Mabon Manoj Ninan

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EDUCATION

Bachelor of Science | ***Computer Engineering, Minor Computer Science*** **Graduating: May 2024**

- **University of Cincinnati** **GPA: 3.93**
- **Honors and Awards:** Deans List (All academic semesters), Highest Math Placement Score
- **Scholarships:** UC International Scholarship (3k$ per year) CEAS outreach Scholarship (12k$ per year), CEAS Research Grant (9k$*3 Academic Semester)

PUBLICATIONS

Accepted Papers

- Chenggang Wang, **Mabon Ninan**, Shane Reilly, Joel Ward, William Hawkins, Boyang Wang, John M Emmert, "**Portability of Deep-Learning Side-Channel Attacks against Software Discrepancies**," In Proceedings of the 16th ACM (WiSec'23), May 29-June 1, 2023, Guildford, United Kingdom (acceptance: 24%)

Ongoing Work

- Haipeng Li, **Mabon Ninan**, Boyang Wang, **"TinyPower: Deep-Learning Side-Channel Attacks with Tiny Neural Networks"**
- **Mabon Ninan**, Boyang Wang, **"CrossEM: The Impact of EM Probe Locations on Deep-Learning Side-Channel Attacks"**

CONFERENCE PRESENTATIONS

1. **Portability of Deep-Learning Side-Channel Attacks Against Software Discrepancies**
   a. Proceedings of the 16thACM WiSec 2023
   b. University of Surrey at Guilford, United Kingdom, May 29- June 1, 2023.
   c. Role: Presenter
2. **Robust Cross Side-Channel Attacks**
   a. CHEST. Semi Annual Conference
   b. University of Cincinnati, Ohio, May 17- May 18, 2023.
   c. Role: Presenter

EXPERIENCE

Deep Learning Researcher | Data Security and Privacy Lab CEAS -*Cincinnati, OH* **July 2022 - Present**

- Conducting research in Deep Learning based Side Channel attacks to decrypt AES encryption keys.
- Working on reinforcement learning models to develop architectures for high noise side channel attacks.
- Developed and implemented custom algorithms to prune existing deep learning models.
- Successfully deployed and fine-tuned models on lower power devices such as Raspberry pies.
- Conducted research on cross domain adaptations of models trained on source devices and successfully developed attacks to counter software, hardware, and discrepancies of different targets.
- Developed a machine learning based algorithm to predict start and end points of AES encryption.

- Generated high sampling rate data from both EM and Power traces along with preprocessing code to help scale in large dataset collections.
- Leading a team of 3 undergraduate students in acquisition of 200+gb of high-quality datasets.
- Developed and tested models that were 80% accurate and could effectively recover Key of encryption.
- Optimized existing binary classification machine learning models to better understand how it can be implemented for side channel attacks using TensorFlow and Keras

Software Engineer | College of Engineering and Applied Sciences -*Cincinnati, OH* **May 2022 – July 2022**

- Created a docker based auto-grader utilizing the Grade Scope framework and deployed the system for 3 programming courses resulting in an overall cost reduction of 30%
- Constructed a server-based coding IDE with an integrated auto-grading system, demonstrating proficiency in both server-side development and automated grading tools.
- Deployed a full-scale auto-grader on Jupyter Hub (Nbgrader) to support courses that utilize notebooks, highlighting experience with large-scale deployment and management of automated grading systems
- Reduced grading time by 90% of the original time as it required only sample unit test cases to be created, allowing instructors to provide more detailed feedback to students and improving overall learning outcomes
- The tool proved to be a viable auto-grading solution for multiple courses across the EECE and CS departments with potential cost savings of $10,000 per course due to the fewer number of TAs required

Computer Vision Co-op | College of Engineering and Applied Sciences -*Cincinnati, OH* **Jan 2022-July 2022**

