Christiana Marchese

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Personal Website

Github

LinkedIn

Education

Pomona College, Claremont, CA   May 2024
Bachelor of Arts Computer Science; GPA: 3.94/4.00
Yonsei University, Seoul, South Korea   August 2022-December 2022
CIEE Arts and Sciences Program Study Abroad Program

Research Interests

I am interested in the privacy and security of ML systems as well as the application of ML to problems in network, software, and systems security. Currently, I am investigating the vulnerabilities of ML systems and improving their robustness with training and test-time defenses.

Current Research Projects

Senior Thesis, Advised by Dr. Eleanor Birrell and Dr. Anthony Clark   August 2023-Present
Securing Federated Learning Against Post-Breach Evasion Attacks
- Implementing and evaluating a potential test-time defense method specific to federated learning

Research Assistant, Autonomous Robotics and Complex Systems (ARCS) Lab   January 2023-Present
Adversarial Training for Sim-to-Real Transfer
- Researching methods to overcome the sim-to-real transfer gap to develop more safe, robust mobile robots
- Implementing adversarial example generation algorithms for adversarial training of computer vision models

Publications

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

Posters

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

Unpublished Works

Implementing and Evaluating the Probability Weighted Word Saliency Algorithm as a Method of Adversarial Example Generation for Deep Neural Networks
Natural Language Processing Final Class Project (Spring 2023), Claremont, California, USA (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 Machine Learning models for sim swap fraud detection across call logs to streamline the confirmation of fraud cases with the Research and Innovation in Security Engineering Team (FastAI)
- Researched and implemented word-based and phrase-based sentiment identification algorithms for the text highlighting of words commonly associated with fraud cases
- Work deployed in AT&T's internal fraud detection app that confirms thousands of fraud cases every day

CVE Analysis Project with the Application Vulnerability Team
- Created mechanized reports to assess the impact of CVEs across the application landscape
- Web scraped CVE data and processed internal vulnerability data (Beautifulsoup, PySpark, DataBricks)
- Collaborated with the AI Tiger group to brainstorm AI-driven solutions for vulnerability remediation efforts

Research Assistant, Autonomous Robotics and Complex Systems (ARCS) Lab   May 2021-May 2022

Investigating Neural Network Architectures, Techniques, and Datasets for Autonomous Navigation
- Researched neural networks that retain different degrees of state for simulated navigation ([Github](#))
- Built custom datasets and modified convolutional neural network (CNN) architectures to create hybrid-input CNNs and ConvLSTMs (Pytorch and FastAI)
- Wrote automation scripts to streamline the training and inference of neural network models
- Conducted literature reviews and wrote lab learning material, library documentation, and a publication

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

Predicting Mental Health Outcomes with Deep Learning Project
- Researched the use of deep learning for community assessment of mental health, using US Census Bureau data, CDC data, TACC's Stampede2 supercomputer, and geospatial analysis
- 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)

High-Performance Computing Support, Pomona College   August 2020-May 2021

Observing Trends in Technical Skill Demand Project
- Processed and visualized data (Python, R) to research market trends in technical skill demand

Teaching Experience

Computer Systems – Teaching Assistant, Pomona College   August 2023-Present

English Conversation – Teacher (Volunteer), Liberty in North Korea   August 2022-December 2022

Introduction to Computer Science – Teaching Assistant, Pomona College   January 2021-May 2021

Honors

Academic: Marshall Scholarship Finalist (2023), Pomona College Scholar, SCIAC All-Academic Team

Athletic (Water Polo): Division 1 All CIF-SS Third Team Selection, CIF-SS Jim Staunton Champions for Character Award, All-Trinity League First Team Selection, 2019 CIF-SS Division 1 Regional State Champion

Other Industry Work Experience

Meta University Engineering Intern – Android, Meta Platforms Inc.   May 2022-August 2022
- Created a fully functional Android social media app: [SurfStop](#) (Java)
- 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, C, Git, Linux, CAD, soldering

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

Extracurricular Activities

Surf Club, Spotlight Musical Theatre, Greenroom Theatre, Korean Student Association, Association for Computing Machinery-Women