Christiana Marchese

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Personal Website
Github
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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

My research interests lie at the intersection of cybersecurity and machine learning, the security of machine learning systems and the use of machine learning – as well as other methods – towards approaching broader problems in the spaces of application, network, and systems security.

Current Projects

Senior Thesis: Securing Federated Learning Against Post-Breach Evasion Attacks
Advisors: Dr. Eleanor Birrell and Dr. Anthony Clark

ARCS Lab: Adversarial Training for Sim-to-Real Transfer

Research Experience

Research Assistant — May 2021-Present
Autonomous Robotics and Complex Systems (ARCS) Lab, Pomona College

- Researching methods for overcoming the reality gap between the simulation learning and real-life performance of search-and-rescue robots
- Built custom datasets and convolutional neural network architectures, like hybrid-input CNNs and ConvLSTMs, for computer vision navigation tasks (Pytorch and FastAI)
- Wrote automation scripts to streamline the training and inference of custom neural networks
- Conducted literature reviews and wrote lab learning material, library documentation, and publications
- Implementing adversarial example generation algorithms for the adversarial training of our models

Cybersecurity Intern — June 2023-August 2023
AT&T

- 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

- Assessed the impact of repeated vulnerabilities (CVEs) across the application landscape by creating mechanized reports (PySpark) for targeted remediation activities with the Application Vulnerability Team
- Collaborated with the AI Tiger team bi-weekly to brainstorm AI-based methods of addressing problems in the application security space

Research Apprentice January 2021-May 2021
NCSI XSEDE Empower Program

- 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 the performances of a linear regression model, a multilayer perceptron, and a convolutional neural network that all predict the risk level of California counties for suicide based on community features (Sklearn, Pytorch)

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

- Researched market trends in skill demand with Pomona Economics professors, using topic modeling
- Processed and visualized data in Python and R

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

Other Work Experience

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

- Created a fully functional Android social media app from scratch: SurfStop (Java)
- Implemented a weather API, a Parse backend running on top of MongoDB, data offline persistence (Room ORM), ephemeral timeline posting through database auto-purging using ParseCloud job executions (JavaScript) and an AlarmManager (Java), etc.
- Deployed custom in-app beach state image classifier with web-scraped image data (Keras) (Model's Github)

Publications and Projects

Implementing and Evaluating the Probability Weighted Word Saliency Algorithm as a Method of Adversarial Example Generation for Deep Neural Networks May 2023
NLP Final Class Project

- Implemented the Probability Weighted Word Saliency (PWWS) algorithm and evaluated its effectiveness in adversarial example generation for sentiment analysis models (Github)

Investigating Neural Network Architectures, Techniques, and Datasets for Autonomous Navigation in Simulation December 2021

2021 IEEE Symposium Series on Computational Intelligence

- Co-wrote and published research paper on analyzing different neural network architectures and data collection techniques for agent navigation in simulated environments (PDF) (Github)

Predicting Mental Health Outcomes with Deep Learning July 2021

2021 ACM PEARC

- Created and presented research poster based on XSEDE Empower Program work (PDF)

Skills

Technical: Proficient in Python, Java; Experienced in C, Deep Learning (TensorFlow/Keras, Pytorch, Fastai), Natural Language Processing, Computer Vision, Explainable Machine Learning, Android Mobile Development, Jupyter Notebook, Git, Linux, DataBricks, Data Processing and Visualization, 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