Rithik Jain

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EXPERIENCE

Project Assistant | Vertical Research Group - University of Wisconsin Madison | Madison, WI | May 2022 - August 2022
- Conducted Research with Professor Karu Sankaralingam's Vertical Research Group.
- Surveyed to determine future Deep Learning developments and create a new benchmark.
- Modified six research prototype DL models to plug into NVIDIA's profiling software.
- Ran experiments generating graphs for NVIDIA's Assembly Language (SASS), CUDA API calls, and other relevant data.
- Presented results using Powerpoint and Excel, undertook scientific writing, and used Latex, Python, Jupyter, and Bash for development.
- Submitted a research paper to ASPLOS' 24.

Undergraduate Research Assistant | University Of Wisconsin Madison | Madison, WI | May 2021 - January 2022
- Assisted in developing and testing LMCAS, a Compiler optimizer that reduced code bloat and pruned unsafe execution branches.
- Assisted in developing a Docker container for running benchmarks. Compiled and compatibilized four other state-of-the-art binary code pruners. Used Bash and Unix utilities extensively.
- Generated and analyzed metrics concerning program security and performance.
- Presented results in accessible graphs using Matplotlib, Jupyter Notebooks, and Python.
- Undertook technical writing and editing.
- Published research findings in the IEEE European Symposium on Security and Privacy 2022, highlighting contributions to the field.

Teaching Assistant | University Of Wisconsin Madison | Madison, WI | September 2022 - April 2023
- Assisted Professor Eric Bach with Introduction to Cryptography in the Fall and Beck Hasti with Introduction to Compilers in Spring.
- Communicated complex concepts to undergraduates clearly and concisely.
- Developed Grading Infrastructure using Gradescope, Bash scripting, and Python.
- Created fun and challenging assignments and exams to assess student performance.
- Analysed over 200 students' performance data to determine what areas of learning required more attention.

Peer Mentor (Undergraduate Teaching Assistant) | University Of Wisconsin-Madison | Madison, WI | January 2021 - May 2022
- Peer Mentor for Michael Doescher's Computer Organization and Machine Programming Course.
- Developed Teaching aids, including graphics and diagrams, to visualize project assignments.
- Provided Mentorship for students dealing with anxiety, stress, or disability.
- Teaching Debugging (GDB), Vim, Tmux, Linux, and Bash to students without experience.

PROJECTS

UPCYCLE: A new approach to AI Hardware/Software systems | University of Wisconsin Madison | January 2022 - May 2022
- Compiler infrastructure developer for Eagle, a novel AI hardware accelerator that implemented the UPCYCLE architecture developed by Mike Davis and Professor Karu Sangkralingam.
- Undertook Cross Compiling RISCV code on x86 machines.
- Modified the GNU toolchain to extend the RISCV instructions to support custom hardware.
- Conducted research on the performance difference of using LLVM to develop compiler infrastructure vs the GNU toolchain.
- Successfully Implemented over 16 custom RISC-V instructions for parallel computing and deep learning workloads.

Literary Survey on Hardware Accelerators | University Of Wisconsin Madison | October 2022 - December 2022
- Developed a Taxonomy to identify current problems with hardware accelerators.
- The 5Ps Taxonomy stands for Problem, Programmability, Power Consumption, Performance, and Portability.
- Read and synthesized information from 12 research papers.
- Identified common trends and issues in Hardware Acceleration research and development.

Sustainable AdSpace | MadHacks Carbon 2019 | October 2019- October 2019
- Developed a DNSwitchole project that modified an existing DNS Sinkhole to redirect ads to dead pages and switch to ads for sustainability awareness-raising organizations.
- Marketed the idea as a product that people could install on their home networks to prevent ads and raise awareness for guests while exclusively partnering with organizations that rely on donations.
- Spun-Off the idea that this could be used in local advertising spaces such as mom-pop shops.
- Used PhP, Raspberry Pi, and Networking Concepts for Development.
- Won 2nd place at the 2019 UW-Madison MadHacks Hackathon.

Sourcer's Stone: The Automatic News Verification Tool | Personal Project | February 2023 - Present
- Developed as Journalism software, this Word document editor enforces citations for each paragraph.
- Developed an accompanying decentralized protocol and data structure that can enable faster retrieval of initial reports.
- Conversational AI (GPT) determines if a link in the chain misinterpreted data by comparing the data with the source.
- Potentially further use cases include Academic Journals.
- Final Goal would be to Open Source the codebase, ensuring that no one can tamper with the criteria for verification.

EDUCATION

Masters of Science, Computer Sciences | University of Wisconsin, Madison | Madison, WI | 2024 | 4.0

Bachelor of Science, Computer Sciences | Minor in Mathematics | University of Wisconsin, Madison | Madison, WI | 2018 - 2022 | 3.4

SKILLS

Tools:
- **Software Development: C, Java, C++, Python, JavaScript.**
- **Hardware Development: RISC-V, x86, MIPS,ModelSim, Verification tools, Verilog.**
- **Data Analysis: Numpy, Pandas, Matplotlib, Latex, Excel & PowerPoint.**
- **Infrastructure Development: Docker, Git, GitHub, Vim, VSCode, Bash & Zsh, Unix, CMake, Pip.**
- **Project Management: Trello.**
- **Systems Development: Kernel Programming, LLVM, GNU Toolchain.**
- **Computer Security: Binary Code Analysis, Pentesting, Cryptography.**
- **High-Performance Computing: AVX instructions, ICC C/C++ intrinsic.**

Skills:
- **Techno--functional**
- **Project Management(Agile, Waterfall methodologies)**
- **Excellent Written & Verbal Communication**
- **Problem-Solving**
- **Product Assessment**
- **Research Roadmap development**
- **Data Analysis & Visualization**