**Atharva Anand Joshi**

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RESEARCH INTERESTS

Speech Processing: Enhancement and Separation, Deep Learning, Representation Learning

education

**Carnegie Mellon University** Pittsburgh, PA

Master of Science in Electrical and Computer Engineering - Applied Advanced Study (AI/ML Systems) December 2024

GPA: 4.0/4.0

**Birla Institute of Technology and Science, Pilani** Pilani, India

Bachelor of Engineering in Electrical and Electronics Engineering July 2022

GPA: 9.49/10

GRE: 331/340 (AWA: 4/6), TOEFL: 109/120

skills

**Programming:** Java, Python3, C, CUDA , MATLAB

**Deep Learning:** PyTorch, TensorFlow, Keras, AWS and GCP for ML

**Frameworks:** Kalimba Toolkit, PySpark, WandB, OpenMP, LaTeX, Git

experience

**Hewlett-Packard Inc., Poly** Austin, TX

Research and Development Intern May – August 2023

* Developed a deep learning model that can suppress stationary and impulsive background noises directly on headsets
* Optimized the inference pipeline on memory, compute and latency for real-time execution on the QCC5171 DSP
* Introduced an efficient approach to Audio ML Development that would make integration into products 6-8 times faster
* Won the 2023 HP Intern Award for this project by securing 4th position among ~90 engineering interns

**American Express, Artificial Intelligence Labs** Gurgaon, India

Analyst - Product Development July - December 2022

* Researched a blend of Tabular models with Tree-based algorithms for the Credit Default Prediction problem
* Enhanced model performance by leveraging extensively hand-engineered features, along with meta features
* Generated valuable business insights pertaining to features selection and effective aggregation of temporal features

Analyst Intern January - June 2022

* Proposed a template-based journey that allows users to seamlessly create and deploy their machine learning pipelines
* Developed a framework that facilitates deployment of end-to-end Self Learning pipelines for Sequence Models

**Adobe Research, India** Bangalore, India

Research Intern May - August 2021

* Created rich user representations that can be projected onto edge servers, hence powering faster marketing services
* Performed various experiments around the extent of compression and updatability of the representations generated
* Contributed towards a **patent** as a co-inventor - “Generating Concise and Common User Representations for Edge Systems from Event Sequence Data Stored on Hub Systems” (US20230419339A1 - Filed June 24, 2022)

publications

* **A. A. Joshi**, H. Settibhaktini, and A. Chintanpalli. Modeling concurrent vowel scores using the time delay neural network and multitask learning. IEEE/ACM Transactions on Audio, Speech, and Language Processing, 30:2452-2459, 2022
* **A. A. Joshi**, P. Bhardwaj, and S. M. Zafaruddin. Terahertz wireless transmissions with maximal ratio combining over fluctuating two-ray fading. IEEE Wireless Communications and Networking Conference (WCNC), pages 1575-1580, 2022

projects

**Machine Learning for Speech Processing Applications**

* Contributed an end-to-end reproducible deep learning pipeline for the Kinect-WSJ dataset – a multichannel, reverberated and noisy version of the WSJ0-2mix dataset to the ESPnet Speech Processing Toolkit
* Performed benchmark analysis on this speech separation dataset using the current state-of-the-art models
* Currently investigating the data and model scalability aspects for large speech enhancement and separation models

**Proactive Servicing: American Express ML Challenge**

* Utilized event sequences and demographic data to predict customer intent at the start of the Ask AmEx chat session
* Employed joint training of Bidirectional GRU with Feedforward Networks
* Attained a validation top-5 accuracy score of 0.768 and hence made it to the top 10 leaderboard out of ~80 teams

**High Performance Parallel Implementations for Convolutional Neural Networks**

* Provided fast OpenMP and CUDA implementations for various subroutines corresponding to the convolution layer
* Investigated several design choices in detail aiming to optimize speedup over a simple sequential C implementation
* Achieved maximum speedup of 4.23x on the Intel(R) Xeon(R) Silver 4208 CPU and 73.87x on the Nvidia Tesla T4 GPU

**Quasi-Newton Methods for Deep Learning**

* Replicated the results of the NeurIPS 2020 paper: Practical Quasi-Newton Methods for Training Deep Neural Networks
* Analyzed the algorithm theoretically and evaluated its convergence plots
* Compared the convergence trends of this algorithm against other first and second-order descent methods

**Concurrent Vowel Identification Using DNN**

* Developed a novel computational model to predict the effect of fundamental frequency difference on the identification scores in a Concurrent Vowel Identification Experiment
* Trained a TDNN augmented with a Multi-task Learning setup on the neuron responses from the Auditory Nerve Model

aWARDS AND RECOGNITION

HP Intern Award – Top 5 2023

American Express Modeling Super Bowl – Top 10 Leaderboard 2022

OP Jindal Engineering and Management Scholarship 2020 and 2021

Institute Merit-Based Scholarship, Birla Institute of Technology and Science, Pilani – Top 2% 2019-2022

Regional Runner-up at TCS IT Wiz, a nationwide inter-school quiz competition 2015

Mentorship and teaching

* **Graduate Teaching Assistant** for 10-605: ML with Large Datasets Spring 2024

Instructors: Prof. Ameet Talwalkar and Prof. Geoff Gordon

* **Graduate Teaching Assistant** for 18-661: Introduction to ML for Engineers Fall 2023

Instructors Prof. Yuejie Chi and Prof. Beidi Chen

* **Undergraduate Teaching Assistant** for BITS F312: Neural Networks and Fuzzy Logic Fall 2021

Instructors: Prof. Surekha Bhanot and Prof. Bijoy Krishna Mukherjee

Relevant coursework

**Graduate:** Introduction to Deep Learning, Machine Learning for Signal Processing, Deep Generative Modeling, Machine Learning with Large Datasets, Natural Language Processing, Introduction to Machine Learning for Engineers, CUDA Programming, Convex Optimization

**Undergraduate:** Neural Networks and Fuzzy Logic, Artificial Intelligence, Object Oriented Programming (Java), Digital Signal Processing, Digital Image Processing, Communication Systems, Operating Systems

POSITIONS OF RESPONSIBILITY

**Joint Coordinator** at Ragamalika, the Classical Music and Dance Club of BITS Pilani, Pilani Campus (2020-2021)

* Actively involved in composing music for semester productions and managing professional concerts
* Avid practitioner and performer of Hindustani Classical Vocal Music for the past fourteen years