Student Intern Presentation Showcase

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AFCEA Central Maryland

July 29, 2021
Virtual Presentation
Agenda

https://www.zoomgov.com/j/16195837684?pwd=cit4QTBLR3dj2FOmZVVkFEV1hxZz09

•  2:00 - 2:15pm  Welcome and Set Up
•  2:15 - 4:00pm  Presentations (Random Order)
•  4:00 - 4:15pm  Networking and Judges Deliberation (Breakout Room)
•  4:15 - 4:30pm  Awards Ceremony

Each team has 15 minutes to make their presentation. The judges have five minutes to ask and receive answers. After a five-minute break, we move on to the next presentation.
Vulnerability Characterization and Prediction

In cybersecurity, vulnerabilities are the main mechanism that malicious actors use to exploit systems. Various public databases exist, like Common Vulnerabilities and Exposures (CVE), Common Weakness Enumeration (CWE), and Common Attack Pattern Enumeration and Classification (CAPEC), which document software and hardware vulnerabilities. These databases are used typically for reference, but in our project, we introduce ways to characterize and analyze this data, using machine learning and artificial intelligence to find insights and generate predictions for the vulnerabilities’ risks and characteristics. We use the Python data science stack, including TensorFlow, Keras, Scikit-learn, and Pandas to implement our models, and the algorithms we leverage include Graph Convolutional Networks (GCN), Convolutional Neural Networks (CNN), and K-Prototypes, as well as Natural Language Processing (NLP) techniques.

Amol Menon is a rising sophomore at the University of Maryland College Park, pursuing Bachelor’s degrees in Computer Science and Finance, and a minor in Mathematics. He is in the Honors College Advanced Cybersecurity Experience for Students Living/Learning Program, and is a Banneker/Key scholar. His previous work experience includes researching machine learning methods for computational chemistry at the Army Research Laboratory. Amol’s hobbies include playing tennis and poker, as well as competitive video gaming.

Mavis Lee is a rising junior at Cornell University, pursuing a Bachelor’s degree in Computer Science and a minor in Real Estate. Mavis is part of the Cornell Electric Vehicles project team where she works on developing computer vision algorithms for vehicle autonomy. She also participates in the Alpha Phi Omega service fraternity. In her free time, Mavis enjoys reading, tennis, and exploring different activities.

Protocol Content Disarm and Reconstruction (CDR)

CDR is the removal of potentially harmful code from files. Instead of detecting malware functionality, CDR removes all file components that are not approved by specific policies set out beforehand. These files are now safe to be open and used, since the potential virus has been removed. Network vulnerabilities have always been an issue to company security. Unwanted packets could be easily sent between devices without anyone noticing, and people with malicious intent could hide code inside the packets without any detection. Now, could the CDR methodology be applied to these vulnerable network protocols? That is the goal of the Protocol CDR project, to determine if network protocols could be cleansed using the same CDR process used for files. This ensures all protocols being sent through the network are not harmful and no data is hiding inside every sent packet.

Alexander Chu is a rising Junior at the University of Maryland College Park and is working towards a Bachelor’s degree in Computer Science. He is the logistics director for Bitcamp, UMD’s annual hackathon, and is looking to pursue a career in defense and national security. Alex enjoys playing basketball with his friends as well as making music on his computer at home.
Video Analytics with Speech & Text (VAST)

In this modern world, phones, cameras, and other electronics capable of documenting everyday activities are everywhere. When a significant incident occurs, it is often possible to find at least one video recording of the event. Law enforcement and intelligence analysts perform forensic analysis on videos depicting an event to build a case or to understand complex situations. Our project, Video Analytics with Speech & Text (VAST) provides analysts with a suite of tools to help with their analysis. These tools extract visual (key image frame extraction, object detection), audio (audio variance detection, speech-to-text), and textual (OCR) information that can help the analyst understand the event without having to watch every video. By processing the visual, audio, and text outputs, VAST transforms videos into searchable and discoverable information, allowing analysts to aggregate and visualize this information. The use of VAST allows government and law enforcement to analyze thousands of hours of video in seconds and rapidly respond to world events.

