Vishnu Asutosh Dasu

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Education

Pennsylvania State University — *State College, U.S.A.*

M.S. in Computer Science and Engineering — *Aug. 2022 - May. 2024*

- GPA: 3.95/4.0
- Thesis: Mitigating unfairness in deep learning models

Manipal Institute of Technology — *Manipal, India*

B.Tech in Computer Science and Engineering — *Jul. 2016 - May. 2020*

- GPA: 8.71/10.0

Skills

Languages	Python, Java, JavaScript, C, C++, Swift
Frameworks	Django, Spring, NodeJS, ReactJS, PyTorch, Tensorflow, OpenCV, Numpy, Huggingface, NLTK, OpenSSL, Gurobi
Tools	Docker, Git, Jenkins
Databases	MongoDB, MySQL, Redis

Work Experience

Pennsylvania State University | Research Assistant — *State College, U.S.A.*

Jan 2023 - Aug. 2023

- Worked on mitigating unfairness in deep learning and developing language models for conversational task assistants.
- Designed a novel algorithm for processing conversational data and implemented multi-GPU training of LLMs.
- Developed prototype algorithms that repairs neurons to improve fairness without compromising model performance.

Tata Consultancy Services | Security Researcher — *Bangalore, India*

Sep. 2020 - Jun. 2022

- Designed and implemented a federated learning algorithm using homomorphic encryption and differential privacy.
- Developed a single-round secure aggregation protocol for federated learning that is 3x faster than related works.
- Designed a data processing algorithm to process network logs for machine learning applications.
- Designed an algorithm using autoencoders to detect malicious behavior from network logs.

Citrix R&D | Software Engineer Intern — *Bangalore, India*

Jan. 2020 - Jun. 2020

- Worked as a full-stack developer in the Citrix Analytics for Security (CAS) team.
- Developed interactive dashboards for analyzing sensitive data to identify malicious user behavior in an enterprise.
- Developed and implemented a trust service to validate API calls to prevent malicious and unauthorized requests.

Nanyang Technological University | Security Researcher Intern — *Singapore*

Dec. 2019 - Jan. 2020

- Developed algorithms to generate optimized hardware implementations of block ciphers.
- Proposed algorithm generated the best-known implementation of the *AES MixColumn* matrix using 12 XOR2 and 47 XOR3 gates.

Tata Consultancy Services | Security Researcher Intern — *Hyderabad, India*

May 2019 - July 2019

- Worked on preventing adversarial attacks on CNNs and explainable AI to understand how CNNs classify images.
- Developed an algorithm using denoising autoencoders to remove adversarial noise added to RGB images.
- Proposed algorithm was 86% effective in removing adversarial noise added to ResNet-based CNNs.

Projects

Data Extraction from Large Language Models | Privacy of Machine Learning

- Helped design attacks to extract training data from LLMs trained using federated learning.
- Proposed attack extracts training sequences verbatim from targeted victim participants in federated learning.

Side Channel Attacks on Stream Ciphers | Hardware Security

- Helped design a framework to perform side-channel attacks on stream ciphers using machine learning and linear programming.
- Designed and implemented a novel machine learning algorithm to identify the hamming weight from oscilloscope electromagnetic traces.

CurrenSee | Android Machine Learning Application

- Developed an Android application to count the value of Indian bank notes from live images using machine learning.
- Designed a simple GUI with accessibility features to assist the visually impaired in using the application.

Theia.ai | iOS Machine Learning Application

- Developed an iOS application to aid the visually impaired traverse unfamiliar external environments.
- Designed an algorithm using CNNs running on the iPhone for path planning and traversal using the live camera feed.

Accomplishments

2021 **Award**, Received $500 award from DAGsHub for completing the ML Reproducibility Challenge 2021

2020 **Award**, Three-time recipient of TCS Citation Award for outstanding research and contribution to TCS Research

2019 **Winner**, Best Project Award out of 13 teams (Indian Statistical Institute, Kolkata) - 3D coordinate estimation from 2D images

2018 **Runner up**, Intelligent Ground Vehicle Competition (IGVC) - Interoperability Profiles Challenge out of 26 teams