Christiana Marchese

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LinkedIn
Personal Website
GitHub

Education

The University of Chicago, Chicago, IL — September 2024 - Present
Ph.D. in Computer Science; Advisor: Grant Ho

Pomona College, Claremont, CA — May 2024
Bachelor of Arts Computer Science; GPA: 3.95/4.00; Cum Laude

Yonsei University, Seoul, South Korea — August 2022 - December 2022
CIEE Arts and Sciences Program Study Abroad Program

Research Interests

I am interested in exploring how AI can be applied to system security problems like vulnerability discovery. I am also curious about the vulnerabilities that may arise in ML-driven defense methods.

Honors

Fulbright Grant Recipient (2024), Marshall Scholarship Finalist (2023), Pomona College Scholar, SCIAC All-Academic Team

Published Work

Investigating Neural Network Architectures, Techniques, and Datasets for Autonomous Navigation in Simulation
Oliver Chang, Christiana Marchese, Jared Mejia, and Anthony J. Clark
2021 IEEE Symposium Series on Computational Intelligence (SSCI) Conference (PDF)

Other Research Work

Undergraduate Thesis:
Exploring the Application of a Model Versioning Based-Evasion Attack Defense to Federated Learning
2024 Pomona College Senior Thesis, Advised by Dr. Eleanor Birrell and Dr. Anthony Clark

- Evaluated robustness of global models against adversarial examples generated on client models
- Implemented and evaluated the difficulties of applying centralized learning defenses to the FL domain

Class Project:
Implementing and Evaluating the Probability Weighted Word Saliency Algorithm as a Method of Adversarial Example Generation for Deep Neural Networks
2023 Natural Language Processing Final Class Project (PDF)

Conference Research Poster:
Predicting Mental Health Outcomes with Deep Learning
2021 ACM Practice and Experience in Advanced Research Computing (PEARC) Conference (PDF)

Past Research Projects

Cybersecurity Intern, AT&T June 2023-August 2023

ML-Driven Fraud Detection Project with the Research and Innovation in Security Engineering Team

- Developed an ML model for sim swap fraud detection across customer call logs to streamline the confirmation of fraud cases (FastAI)
- Researched and developed algorithms for word and phrase-based sentiment identification to highlight words commonly associated with fraud cases
- Deployed algorithms in AT&T's fraud detection app that seeks to confirm thousands of fraud cases everyday

CVE Analysis Project with the Application Vulnerability Team

- Created mechanized reports to assess the impact of CVEs across AT&T's application landscape
- Web scraped CVE data and processed internal vulnerability data (Beautifulsoup, PySpark, DataBricks)

Research Assistant, Autonomous Robotics and Complex Systems (ARCS) Lab May 2021-May 2024

Adversarial Training for Sim-to-Real Transfer

- Implemented adversarial example generation algorithms for adversarial training of computer vision models to assess their effect on robot sim-to-real transferability

Investigating Neural Network Architectures, Techniques, and Datasets for Autonomous Navigation

- Researched neural networks that retain different degrees of state for simulated maze navigation (GitHub)
- Built custom datasets and modified convolutional neural network (CNN) architectures to create hybrid-input CNNs and ConvLSTMs (Pytorch and FastAI)
- Developed automation scripts to streamline the training and inference of neural network models
- Wrote lab tutorials, library documentation, and a publication

Research Apprentice, NSF XSEDE Empower Program January 2021-May 2021

Predicting Mental Health Outcomes with Deep Learning

- Researched the use of deep learning for community assessment of mental health, using US Census Bureau data, CDC data, geospatial analysis, and TACC's Stampede2 supercomputer resources
- Developed and compared a linear regression model, a multilayer perceptron, and a CNN that all predict the risk level of California counties for suicide based on community features (Sklearn, Pytorch)

Teaching Experience

Computer Systems – Teaching Assistant, Pomona College August 2023-December 2023
English Conversation – Teacher (Volunteer), Liberty in North Korea August 2022-December 2022
Introduction to Computer Science – Teaching Assistant, Pomona College January 2021-May 2021

Other Work Experience

Meta University Engineering Intern – Android, Meta Platforms Inc. May 2022-August 2022

- Created a fully functional Android social media app: SurfStop (Java)
- Implemented a Parse backend running on top of MongoDB, data offline persistence (Room ORM), ephemeral timelines through database auto-purging (JavaScript, Java), etc.
- Deployed custom in-app beach state image classifier with web-scraped image data (Keras) (Model's GitHub)

Skills

Technical: Proficient in Python, Java; Experienced in TensorFlow/Keras, Pytorch, Fastai, TensorFlow Federated, Android Mobile Development, Jupyter Notebook, Git, Linux, CAD, soldering

Language: English (native), Korean (intermediate), Spanish (elementary)

Extracurricular Activities

UChicago University Chorus, UChicago Water Polo Club, Korean Graduate Student Association