Chidera Biringa

biringachi.github.io/Lines/ | biringaChi

Education

University of Massachusetts Dartmouth — MA, US

College of Engineering — Ph.D. in Computer Science — September 2021 - May 2024 (Expected)

- **Research Area:** Cybersecurity, Software Performance, Natural Language Processing, and Machine Learning

University of Massachusetts Dartmouth — MA, US

College of Engineering — M.S. in Computer Science — September 2019 - May 2021

- Graduate Research Award Recipient

Bells University of Technology — Ota, Nigeria

College of Natural and Applied Sciences — B.Tech. in Computer Science — November 2013 - May 2017

Professional Experience

US Navy - Software Security Research — January 2023 - Present

Student Researcher

- Developing **vPORT:** Automated Vulnerability and Backdoor Detection Framework as a Part of Software Development Pipeline.

College of Engineering - University of Massachusetts Dartmouth — September 2020 - Present

Research Assistant

- Developing **CPP:** Compilation-Level Vulnerability Detection via Program Profiling.
- Developed **SARA:** Exposing Mediocre Performance Code, **SPECDET:** Detecting Spectre Vulnerabilities and Attacks, **SEAL:** Secure Design Pattern Approach Toward Tackling Lateral-Injection Attacks, and **CADE:** Context-Aware Detection of Embedded Credentials.

NSA/DHS Cybersecurity Center — May 2020 - Present

Student Researcher

- Conducted research on software performance and security, and open-world recognition for network intrusion detection systems.
- Mentored 3 students participating in the National Science Foundation-Undergraduate Research program from the University of Massachusetts Dartmouth, University of Maryland College Park, and Arizona State University in software vulnerability and user experience testing research.

Peer-Reviewed Doctoral Publications

- **Chidera Biringa** [1], Gaspard Baye and Gokhan Kul. 2022. "Static and Microarchitectural ML-Based Approaches For Detecting Spectre Vulnerabilities and Attacks" Hardware and Architectural Support for Security and Privacy (HASP'22), in conjunction with the 55th IEEE/ACM MICRO'22.
- **Chidera Biringa** [1] and Gokhan Kul. 2022. "A Secure Design Pattern Approach Toward Tackling Lateral-Injection Attacks" The 15th IEEE International Conference on Security of Information and Networks (SIN).
- Gokhan Kul, **Chidera Biringa** [2]. 2022. "Forensics in Cyber-Physical Systems (CPS)" Springer Cyber Forensics for Cyber-Physical Systems.
- **Chidera Biringa** [1], Gokhan Kul. 2021. "Automated User Experience Testing through Multi-Dimensional Performance Impact Analysis" ACM/IEEE 2nd International Conference on Automation of Software Test co-located with the International Conference on Software Engineering (ICSE'21).

Selected Projects

- **SARA: Code Performance Prediction by Mapping Execution Test Times to Stylometry Features — (September 2021 - March 2023):** Developed a novel approach to detect the introduction of mediocre performance code in remote repositories during software development.
- **CADE: Context-Aware Detection of Embedded Credentials using BERT — (September - October 2022):** Developed a context-aware approach to detect embedded credentials and attained state-of-the-art (91% F-measure) performance outperforming current detection tools.
- **iFuzz: Intelligent Fuzzing using Reinforcement Learning (RL) — (September - December 2021):** Developed an actor-critic RL multi-agent to identify bugs via mutation and software coverage. Agents maximize rewards by generating quality mutations that cause rapid crashes.
- **PIF: Predictive Frame Inference using Generative Adversarial Network (GAN)— (April - May 2020):** Developed a GAN model that interpolates in-between frames of a given video, thus increasing the frame rate. A high-definition 25 FPS video was increased to 50 FPS without loss in resolution, reduced video length, or noticeable distortion. Generated frames were stitched to create a full synthetic video.
- **Database Engine — (February - April 2020):** Developed an SQL query evaluator with operational support for Select, Project, Join, Union, Aggregate, and standard optimization techniques such as projection pushdown, selection pushdown and cross product to join conversion.
- **Authorship Attribution — (November 2019):** Developed ML classifiers to detect Victorian Era (VE) authors using statistical features of authored novels. Conducted an exhaustive text mining and sentiment analysis. Best-performing classifier achieved 99% accuracy in detecting VE authors.
- **Customer Response Chatbot — (December 2019):** Developed a customer response chatbot to classify responses to customer inquiries.

Technical Skill

Research: Code Performance, Natural Language Processing, Threat Modeling, Vulnerability Assessment & Machine Learning.

Programming Languages: C/C++/C#, Java, Python, R, SQL, MATLAB, PHP, Swift, HTML/CSS & JavaScript.

Transferable Skill

Soft: Creativity, Learning, Analytical Reasoning, Communication, Evaluation, Mentoring, Management, Collaboration & Presentation.

Services

- Startup Weekend UMD Technical Mentor. 2023, 2022 & 2021.
- Very Large Data Base (VLDB) Reproducibility Reviewer. 2021.