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NATARAJAN BALAJI SHANKAR

EDUCATION

University of California, Los Angeles (UCLA) — Los Angeles, CA
Ph.D. Electrical and Computer Engineering — March 2023 - present
Advisor: Dr. Abeer Alwan

University of California, Los Angeles (UCLA) — Los Angeles, CA
M.S. Electrical and Computer Engineering — September 2021 - March 2023
Specialization in Signals and Systems — **GPA: 3.97/4.0**

National Institute of Technology Tiruchirappalli (NIT Trichy) — Tiruchirappalli, India
B. Tech. Electronics and Communication Engineering — July 2016 - June 2020
Minor in Computer Science — **GPA: 8.57/10**
First Class with Distinction

RESEARCH EXPERIENCE

Speech Processing and Auditory Perception Laboratory (SPAPL), UCLA — January 2022 – present

- Designed a pipeline for automatic scoring of child reading assessments based on domain adapted generation of transcripts and extraction of linguistic features
- Devised a framework for automatic dialect density estimation of African American English based on the extraction of grammatical features, speaker embeddings, and prosodic representations of child and adult speech
- Developed an encoder only CTC-alignment single-step non-autoregressive transformer based Automatic Speech Recognition (ASR) system to increase transcription speed from speech segments during inference
- Formulated a technique for unsupervised domain adaptation of speech foundation models for low resource domains, resulting in a 29% relative Word Error Rate reduction on noisy speech
- Assisted in the creation of the CORAAL QA database for spoken question answering from spontaneous speech

Signal and Image Processing Laboratory, NIT Trichy — May 2019 – July 2019

- Integrated usage of anisotropy preserving Shearlet transform with contrast limited adaptive histogram equalization and adaptive gamma correction to obtain greater edge and contour preservation in fundus images.
- Devised a novel method to perform macula detection in fundus images with severe degradation using known optic disc data and morphological transformations to enhance darker regions and to help in further exudate grading.

Pattern Recognition and Computational Intelligence Laboratory, NIT Trichy — May 2018 – July 2018

- Overcame presence of instrumental background noise by extracting MFCCs from segments to perform Automatic Separation of Vocal and Non-Vocal Segments Present in South Indian Songs
- Designed and implemented several classifier models for cleaner feature separation, including a SVM with a modified Gaussian kernel and generated a classification accuracy of 82%, a 17% improvement over a standard Gaussian kernel.

PROFESSIONAL EXPERIENCE

KLA Corporation — June 2022 – September 2022
Algorithms Intern — Milpitas, CA

- Developed license generation system using Python and Flask to authenticate access requests for eligible clients for an internal tool
- Migrated backend for wafer inspection tool from Windows to Linux to facilitate multi GPU execution
- Devised data transmission framework to enable client side wafer inspection tool GUI to communicate with Linux based remote backend

thiMk — November 2018 – January 2019
Machine Learning Intern — Bangalore, India

- Analyzed data about derivatives and options using different Machine Learning techniques to observe trends present in the Indian derivative market with Python, using Tensorflow libraries.
- Collaborated with a team of traders and developed a tool to dynamically provide a signal of buy or sell based on historical data and observed real time trends and fluctuations using a LSTM neural network.

PUBLICATIONS

- A. Johnson, H. Veeramani, N. B. Shankar, and A. Alwan. *An Equitable Framework for Automatically Assessing Children's Oral Narrative Language Abilities.* Proc. Interspeech 2023
- H. Veeramani, A. Johnson, N. B. Shankar, and A. Alwan. *Towards Automatically Assessing Children's Oral Picture Description Tasks.* Proc. 9th Workshop on Speech and Language Technology in Education (SLaTE)
- Palanisamy, Gopinath, Natarajan B. Shankar, Palanisamy Ponnusamy, and Varun P. Gopi. *A hybrid feature preservation technique based on luminosity and edge based contrast enhancement in color fundus images.* Biocybernetics and Biomedical Engineering (2020)

TECHNICAL SKILLS

Languages: C, C++, Python
Packages: PyTorch, Kaldi, TensorFlow, OpenCV, Flask, Langchain
Other Tools: Latex, MATLAB, PostgreSQL, Docker, Linux, Git