VEENA VIJAI

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Software Engineer, Machine Learning

Curious and driven Electrical Engineering Master's graduate looking to work on challenging and creative problems in machine learning and audio technology. Experienced in deep learning, audio and speech signal processing, and the underlying math. Proficient in C++ and Python and enjoys simplifying concepts through writing. Believer in clear & open communication and collaborative culture.

EDUCATION

University of Southern California — Los Angeles, CA
Master of Science in Electrical Engineering, GPA: 3.82/4.0 — *January 2019 – December 2020*
MS Honors Fellow, Ming Hsieh Department of Electrical & Computer Engineering, for exceptional academic performance.

Birla Institute of Technology and Science, Pilani — Goa, India
Bachelor of Engineering in Electrical Engineering, Minor in English Studies, GPA: 8.36/10 — *August 2014 – May 2018*

TECHNICAL SKILLS

Coursework: Immersive Audio, Speech Recognition, Digital Signal Processing, Data Structures & Algorithms, Pattern Recognition, Machine Learning, Deep Learning, Parallel & Distributed Computing, NLP with Deep Learning, Linear Algebra, Probability
Languages/Tools: C++, C, Python, MATLAB, TensorFlow, PyTorch, Keras, Linux, git, Jupyter

EXPERIENCE

Amazon Lab126, Hardware Technology & Architecture — Bellevue, WA (remote)
Applied Scientist Intern — *May 2020 – Aug 2020*

- Studied the capabilities and limitations of Amazon's **Neural Network Accelerator** (NNA) for audio applications
- **Modified existing model architectures** for compatibility with Open Neural Network Exchange (ONNX) format and NNA
- Exhaustively **explored & documented techniques** to improve model performance for NNA's 8-bit quantization scheme
- Worked on **integrating new machine learning-based speech enhancement module** in the existing audio front-end in C code

Signal Analysis and Interpretation Lab — Los Angeles, CA
Graduate Research Intern — *February 2020 – present*

- Mapping Google's **AudioSet taxonomy** to subtitle data from Hollywood movies to analyze sound events by movie genre
- Cleaning up crowd-sourced annotations for text subtitles to perform **audio event classification**

Bioacoustics Research Program, Cornell Lab of Ornithology — Ithaca, NY (remote)
Research Intern — *July 2018 – December 2018*

- Aimed to automate sifting through years' worth of 24/7 acoustic data to find regions likely containing bird calls (blog)
- **Extracted** 5 acoustic features & **visualized their correlation** by **creating scatterplot** matrices with pandas (repo)
- **Classified** ≈3000 spectrograms from 30 species into bird calls, human speech & background noise

Medical Intelligence and Language Engineering Lab, Indian Institute of Science — Bengaluru, India
Summer Research Fellow

Speech Segmentation — *May 2017 – December 2017*

- **Extracted** time & frequency-domain information from clean speech signals in TIMIT database with MATLAB (thesis)
- Formulated a **rule hierarchy** with 3 **acoustic features** to segment speech into silence, sonorants, fricatives, & bursts

Identifying Language Relationships — *May 2016 – July 2016*

- **Modeled phoneme sequences** with long-distance bigram MFCC features for 5 Indian languages and English (paper)
- Applied k-medoid **clustering** & **visualized language relationships** by constructing phylogenetic trees with MATLAB

SELECTED PROJECTS

Garfield Comic Strip Generation — *October 2019 – December 2019*

- **Generated images and dialog** for the third panel of Garfield using previous two panels as 'context' with **PyTorch** (blog)
- Achieved best results with pix2pix, a **Conditional GAN** model & evaluated using Frechet Inception Distance
- Generated dialog with context by **fine-tuning OpenAI GPT-2**, experimented on **transformers** & **LSTMs** with **attention**

Room of Requirement: Room Impulse Response (RIR) Similarity Calculator — *May 2020*

- Designed and created dataset of ~500 rooms with varying shape, size & absorption coefficient using pyroomacoustics (repo)
- Predicted top 3 similar rooms wrt RIR & observed frequency response patterns with varied size and absorption coefficient

Others: Time series classification on AReM sensor data, Self-driving car competition (repo), Frontal-lobe EEG analysis (report)

LEADERSHIP & KEY INITIATIVES

- **Chief Editor** of BITS Annual Magazine: **led a team of 10** editors & designers to publish first bilingual edition (issue)
- **Coached** underprivileged Indian students in basic arithmetic for 2 years in Nirmaan Goa for the JNV scholarship exam (blog)