Linear Recursive Sequences (LRS).....	17
<i>Anthony Rizi, Eric Yocam, Varghese Vaidyan, Yong Wang</i>	
Extending Q-Learning Agents in SQLi Environments.....	26
<i>Ryan Marinelli, Laszlo Erdodi, Åvald Åslaugson Sommervoll, Fabio Massimo Zennaro</i>	
A Survey of Unikernel Security: Insights and Trends from a Quantitative Analysis.....	32
<i>Alex Wollman, John Hastings</i>	
Transforming Information Systems Management: A Reference Model for Digital Engineering Integration	41
<i>John Bonar, John Hastings</i>	
Anomaly Detection in Air-Gapped Industrial Control Systems of Nuclear Power Plants.....	50
<i>Karthik Thiagarajan, Issam Hammad</i>	
Bi-Directional Transformers Vs. Word2vec: Discovering Vulnerabilities in Lifted Compiled Code	56
<i>Gary A. McCully, John D. Hastings, Shengjie Xu, Adam Fortier</i>	
SETC: A Vulnerability Telemetry Collection Framework	64
<i>Ryan Holeman, John D. Hastings, Varghese Mathew Vaidyan</i>	
Blockchain Based Access Control for Personal Data Sharing on Embedded Devices	71
<i>Farha Masroor, Neena Goveas</i>	
Enhancing Cybersecurity Awareness in Medical IoT Through Gamification with a Card Game Approach	77
<i>Collins Poku Obeng, Victor Tsui, Mohamed Mahmoud, Sukhveer Sandhu, Ryan Striker, Enrique Alvarez</i>	
The Effectiveness of Education and Fear Appeal to Prevent Spear Phishing Attacks	82
<i>Saja Alsulami, Marc Dupuis</i>	
Friend Or Foe? AI and the Evolving Landscape of Ransomware-As-A-Service (RaaS)	90
<i>Frank Offei Gyimah, Ernest Ofori-Mensah, Henrietta Boowuo, Sakhi Aggrawal</i>	
Cybersecurity in the Oil and Gas Sector: Vulnerabilities, Solutions, and Future Directions.....	95
<i>Prasad Pothana, Vasanth Gokapai, Ananth N. Ramaseri-Chandra</i>	
Cybersecurity Threats in Virtual Reality Environments: A Literature Review.....	102
<i>Ananth N. Ramaseri-Chandra, Prasad Pothana</i>	
Extracting Spatiotemporal Features for Detecting the Beginning of a Network Layer Attack with a Graph Neural Autoencoder and Deep Metric Learning.....	109
<i>Mukesh Yadav, Peter Hawrylak</i>	

Automated Detection of Masquerade Attacks with AI and Decoy Documents	116
<i>Matt Berdychowski, Sergio A. Salinas Monroy</i>	
Decentering the Human: A Posthuman Approach to Cybersecurity Education	122
<i>Ryan Straight</i>	
Virtual Power Plants Security Challenges, Solutions, and Emerging Trends: A Review	128
<i>Sriram Prabhakara Rao, Raja Sree Tiruvalluru, Shree Ram Abayankar Balaji, Olusegun Stanley Tomomewo, Prakash Ranganathan</i>	
PaciPhish: Intelligent and Interpretable Phishing URL Detection Framework	139
<i>Rahul Choutapally, Tapadhir Das</i>	
Navigational Errors in Small Unmanned Aerial Systems (sUAS) – a Short Review	146
<i>Niroop Sugunaraj, Zakaria El Mrabet, Prakash Ranganathan, William Semke</i>	
Navigational Dropouts in Small Unmanned Aerial Systems (sUAS) – a Short Review	152
<i>Niroop Sugunaraj, Zakaria El Mrabet, Prakash Ranganathan, William Semke</i>	
Cyber Security Training with Generative Artificial Intelligence Supported Web Platform Using IoT Cyber Threat Scenarios	160
<i>Zehra Hatipoglu, Busra Yaman, Sedanur Ceylan, Utku Kose</i>	
Analysis of Network Intrusion Detection Via Explainable Artificial Intelligence: Applications with SHAP and LIME	166
<i>Ilhan Uysal, Utku Kose</i>	
Confronting the Reproducibility Crisis: A Case Study of Challenges in Cybersecurity AI.....	172
<i>Richard H. Moulton, Gary A. McCully, John D. Hastings</i>	
Cyber Deceptive Countermeasures' Effects on Human-Simulated Attacks	178
<i>Ben Bowman, Tyler Thomas, Jihene Kaabi</i>	
An EEG-Based User Authentication System Using Event-Related Potentials and Ensemble Learning	184
<i>Soudabeh Bolouri, Diksha Shukla</i>	
Evading VBA Malware Classification Using Model Extraction Attacks and Stochastic Search Methods.....	190
<i>Brian Fehrman, Francis Akowuah, Randy Hoover</i>	
Medical Advisories as Deterrents in Healthcare Cybercrime	196
<i>Nastaran Hadipour, Renita Murimi</i>	
Federated Learning for Fake News Detection and Data Privacy Preservation.....	202
<i>Sanjaikanth E Vadakkethil Somanathan Pillai, Wen-Chen Hu</i>	
DynaDetect2.0: Improving Detection Accuracy of Data Poisoning Attacks	208
<i>Sabrina Perry, Yili Jiang, Fangtian Zhong, Jiaqi Huang, Sohan Gyawali</i>	
A Review on Generative Intelligence in Deep Learning Based Network Intrusion Detection.....	216
<i>Mohammad Ali, Iftiok Udoidiok, Fuhao Li, Jielun Zhang</i>	
Password Usage Behavior of Online Users	225
<i>Sangyoong Jin, Marc Dupuis</i>	

