JOSEPH MA

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EDUCATION

Purdue University, College of Engineering – West Lafayette, IN **Expected: May 2025**
Master of Science in Electrical and Computer Engineering

Purdue University, College of Engineering – West Lafayette, IN **Graduated: May 2023**
Bachelor of Science in Computer Engineering **GPA: 3.83/4.00**

Relevant Coursework:

- Artificial Intelligence, Reinforcement Learning, Operating Systems Engineering, Introduction to Computer Security

WORK EXPERIENCE

Purdue University School of Electrical and Computer Engineering – West Lafayette, IN

Graduate Teaching Assistant – Microprocessor Systems and Interfacing **January 2024 - Present**

- Leading lab sessions on STM32 ARM microcontroller in Embedded C and Assembly, focusing on DMA, ADC/DAC interfacing.
- Instructing on critical communication protocols including SPI, I2C, and UART, applied in embedded systems.
- Evaluating student projects and labs on interrupt service routines, timer configurations in real-time operating systems, with a focus on memory optimization and efficient peripheral interfacing.

Undergraduate Teaching Assistant (4 Semesters) **August 2021 – May 2023**

- Instructed four distinct courses, including Electrical Engineering Fundamentals (lecture and lab), Advanced C Programming and Data Structures, emphasizing hands-on projects like Wheatstone bridges and audio equalizers, along with algorithm efficiency and memory management.
- Managed lab experiments, graded assignments, and held office hours, supporting student learning and skill development.

Undergraduate Researcher – Sequential Task based Reinforcement Learning **May 2022 – January 2023**

- Explored algorithms to enhance the sequential task efficiency of RL agents, focusing on multi-domain adaptability.
- Engineered a binary-tree based Q table architecture for comprehensive state management and expedited decision-making.
- Applied dynamic programming and memorization to curb training time growth.

Preface Coding – Hong Kong **June 2021 – August 2021**

Full Stack Development Intern

- Revamped web portal interfaces with improved responsiveness and compatibility using HTML5, CSS3 and JavaScript.
- Enforced data validation and security in Ruby on Rails through active record validations for backend forms.
- Enhanced backend functionality with systematic CRUD operation testing and REST API interfacing via Postman.

TECHNICAL SKILLS

Languages: Advanced: Python, C; Intermediate: Assembly, Java, HTML, CSS, JavaScript, MATLAB; Basic: C++, SystemVerilog
Tools: Git, GDB, React.js, Matplotlib, NumPy, Pandas, SolidWorks, EAGLE, Fusion 360, CATIA V5, STM32 ARM microcontroller

PROJECTS

Cat & Mouse – Reinforcement Learning **December 2023**

- Engineered and created a pursuit-evasion game using Dijkstra's algorithm for a deterministic cat agent, and iterative Q-learning for an adaptive mouse agent, improving their strategies through generational training and dynamic interactions.

Differential Cryptoanalysis – Computer Security **December 2023**

- Analyzed the PRESENT lightweight block cipher using differential cryptanalysis, focusing on its application in IoT and RFID systems; identified key vulnerabilities and assessed the cipher's resistance to differential attacks.

Boiler Ticket Chain – Blockchain **May 2023**

- Co-designed key elements of Boiler Ticket Chain, an innovative blockchain-based ticketing system using technologies like Ethereum, Solidity, Hardhat, and IPFS, enhancing security and efficiency in university event ticketing.