Devin Bowler

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EDUCATION

Bachelor of Science in Computer Science Expected May 2026

University of Massachusetts Amherst, Amherst, Massachusetts

Relevant Coursework: Algorithms, Database Design, Computer Architecture, Web Programming

TECHNICAL SUMMARY

Languages: Proficient in Python (Flask), Java, & C, Experience in, C++, JavaScript (React), C# (Unity), HTML (CSS), MongoDB and SQL

Software: Git, Docker, Kubernetes, Linux, Jupyter Notebook, Vim, and VSCode

EXPERIENCE

Applied Research Engineer

University of Houston May 2024 - August 2024

- Led a research project focused on integrating and optimizing Large Language Models to elevate code security analysis, achieving significant improvements in vulnerability detection
- Explored various open-source models, including Gemma, LLaMA, RoBERTa, and Phi, applying a sentiment analysis approach to assess generative model outputs, ultimately selecting RoBERTa for its superior classification performance in detecting vulnerable code
- Fine-tuned a RoBERTa model for binary vulnerability classification to enhance the precision of identifying and categorizing code vulnerabilities. Utilized the model's prediction to find specific vulnerability details using a generative language model

SOFTWARE PROJECTS

Systems / Computer Architecture

ARCH-16

University Project February 2025 - Present

- Designed a custom 16-bit Instruction Set Architecture (ISA) in C with 16 general-purpose registers, memory encryption support, and simulated pipelining and caching
- Built a GUI-based simulator in PyQt that communicates with the C-based ISA simulator via a Flask API, supporting file uploads, step execution, and breakpoint debugging
- Developed an instruction encoder and memory model for arithmetic, branching, and memory operations with real-time display of registers, DRAM, cache, and pipeline stages

Full Stack - Visualization

Conceptrix

Personal Project December 2024 - Present

- Developed a full-stack JavaScript application leveraging Manim and ChatGPT API, automating the rendering of interactive mathematical and engineering visualizations
- Deployed a microservices architecture with two independently scalable web services, isolating the login system from the main application for improved modularity
- Integrated an Amazon S3-backed Python backend for seamless video storage and retrieval, enabling user-generated visualizations with SQL database support

Machine Learning

Vulnerability Detection

Research May 2024 - August 2024

- Fine-tuned the RoBERTa model to achieve a 96% F1 score and 1.1% false positive rate, demonstrating effective detection of software vulnerabilities & exploits on unseen data
- Built a Flask-based web application allowing users to upload C/C++ code for automatic vulnerability classification and analysis, identifying risks and categorizing them by type