

NATARAJAN BALAJI SHANKAR

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EDUCATION

University of California, Los Angeles (UCLA)

Ph.D. Electrical and Computer Engineering

Advisor: Dr. Abeer Alwan

Los Angeles, CA

Expected, June 2027

GPA: 4.0/4.0

University of California, Los Angeles (UCLA)

M.S. Electrical and Computer Engineering

Specialization in Signals and Systems

Los Angeles, CA

December 2023

GPA: 3.97/4.0

National Institute of Technology Tiruchirappalli (NIT Trichy)

B. Tech. Electronics and Communication Engineering

Minor in Computer Science

First Class with Distinction

Tiruchirappalli, India

June 2020

GPA: 8.57/10

RESEARCH EXPERIENCE

Speech Processing and Auditory Perception Laboratory (SPAPL), UCLA

01/2022 – present

- 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
- Facilitated the creation of the CORAAL QA database for spoken question answering from spontaneous 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

- 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) (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)

Accepted

- 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*. 2024 IEEE International Conference on Acoustics, Speech, and Signal Processing (2024)
- 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 (2024)
- R. Fan, N. B. Shankar, and A. Alwan. *UniEnc-CASSNAT: An Encoder Only Non-autoregressive ASR with Self-supervised Pretrained Speech Models*. IEEE Signal Processing Letters (2024)

Submitted

- N. B. Shankar, R. Fan, and A. Alwan. *SOA: Reducing Domain Mismatch in SSL Pipeline by Speech Only Adaptation for Low Resource ASR*
- 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