William Cantera is a rising senior at the University of Delaware working to complete a degree in Computer Science. He has been a teaching assistant for multiple semesters helping new students in the program. Previously, his experience lies in startup environments building up a variety of skills from machine learning techniques to web development. In his free time, he plays the viola, lifts weights, and plays video games, as well as programming some himself. Going forward, William plans to continue his work in software engineering and data driven applications.

Nathan Chung is a rising junior at the University of Maryland working towards a degree in Computer Science. He has a passion for applying Data Engineering and Full-Stack Development solutions in financial contexts. In his free time, Nathan enjoys producing music and cooking.

Sachin Sulkunte is a rising sophomore attending the University of Maryland. He is majoring in Computer Engineering as well as pursuing a minor in Robotics and Autonomous Systems. He is a member of UMD’s cybersecurity honors program. In his free time, Sachin enjoys playing several instruments including guitar as well as writing music.
THANK YOU TO:

Our Judges

Maria Marinelli

Maria Marinelli is the CEO and Co-Founder of Calibyr Corporation, a small business delivering innovative solutions in software development, system engineering, integration and testing, and cloud deployments to the Federal Government. Maria advances secure software solutions for the Intelligence Community as a systems engineer and project manager on DoD contracts. Maria has a B.S. in Mathematics, Summa Cum Laude, from Mount St. Mary’s University and is a graduate of the National Security Scholars Program (NSSP). Passionate about advancing STEM education and creating opportunities for students, Maria volunteers with organizations including AFCEA, Girls Inc., Girls Who Code, FIRST Robotics, and the Fort Meade Alliance.

Ericka Trice

Ericka Trice serves as managing partner of Analogy & Associates, LLC a woman-owned small business technology management consulting team that provides analytic and engineering services and support within the federal government sector. She also works as a Cloud Engineer supporting efforts involving systems architecture, requirements analysis, process execution and evaluation, and application migration into cloud computing environments. She has over 20+ years of IT experience in lead roles as an engineer and manager. Ericka received her Master of Science from Johns Hopkins University, Carey School of Business and a Bachelor of Science from University of Maryland Baltimore County. In addition to her professional responsibilities, she is active in mission outreach at her church, loves hanging out with her family, enjoys bowling, singing, dancing, eating and traveling with her husband.

Ryan Hendrickson

Ryan Hendrickson is a Senior Software Engineer and Director of Innovation who joined Clarity Business Solutions in 2015. He is a Software Project Co-Lead, participates in the Maryland Data Works Meetup, attended OSCON 2018, presented at CodeMash ‘19 & ‘20 and enjoys working on his 1966 MGB. Ryan presented Connect Data and Devices with Apache NiFi at CodeMash 2019 and Horizontally Scaling Graph Databases in 2020. He earned his M.S. in Information Systems Engineering from Johns Hopkins University, and his B.S in Software Engineering from Robert Morris University. Ryan is presently completing a Management Development Program certificate from the Wharton School of Business. He has significant experience developing dataflow pipelines, enriching and manipulating streaming data, and storage of large dataflows.
David Taylor is a Principal Consultant with the Lohfeld Consulting Group in the Washington DC area, providing proposal and orals consulting to major companies.

With over 30 years in international high-technology businesses David has experience in engineering, project management, product management, business development, and senior level leadership.

In past careers David has been an airline pilot with British Airways, a Director of Management Information Services, and a Vice President with a major software manufacturer.

David has a BSEE in Electrical Engineering, a Master’s degree in Business Administration, and is a certified Project Management Professional (PMP). In the business development and proposal industry David holds a Certified Proposal Professional (CPP) qualification from the Association of Proposal Management Professionals (APMP), and is a Certified Capture Expert.

David worked with each team to help the student interns with their presentations.