Thomas Nathaniel Armstrong

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EXPERIENCE

Undergraduate Research – University of Maryland College Park • Spring 2023 – Present

- Created a shift equivariant vision transformer for image classification. Trained several different vision transformers and tested them with multiple types of adversarial attacks.

Johns Hopkins University Applied Physics Laboratory • Summer 2020 – Present

- College Intern – Asymmetric Operations/QAC
  - Developed a communication script between GPT 3.5 Turbo and Dolly 12B or Stable Vicuna 13B allowing them to engage in a directed dialog designed to eliminate manual testing by 15 staff.
    - Employed prompt engineering to ensure each model performed as intended.
  - Built standardized machine learning environment including PyTorch and Tensorflow using Docker for use by all APL employees.
    - Established a thorough dynamic Gitlab CI/CD pipeline to ensure stability of the environment across a variety of GPUs.
  - Created two network agnostic machine learning models for detecting malicious network traffic in near-real time.
    - Created an LSTM model that minimized time to detect malicious network traffic.
    - Developed a Longformer model with comparable speed to the LSTM model and greatly improved accuracy to greater than 99%.
    - Constructed standardized methods for testing the models against each other.
    - Preprocessed data for entry into each model.
    - Tuned hyperparameters to optimize the models.
  - Built a TensorFlow LSTM model to extract relationships between entities in a given labeled text.
  - Established automated annotations of network traffic to train a supervised machine learning model in a classification task.
  - Developed a Siamese BERT model with PyTorch to extrapolate moral foundations from text.
  - Supported development in VMware vCenter of a cyber experiment center used to reconstruct networks and create ground truth network data to train machine learning models to detect anomalous network behavior.
  - Built communication infrastructure between Android devices using Python and Ruby.
  - Presented research and findings at the end of each summer to senior leadership.
  - Used Git for version control and to manage documentation on all projects.

Johns Hopkins University Applied Physics Laboratory • Summer 2018 and 2019

- Summer ASPIRE Program Intern – Focus: Asymmetric Operations/Cybersecurity. Developed system to transfer packet metadata in near-real time using Apache Kafka and performed further testing of an LSTM based machine learning model built with Keras designed for anomaly detection.

EDUCATION

University of Maryland College Park • Class of 2024

- Cumulative GPA: 3.82
- Major: Computer Science with Machine Learning Specialization | Minor: Statistics
- Honors College • Advanced Cybersecurity Experience for Students (ACES) Living-Learning Program
- Cybersecurity Club, Game Dev Club, Board Game Club

TECHNICAL SKILLS

Python; TensorFlow; PyTorch; Pandas; NumPy; Git; Docker; Unix/Linux Systems; SQL; Ruby; Java; HTML