

Shaunak Ranade

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EDUCATION

New York University, New York, NY

August 2022 – December 2024

Master of Music, Major: Music Technology

Relevant Coursework: Digital Signal Processing, Advanced Musical Acoustics, 3D Audio, Deep Learning for Media, Music Information Retrieval

GPA: 3.68

Loyola Marymount University, Los Angeles, CA

August 2017 – May 2021

Bachelor of Arts, Major: Recording Arts

TECHNICAL SKILLS

Programming Languages: Python, MATLAB, Max MSP, gen~, C, C++, Bash, Unix, LaTeX, Unity

Tools/Platforms: Git/Github, VSCode, MATLAB App Designer, Pytorch, HPC Usage, librosa, matplotlib, ADC/DAC workflows, Motion Capture

PROFESSIONAL EXPERIENCE

Virtuel Works LLC, New York, NY

Research Assistant

May 2024 – Present

- Work with Dr. Agnieszka Roginska and Dr. Jean-Marc Jot to enhance externalization in existing binaural audio processing methods.
- Developed a user-friendly GUI in MATLAB for participant studies, enabling seamless playback and data collection for perception analysis.
- Assisting in enhancing the externalization algorithm using novel filtering techniques.
- **Skills: Audio Processing Research, Psychoacoustics, Auditory Perception, Spatial Audio, Room Acoustics, MATLAB, Python, MaxMSP, Acoustic Experimentation & Data Collection, Research Methodology Documentation, Technical Writing, Physical Acoustics, AR/VR, Spectral Analysis, Statistical Analysis**

New York University, New York, NY

IT Technician

January 2024 - December 2024

- Delivered technical support for NYU Steinhardt Music Department, managing computers, file servers, and specialized studio equipment.
- Performed maintenance and security updates on faculty devices, diagnosed and resolved networking issues..
- **Skills: Technical Support, File Server Management, Security Software Maintenance, Network Troubleshooting**

Studio Technician

January 2023 – December 2023

- Provided technical assistance with studio procedures, console setup, Pro Tools, signal routing, etc.
- Assisted with recording sessions and performed studio maintenance, including troubleshooting, debugging, and testing analog equipment, outboard effects, and other studio hardware, ensuring optimal performance.
- **Skills: Pro Tools, Logic Pro, Ableton, Signal Flow Troubleshooting, Analog Gear Maintenance, Cross-Talk Cancellation, Network Compensation Digital Audio Workstations**

Highlighted Projects

Foley Sound Synthesis (Master's Thesis)

- Developed a Foley Sound Synthesis neural network by leveraging deep learning techniques like audio tokenization, augmentation and transformer learning to generate novel foley sounds in 7 different categories
- Performed dataset collection of 6 hours of data and performed fine-tuning of model weights to obtain high-fidelity audio
- Performed quantitative analysis on the generated audio through the use of Fretchet Audio Distance (FAD) scores to gauge the quality of the audio obtained.
- **Skills: GenAI, Data Augmentation, Audio Tokenization, Transformers, Tensorflow, AL/ML, Generative Adversarial Networks (GANs), PyTorch, librosa, Audio Codecs, Weight&Biases (WnB), Fretchet Audio Distance, Quantitative Analysis**

Beat Detection with Spectral Flux

- Implemented beat detection for GTZAN dataset using spectral flux onset function, computing a tempogram and PLP features for accurate beat detection
- Evaluated beat accuracy by computing F-measure scores to assess estimated beats against ground truth, analyzed results by genre, and explored tempo-performance relationships.
- Created utilities to generate time axes for novelty curves and audibly compare estimated vs. reference beats with click tracks.
- **Skills: Beat Detection, Audio Evaluation Metrics (F-measure), Audio Visualization, Audio Feature Extraction, Onset Detection, Time Series Processing, Music Information Retrieval**

Real-Time HRTF Convolution GUI

- Implemented HRTF convolution of mono audio using SOFA-format impulse responses recorded with a KU100 dummy head, enabling realistic 3D spatial audio rendering
- Designed an interactive TKinter GUI with adjustable azimuth and elevation sliders, allowing users to control sound source positioning in the auditory field in real time
- **Skills: Audio Signal Processing, Phase Noise Analysis, Harmonics Analysis, SNR, Time domain/ frequency domain processing, FFT, Filter Design**

Guitar Tuner Application in JUCE

- Designed and implemented a real-time guitar tuner plug-in using the JUCE framework, featuring low-latency audio I/O and responsive UI components
- Integrated YIN fundamental frequency estimation algorithm for precise pitch detection, supporting multiple standard and custom guitar tunings
- Optimized DSP routines and buffer management to ensure efficient real-time audio processing with minimal CPU and memory footprint
- **Skills: C++, Memory Optimization, Real-time audio coding, JUCE Framework, Multi-Threading**

Filter Design Visualizer in MATLAB

- Developed an interactive Filter Analysis Tool using MATLAB App Designer, enabling real-time design and visualization of FIR/IIR filters with adjustable parameters and multiple filter types
- Implemented response plots including frequency, phase, impulse and pole-zero diagrams, with integrated audio playback for immediate perceptual evaluation
- Facilitated rapid DSP experimentation and educational use by supporting test signal loading, parameter tweaking and instant auditory and visual feedback
- **Skills: MATLAB, MATLAB App Designer, Filter Design, FIR/IIR filters, Digital Signal Processing, Frequency Response Analysis, Phase Response Analysis, GUI Development, Educational Tool Development**