- Processed videos using pretrained machine learning models like CLIP and GoogLe-Net to extract features for video summarization and video classification using PyTorch
- Developed a pipeline to extract frames, preprocess images and run specified computer vision models on frames, followed by generating frame probabilities utilizing python
- Generated video segments using Knapsack clustering to generate a summary of original video
- Trained versions of the existing models to identify layers of the network that provide usable features
- Created a program to classify frames of surgical videos into informative and non-informative categories

Research Intern | Spatio-Temporal Data Analytics Lab (UC) -*Remote* **Nov 2021 - Jan 2022**

- Utilized JULIA to extract and preprocess data from simulations, resulting in the creation of matrices and data frames for research purposes.
- Produced clear and organized CSV files and graphical representations (using MAKIES) of the data for future reference.
- Conducted comprehensive analysis of large data sets, summarizing findings, and recommending techniques to compress data for future research.
- Identified areas for improvement in the data collection process and recommended changes to optimize data quality.
- Maintained documentation of data analysis methods, results, and conclusions for future reference and replication.

TECHNICAL SKILLS

- **Programming Technologies:** Python, JAVA, C++, C, MATLAB, LabView, HTML, CSS, Flask
- **Machine Learning:** Tensor Flow, Keras, PyTorch, Sklearn, Pandas, Numba, Open-CV, cuDNN

- **Data Analysis and Visualization:** Matplotlib, Plotly, Seaborn, VBA, Tensor Board, Julia, Pandas
- **Other Technologies:** Docker, SSH, Bash, Unix/Linux, AWS, Azure, GCP, GIT

TEACHING EXPERIENCE

Supplementary Instructor and Department Coordinator | UC -*Cincinnati, OH* **July 2021 – Dec. 2022**

- Facilitated and lead interactive group learning sessions for Chemistry and Calculus-based Physics 2, supporting a class size of 650 students per semester
- Developed and implemented engaging teaching strategies to enhance understanding and comprehension of complex concepts while coordinated with the course instructors
- Maintained open communication channels, fostering collaboration, and sharing best practices among SI leaders while providing a support structure to ensure their success
- Served as the Department Coordinator, overseeing 35 other Supplementary Instructor leaders provided guidance and support, ensuring effective delivery of course content
- Conducted performance reviews, provided feedback, maintained time charts and payroll, and facilitated various administrative functions within the department

Peer Leader | UC -*Cincinnati, OH* **July 2021 – Dec. 2022**

- Led weekly Learning Community meetings, providing academic support and mentorship while focusing on First Year Target Learning Areas
- Organized and executed social events to create a supportive and inclusive environment for students
- Conducted individual and group mentoring sessions to address students' academic needs and interests
- Collaborated with faculty, advisors, and organizations to enhance the Learning Community experience and prepare students for future academic accomplishments

CAMPUS INVOLVEMENT AND VOLUNTEERING

Production Volunteer | Cross-Roads Church **Nov. 2021 – Present**

- Operated high-quality cameras to create an immersive concert experience for the audience by capturing live musicians and on-stage speaker while ensuring that multiple cameras matched brightness and color
- Provided a pleasing picture to the viewer while maintaining a professional and ethical approach to the role, prioritizing the quality of the captured footage and the satisfaction of the audience

English Tutor | ENGine **Aug 2020 – May 2021**

- Tutored students in Ukraine, providing personalized English language instruction to improve their speaking, listening, reading, and writing skills
- Developed engaging lesson plans and utilized interactive teaching methods to make learning effective

REFERENCES

1. Dr. Boyang Wang (Assistant Professor at the University of Cincinnati)
Phone Number: +1 513 556 4785

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Website: https://homepages.uc.edu/~wang2ba/

2. Dr. Mehdi Norouzi (Assistant Professor at the University of Cincinnati)
Phone Number: +1 513 549 3435
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3. Richard Farris (Adjunct Professor at the University of Cincinnati)
Phone Number: +1 513 556 3600
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