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NATARAJAN BALAJI SHANKAR

EDUCATION

University of California, Los Angeles (UCLA) — Los Angeles, CA
Ph.D. Electrical and Computer Engineering — Expected, June 2026
Advisor: Dr. Abeer Alwan

University of California, Los Angeles (UCLA) — Los Angeles, CA
M.S. Electrical and Computer Engineering — June 2023
Specialization in Signals and Systems

National Institute of Technology Tiruchirappalli (NIT Trichy) — Tiruchirappalli, India
B. Tech. Electronics and Communication Engineering — June 2020
Minor in Computer Science
First Class with Distinction

RESEARCH EXPERIENCE

Speech Processing and Auditory Perception Laboratory (SPAPL), UCLA — 01/2022 – present

- Facilitated the creation of the CORAAL QA database and framework for question answering from long audio files through the integration of Large Language Models with existing speech foundation models
- 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
- 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
- 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

Signal and Image Processing Laboratory, NIT Trichy — 05/2019 – 07/2019

- 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
- Drafted 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

PROFESSIONAL EXPERIENCE

KLA Corporation — 06/2022 – 09/2022
Algorithms Intern — Milpitas, CA

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

PUBLICATIONS

Published

- N. B. Shankar, A. Johnson, C. Chance, H. Veeramani, and A. Alwan. *CORAAL QA: A Dataset and Framework for Open Domain Spontaneous Speech Question Answering from Long Audio Files*. ICASSP 2024 - IEEE International Conference on Acoustics, Speech, and Signal Processing (2024)
- N. B. Shankar, R. Fan, and A. Alwan. *SOA: Reducing Domain Mismatch in SSL Pipeline by Speech Only Adaptation for Low Resource ASR.* 2024 IEEE International Conference on Acoustics, Speech, and Signal Processing Workshops (2024)
- R. Fan, N. B. Shankar, and A. Alwan. *UniEnc-CASSNAT: An Encoder-only Non-autoregressive ASR for Speech SSL Models*. IEEE Signal Processing Letters (2024)
- 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)
- A. Johnson, C. Chance, K. Stiemke, H. Veeramani, N. B. Shankar, and A. Alwan. *An Analysis of Large Language Models for African American English Speaking Children's Oral Language Assessment*. Journal of Black Excellence in Engineering, Science, and Technology (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) (2023)
- G. Palanisamy, N. B. Shankar, P. Palanisamy, and V. P. Gopi. *A hybrid feature preservation technique based on luminosity and edge based contrast enhancement in color fundus images.* Biocybernetics and Biomedical Engineering (2020)

Submitted

- A. Johnson, N. B. Shankar, M. Ostendorf, and A. Alwan. *An Exploratory Study on Dialect Density Estimation for Children and Adult's African American English*.
- A. Bailey, A. Johnson, N. B. Shankar, H. Veeramani, J. Washington, and A. Alwan. *Addressing Bias in Spoken Language Systems Used in the Development and Implementation of Automated Language Assessment*

TECHNICAL SKILLS

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