XIAXIN SHEN

xiaxin.shen@princeton.edu | 219-238-8619 | https://allisonshen.github.io/

EDUCATION

Ph.D. in Electrical and Computer Engineering, Princeton University *2027 (Expected)*
PhD candidate *Princeton, NJ 08544*

M.A. in Electrical and Computer Engineering, Princeton University *2024*
Princeton, NJ 08544

B.S. in Computer Information Technology, Purdue University *2022*
Graduated with highest distinction (GPA: 3.96 / 4.00) *West Lafayette, IN 47906*

SKILLS

- **Python:** Implemented data scraping, XML files parsing, data cleaning, data analytics, and model building with TensorFlow and PyTorch
- **C/C++:** Implemented data structure and algorithms by finishing about 150 problems at online judge system
- **Java:** Maintained a Java-based system using the technique of Mybatis, Maven, Spring MVC for knowledge mapping. Implemented parallel programming for operating system. Developed Android App: RLEAM Reader
- **Dynamic website development:** Implemented an e-commerce site with HTML, CSS, JavaScript, JQuery, PHP, MySQL
- **Latex:** Edited paper with IEEE/ ACM/ Springer formats
- **Git:** Version control especially for group projects
- **Tableau:** Visualized and analyzed data in Purdue's 7th Annual ASA DataFest Competition

AWARDS

- Gordon Y.S. Wu Fellowship in Engineering *2022*
- Best Session Paper Award in 2021 Springer IHCI (Session Name: Machine Learning for HCI) *2021*
- 3rd Place in the SAE Mobility Forward Challenge: AI Mini-Challenge Competition *2021*
- Award for Best Visualization in Purdue's 7th Annual ASA DataFest Competition *2021*
- National-wide: Top 40 and Finalist in the ITA Tech Challenge Programming Competition *2019*

COURSE PROJECTS

Bitcoin Client Implementation in Rust **Sep 2022 - Dec 2022**

- Developed a simplified Bitcoin client from scratch using the Rust programming language, focusing on core blockchain principles
- Implemented fundamental cryptographic data structures, including a Merkle Tree, and built the core blockchain with a Proof-of-Work (PoW) consensus mechanism
- Integrated a peer-to-peer (P2P) network using a gossip protocol for block and transaction propagation
- Designed a transaction mempool and a comprehensive state model to validate transactions and prevent double-spending

Twitter Scraper **Jan 2021 - May 2021**

- Built a web scraping tool to obtain Twitter information by accessing and recording data from the Twitter website with Python library selenium
- Scraped information including user, handle, post dates, tweet texts as well as counts of reply, retweet and like
- Cleaned the data and saved the data to CSV files
- Analyzed and visualized the data with Python libraires: pandas and matplotlib

RLEAM Reader: Read, Learn, and Memorize **Oct 2021 - Dec 2021**

- Developing the Android App: RLEAM Reader, which can help users read ebook/documents with a convenient way to lookup dictionary explanations of words and review as well as memorize complex vocabularies with flashcards and forgetting curve
- Implementing the function of querying the meaning of words very conveniently by simple tapping in the read view
- Implementing the function of personalizing favorites lists from the text the user read
- Realizing the association of favorites lists with dates, and helping users review and memorize with flashcards based on the forgetting curve

E-Commerce Website **Aug 2019 - Dec 2019**

- Collaborated with 6 students to design and implemented front-end and back-end of the e-commerce website using HTML, JavaScript, CSS, PHP, MySQL
- Utilized distributed application architecture and deployed the database at the Oracle server
- Identified user requirements, drew ER, EER diagram, and created relational schema to build the database

RESEARCH EXPERIENCE

Neural Architecture Search (NAS) **April 2023 - Present**

- Implemented Deep Regression Component Analysis, taking into account the asymmetric case and temporal sensitivity
- Applied Deep RCA to Deep progressive and regressive NAS for optimizing neural network architectures
- Developed Supervised Deep Interpolation (SDI), leveraging Deep RCA for supervised super-resolution image enhancement
- Adapted and implemented Deep Progressive and Regressive NAS for numerical datasets

UAV Ground Scanning System: Human Detection with Deep Learning **Jan 2021 - May 2022**

Team Leader in the IITP Technology Entrepreneurship Program

- Created LIAEHU dataset comprising low-altitude infrared aerial images for human detection
- Presented an UAV ground scanning system developed with an infrared camera mounted on the UAV to detect human both in the daytime and at night
- Built a warning system for sending real-time notifications with GPS information if the result from the ground scanning system triggers the warning
- Compared and analyzed the performance of several deep learning state-of-the-art models with the LIAEHU dataset including YOLOv3, YOLOv4, YOLOv5, YOLO X, MobileNetSSDv2, and EfficientDet with TensorFlow and PyTorch

RoboMal: Malware Detection for Robot Network Systems **Mar 2021 - Aug 2021**

Undergraduate Research Assistant

- Developed the RoboMal dataset using the controller files of the publicly available autonomous car with Gazebo-based simulation available at GitHub
- Created a total of 450 binary executable and linkable format (ELF) files with 232 malware files and 218 good software files by modifying gains and scalars and manipulating the proportional–derivative (PD) control structure by person
- Identifying the maliciousness of the code with an accuracy of 85% and precision of 87%

Attitude Control for Fixed-Wing Aircraft using Q-Learning **Jan 2020 - Nov 2020**

Undergraduate Research Assistant

- Applied algorithms Q-Learning proposed in 1989 to airplane simulator which is available at GitHub
- Utilized Python to work with high dimensional, non-linear and complex tasks with a simulated aircraft Cessna 172 in JSBSim
- Implemented the algorithm for airplane flight based on Q-Learning to make the airplane fly with the goal of maintaining a constant altitude
- Defined a Q-table with the size (states(168), actions(4)) by creating an encoding system by converting discrete action values to continuous values

TEACHING EXPERIENCE

- **ECE 115 Introduction to Computing: Programming Autonomous Vehicles** *2023 - 2025*
  Graduate assistant in instruction *Princeton University*
- **EGR 154 Foundations of Engineering: Linear Systems** *2024 -2025*
  Head TA *Princeton University*

PUBLICATIONS

- **Xiaxin Shen**, Corbin Newhard, Miad Faezipour, and Smriti Bhatt. Smart monitoring and detection of ecg and breathing sound signals with deep learning. In *2022 IEEE International Conference on Engineering in Medicine and Biology Society (EMBC)*. IEEE, 2022
- David J. Richter, Lance Natonski, **Xiaxin Shen**, and Ricardo A. Calix. Attitude control for fixed-wing aircraft using q-learning. In *International Conference on Intelligent Human Computer Interaction (IHCI)*. Springer, 2021
- Upinder Kaur, Haozhe Zhou, **Xiaxin Shen**, Byung-Cheol Min, and Richard M. Voyles. Robomal: Malware detection for robot network systems. In *2021 IEEE International Conference on Robotic Computing (IRC)*. IEEE, 2021