Ruiyang Zhou

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Education

University of Virginia Expected May 2025
Bachelor of Art in Computer Science (GPA: 3.85 / 4.00) *Charlottesville, VA*

- Continue Master's studies after graduation
- **CS core Courses:** Software Development Method, Discrete Math, Program and Data Representation, Intro to Cybersecurity, Advanced Software Development, Discrete Math and Theory 2 , Data Structure and Algorithm 2, Computer Architecture, Hardware Security, Digital Signal Processing, Operating System, Machine Learning, Compiler, Database System
- **Music core Courses:** Music Theory, Intro to Composition, Intro to Music & Computers, Computer Applications in Music, Sound Synthesis, Orchestration I
- **Certification:**Certificate of Completion of Recording Art in CCRMA Summer Workshop at Stanford University

Technical Skills

Programming Languages: C++, Python, X86 Assembly, HTML, C, SQL, Java, Javascript
Technologies/Environment: Xilinx Vitis, Linux, JUCE, Django, OpenCL, Vivado, Git, Scikit-Learn, TensorFlow, Vue.js, MsSQL, Docker, SolidWorks, Ardruino, Latex, Ableton, Pure data.

Research Experience

Evaluation across FPGA Regex Engines for Regular Expression Processing December 2022 - present
Research Assistant, Advisor: Kevin Skadron *Charlottesville, VA*

- Used AMD Alveo U280 FPGA and implement Xilinx's Vitis library with C++ to scale up the virtual machine based regular expression matching on automata processing.
- Modified the virtual machine in Vitis Library's L2 level to supplement concurrent 13 kernels running which process single input and multiple pattern matching on FPGA simultaneously. Built tests on hardware, hardware emulation and simulation.
- Experimented on benchmark tools like ANMLZOO and AUTOMATAZOO to evaluate the speed of automata processing. Modified regular expression format in benchmarks for use in regex virtual machine.

Research in Reference Mixing and Audio Similarity September 2024 - present
Advisor: Tom Fletcher *Charlottesville, VA*

- Used Spleeter to perform 4-stem separation of input audio. Implemented Short-Time Fourier Transform to create spectrogram of input audio
- Analyzed and compared the spectrogram of two input audio. Partitioned the audio into different section according to the spectrogram loudness and frequency range. Tagged and categorized those different sections.

DRAM Traffic in Side-Channel Attacks in iGPUs From Transparent Compression February 2024-May 2024
Advisor: Ashish Venkat *Charlottesville, VA*

- Replicated experiments of GPU.zip on time side-channel attack arise from transparent compression on i7-1255U CPU with Iris Xe integrated GPU
- Compared the DRAM traffic and rendering time difference of different integrated GPU structure like Alder-Lake and Coffee-Lake arise from compression
- Used static code analysis and designed a strategy to use subprocess to inject DRAM traffic to eliminate the DRAM difference in rendering different texture

Projects

VST Plugin Bundle | *Juce*

- Used C++ and JUCE framework to design fully usable VST/AU plugins with GUI.
- Designed the suite including a volume-balancer, an equalizer, a delay, a chorus, a compressor, and a creative multi-band distortion plugin.
- Implemented the RMS detector for compressor; Implemented the Linkwitz-Riley filters for multi-band separation; Implemented various distortion algorithms like soft clipping and hard clipping.

Digital FM Bass Synthesizer | *Puredata, Bela, Solidworks*

- Designed and build a digital bass synthesizer in Game controller like interface. Used Bela as processor and designed the software synthesizer in puredata with FM synthesis and implemented the bitcrush algorithm.
- Used Solidworks to modeling the prototype and 3D printing the structure.

TennisBole Athlete Filter Tool | *Selenium*, *Beautifulsoup*, *Git*

- Built a tool for Georgia Institute of Technology Athletic Association Tennis Team that can filter tennis athletes based on customized criteria (e.g., age range and nationality) and rank filtered athletes based on scores/rankings from different sources (e.g., UTR, ATP, ITF and USTA) and customized weight.
- Implemented data scraping and processing from different websites. Use beautifulsoup in python to pull data out of website. Use Selenium and webdriver to actualize automation and avoid robot detection.
- Built the standalone python executables and sorted out the data in CSV format. Cooperated with other teammates to build the data base in JSON format and further filtering, ranking and weighing with LINQ.

Local Lost and Found web application | *Django*, *Postgred*, *Heroku*, *Git*

- Used Django framework and Heroku cloud platform to build Lost and Found web application helping students in the University to report and find their lost item.
- Integrated Google Oauth2 to allow users login with google emails. Applied Google Map API for real time map checking and pin markers on the map. Integrated with Google Cloud Storage for image data storing and sharing.
- Used git to manage repository for team. Managed Postgres database on heroku and maintain Continuous Integration with YML file.

Personal Website | *Vue.js*

- Designed and implemented personal website for demonstrating my projects and music using Vue.js. Deployed the website on the Github Pages.
- Embedded video play from Youtube, music play from Soundcloud, and pdf view using iframe. Used font-awesome to build icon link to my Github, Instagram and Linkedin

Honor

- Dean List - 2023 Fall, 2024 Spring
- Best GT Athletics - Tennis Hack in Hacklytics 2021

Extracurricular Activities

Music Producer: Produced and mixed music. Experienced in studio recording. Co-produced Stanford Recording Arts Workshop 2024 Double Album *The Tapestry of the Soul*.
UVA Badminton Team : Member of UVA Competitive Badminton Team. Assisted and participated weekly practice of competitive team.