Identification and Operationalization of Key Risks and Mitigations for the Cybersecurity Risk Management of Home Users	231
<i>Joseph Tsai, Marc Dupuis</i>	
Towards Quality Controllable Data Synthesis: A Case Study on Synthesizing Network Intrusions	240
<i>Fuhao Li, Hongyu Wu, Qinxuan Shi, Sicong Shao, Jielun Zhang</i>	
Evaluating the Suitability of LSTM Models for Edge Computing.....	246
<i>Leslie A. Viviani, Prakash Ranganathan</i>	
Anomaly Transformer-Based System Log Anomaly Detection	253
<i>Qinxuan Shi, Zhanglong Yang, Ali Haidar, Brian Terry, Fuhao Li, Jielun Zhang, Sicong Shao</i>	
Security and Privacy Challenges and Opportunities in FinTech.....	259
<i>Sanjaikanth E Vadakkethil Somanathan Pillai, Wen-Chen Hu</i>	
Exploring AI for Vulnerability Detection and Repair.....	265
<i>Onyeka Ezenwoye, Eduard Pinconschi, Earl Roberts</i>	
Anomaly Detection in ICS Networks with Fuzzy Hashing	274
<i>William Tatum, Noam Gariani, Keith Alan Crabb, Gabriel De Conto, John A. Hamilton</i>	
When XAI Meets CAPTCHA: A Case Study.....	279
<i>Ifiok Udoidiok, Jielun Zhang</i>	
Bridging the Protection Gap: Innovative Approaches to Shield Older Adults from AI-Enhanced Scams	285
<i>Ld Herrera, London Van Sickle, Ashley Podhradsky</i>	
Optimal Dynamic Load Altering Attack on Power Grids Via Electrical Vehicle Charging Stations.....	294
<i>Nishad Tasnim, Md Omor Faruk, Zejian Zhou</i>	
Website Fingerprinting Attacks with Advanced Features on Tor Networks	300
<i>Donghoon Kim, Andrew Booth, Olusegun Akinyemi, Euijin Choo, Doosung Hwang</i>	
Feature Selection Framework for Optimizing ML-Based Malicious URL Detection	306
<i>Sajjad H. Shah, Amit Garu, Duong N. Nguyen, Mike Borowczak</i>	
Generative AI in Phishing Detection: Insights and Research Opportunities	312
<i>Olga Perera, Jason Grob</i>	
Web Services Analysis and Threat Detection Through Score-Based Anomaly Detection System and Data Visualizations	317
<i>Jesús A. Rodríguez Rivera, José Ortiz-Ubarri</i>	
Generating an Instruction Dataset to Build Cyber Intelligent Large Language Models.....	325
<i>Paige Zaleppa, Siddharth Kaza, Blair Taylor</i>	
An Overview of User Psychological Manipulation Techniques in UI/UX Web Design.....	330
<i>Rimsha Riaz, Aurora Vasconcelos, Pedro Pinto</i>	
Systematic Literature Review of Cybersecurity and User Experience	336
<i>Shreenandan Rajarathnam, Vandana Singh</i>	
Exploring the Effectiveness of Synthetic Data in Network Intrusion Detection Through XAI.....	345
<i>Mohammad Ali, Jielun Zhang</i>	

Masked Autoencoder for Data Recovery in Polymer Research: Mitigating Data Integrity Threats	350
<i>Bruno Saidou Fonkeng, Fuhao Li, Binglin Sui, Jielun Zhang</i>	
Cost-Benefit Framework for Secure Smart Installations	356
<i>Vincent Gonzales, Andrew Morin, Tyler Moore</i>	
Graph Neural Networks Approach for Cyberattack Detection in Smart Grids.....	364
<i>Xiao Yue, Guangzhi Qu</i>	
Digital Twin Models for Cybersecurity Use Cases in Water Utilities and SCADA Systems: A Review.....	371
<i>Joshua Ronald Boogaard, Sriram Prabhakara Rao, Shree Ram Abayankar Balaji, Prakash Ranganathan</i>	
Implementing Lightweight Intrusion Detection System on Resource Constrained Devices	382
<i>Charles Stolz, Fuhao Li, Jielun Zhang</i>	
Lessons from the CrowdStrike Incident: Assessing Endpoint Security Vulnerabilities and Implications.....	388
<i>Seetaram Ruthvik Mugu, Briley Zhang, Harish Kolla, Shree Ram Abayankar Balaji, Prakash Ranganathan</i>	

Author Index