# 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

**Manipal Institute of Technology** — *Manipal, India*

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

- GPA: 8.71/10.0

## Skills

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|---|---|
| **Languages** | Python, Java, JavaScript, C, C++, Swift, SageMath, YAML |
| **Frameworks** | Django, Flask, Spring, NodeJS, ReactJS, PyTorch, Tensorflow, OpenCV, Numpy, Huggingface, NLTK, OpenSSL, Gurobi, LaTeX |
| **Tools** | Docker, Git, Jenkins |
| **Databases** | MySQL, Redis |

## Work Experience

**Pennsylvania State University** | Research Assistant (NLP and Fairness of ML) — *State College, U.S.A.*

*Jan 2023 - Aug. 2023*

- Worked on ensuring neural networks are not biased towards race and sex during classification (fairness of ML).
- Developed an algorithm using Python and PyTorch to modify neuron values to reduce classification bias, which enables neural networks to be deployed in sensitive socioeconomic use cases.
- Developed an algorithm using Spacy and NLTK for processing raw conversational data that enabled language models to be fine-tuned to function as chatbots.

**Tata Consultancy Services** | Security Researcher (Privacy of ML) — *Bangalore, India*

*Sep. 2020 - Jun. 2022*

- Worked with tech leads from the Security Operations Center on identifying malicious employee behavior from network logs.
- Designed pre-processing algorithms for network logs to ensure they can be effectively utilized by ML algorithms.
- Developed ML algorithm using neural networks to identify insider threats from processed logs, thereby preventing the loss or theft of confidential enterprise data.
- Proposed algorithms substantially improved detection rate over the prior solution by 2x.

**Citrix R&D** | Software Engineer Intern (Full Stack and Security) — *Bangalore, India*

*Jan. 2020 - Jun. 2020*

- Developed interactive dashboards using React.JS that helped customers analyze sensitive data to identify and act upon malicious user behavior in a timely fashion.
- Developed a trust service using Spring to validate API calls to filter unauthorized requests, thereby ensuring application security and data privacy.
- Implemented client-side caching to speed up GraphQL requests by 1.5x which improved user experience and latency.
- Configured Jenkins pipelines for CI/CD that improved build times and helped developers identify and triage bugs.

**Nanyang Technological University** | Security Researcher Intern (Hardware Security) — *Singapore*

*Dec. 2019 - Jan. 2020*

- Developed algorithms using C++ and SageMath to generate optimized ASIC implementations of block ciphers.
- Generated the best-known implementation of the *AES MixColumn* matrix using 12 XOR2 and 47 XOR3 gates.
- Improved gate count over state-of-the-art by 10%, thereby resulting in efficient hardware implementation of AES.

**Tata Consultancy Services** | Security Researcher Intern (Robustness of ML) — *Hyderabad, India*

*May 2019 - July 2019*

- Worked on preventing attacks that exploit CNNs by adding noise to input images to produce misclassification errors.
- Developed an algorithm using PyTorch and autoencoder neural networks to remove adversarial noise added to inputs.
- Proposed algorithm prevented misclassification by retaining 86% of baseline accuracy and helped ensure the robustness of deployed machine learning models.

## Projects

**Side Channel Attacks on Stream Ciphers** | Hardware Security

- Helped develop attacks to retrieve secret keys from stream ciphers running on 32-bit microcontrollers, thereby highlighting important vulnerabilities that could result in data theft.
- Designed an ML algorithm using PyTorch to identify the hamming weight from oscilloscope traces with 99.7% accuracy.

**CurrenSee** | Android Machine Learning Application

- Developed an Android application to count the value of Indian bank notes from live images using machine learning that helped the visually impaired make monetary transactions.
- Implemented and deployed an ML algorithm using Python, OpenCV, and Flask to count the value of banknotes from an image.
- Designed an accessibility-focused GUI with an easy-to-use interface and voice commands to aid the visually impaired.

**Theia.ai** | iOS Machine Learning Application

- Developed an iOS application to aid the visually impaired in traversing external environments by circumventing dangerous obstacles.
- Designed an algorithm using TensorFlow and Python for path planning and traversal using the live camera feed.
- Designed an accessibility-focused GUI with an easy-to-use interface and voice commands to aid the visually impaired.