Ravi Shankar, Ph.D. Student
Department of Electrical and Computer Engineering, Johns Hopkins University
rshanka3@jhu.edu | (+1) 443-842-2025 | github.io/ravi-shankar

---

Research Interests

My research interests are mainly in the application of machine learning and statistical modeling to speech and audio signal analysis. I am currently working on emotional speech synthesis. Our goal is to develop less data-hungry models by combining Bayesian techniques (prior knowledge) with modern deep learning machinery in un/supervised settings.

Education

Johns Hopkins University, Baltimore *(2017 - present)*
Ph.D. candidate, Department of Electrical and Computer Engineering
Advisor: Dr. Archana Venkataraman

Johns Hopkins University, Baltimore *(2021 - 2022)*
M.S.E. in Applied Mathematics and Statistics
Advisor: Prof. Fadil Santosa

Indian Institute of Technology, Guwahati *(2011 - 2015)*
Bachelors in Technology in Electronics and Electrical Engineering
Advisors: Prof. S.R.M Prasanna (Dean, RnD) and Dr. S. Sundaram

Honours & Awards

MINDS Data Science Research Fellowship (2019-20 and 2020-21)
Received for our proposal titled **'Diffeomorphic Time Warping for Duration Modification'**. Awarded annually for mathematical contribution in the domain of machine learning and data science.

ISCA 2020 Travel Award
Recognized for our technical contributions in the chained Encoder-Decoder-Predictor model based on reviewer's comments.

NVIDIA Research Fellowship
Our proposal titled **'AI for Mental Health and Speech Disorder'** featured among the top 5% proposals in a pool of >350 applicants.

Graduate Research Fellowship, JHU, 2017-18
JHU award for PhD students to recognize their research contribution in the domain of Electrical Engineering.

UofA Research Fellowship, 2015
Awarded by University of Alberta for doing research in Computer Science (**Declined**).

Institute Merit Scholarship, 2012-13
Awarded to a single student annually for the best academic performance.

DAAD-WISE Fellowship, 2014
Fellowship for doing a summer research internship in Germany (selection based on academic performance and prior research experience).

Merit-Cum-Means Scholarship, 2012-13, 2013-14 and, 2014-15
This award recognizes students from lower income group and unprivileged households for strong academic performance.

Cepstrum Graduation Award, IIT Guwahati, 2015
Awarded to 3 students every year from EEE graduating batch for student services.

Summer Research Support, 2013
Summer research internship program at IIT Hyderabad under Dr. K.S.R Murthy.

Talks & Posters

Generative Modeling for Expressive Speech Synthesis
Ohio State University, CS Seminar (November 2021)
Microsoft Research, Seattle, Washington (October 2021)
AAII, India (October 2021)
Variational Cycle-GAN for Emotion Morphing
MINDS-CIS Seminar, JHU (May 2020)
Emotion Morphing in Speech
2020 MINDS Symposium, Baltimore (January 2020)
School of Medicine, JHU (February 2020)
An Overview of Generative Models
Machine Learning Journal Club, JHU (June 2020)
Lightning Presentation: MFCCs
Information Extraction, JHU (March 2019)

Skills & Softwares

Statistical Modeling, Python, Deep Learning, Tensorflow, PyTorch
Bash Script, Javascript, Solidity, Ruby on Rails (RoR), Objective-C

Research articles

A Diffeomorphic Flow-based Variational Model for Emotion Conversion
Ravi Shankar, Hsi-Wei Hsieh, Nicholas Charon, Archana Venkataraman
Under Review (IEEE Transactions).

Adaptive Speech Duration Modification using a Generative Framework
Ravi Shankar, Archana Venkataraman
Under Review (ICLR, 2022).

Non-parallel Emotion Conversion using a Deep-Generative Hybrid Network and an Adversarial Pair Discriminator
Ravi Shankar, Jacob Sager, Archana Venkataraman
Published in Interspeech 2020. (Held Virtually)

Multi-speaker Emotion Conversion via Latent Variable Regularization and A Chained Encoder-Decoder-Predictor Network (**ISCA Award**)
Ravi Shankar, Hsi-Wei Hsieh, Nicolas Charon, Archana Venkataraman
Published in Interspeech 2020. (Held Virtually)

A Multi-Speaker Emotion Morphing Model Using Highway Networks and Maximum Likelihood Objective
Ravi Shankar, Jacob Sager, Archana Venkataraman
Published in Interspeech 2019. (**Oral**)

VESUS: A Crowd-Annotated Database to Study Emotion Production and Perception in Spoken English
Jacob Sager, **Ravi Shankar**, Archana Venkataraman
Published in Interspeech 2019. (**Oral**)

Weakly Supervised Syllable Segmentation by Vowel-Consonant Peak Classification
Ravi Shankar, Archana Venkataraman
Published in Interspeech 2019. (Poster)

Automated Emotion Morphing in Speech Based on Diffeomorphic Curve Registration and Highway Networks
Ravi Shankar, Hsi-Wei Hsieh, Nicolas Charon, Archana Venkataraman
Published in Interspeech 2019. (Poster)

Spoken Keyword Detection Using Joint DTW-CNN
Ravi Shankar, Vikram C.M., S.R.M Prasanna
Published in Interspeech 2018. (**Oral**)

Spoken Term Detection using DTW and Morphological Operations
Ravi Shankar, Arpit Jain, Deepak K.T., Vikram C.M., S.R.M Prasanna
Published in National Conference on Communications 2016. (Poster)

Work Experience

Research Assistant, IDIAP Institute, Martigny *(Jan'17 - Jun'17)*
Study the effect of continuity in acoustic features in HMM-DNN models.
Research Assistant, IIT Guwahati *(Sep'16 - Dec'16)*
Proposed joint DTW-CNN framework for keyword spotting in speech.
Rails Developer, CaRPM, Gurgaon *(Jan'16 - Aug'16)*
Developed module for analysis of used cars to gauge their resale value.
Research Assistant, AICML, UofA *(Sep'15 - Jan'16)*
Worked on patient specific survival prediction using machine learning.
iOS Developer, Housing.com, Mumbai *(Jun'15 - Sep'15)*
Developed new features for property rental in the native iOS app.

Relevant Courses

- High Dimensional Statistics (JHU)
- Stat. Pattern Recognition (JHU)
- Random Signal Analysis (JHU)
- Matrix Analysis (JHU)
- Stat. Theory (JHU)
- Causal Inference (JHU)
- Compressive Sensing (JHU)
- Unconstrained Optimization (JHU)
- Constrained Optimization (JHU)
- Bayesian Statistics (JHU)

Mentoring

Yi-Te Hsu, Dept. of Computer Science, JHU
Arjun Somayazulu, Dept. of Computer Science, JHU
Jacob Sager, Dept. of Electrical and Computer Engineering, JHU

Services

Reviewer, **ICLR** 2022
Teaching Assistant, **Probabilistic Machine Learning** (Fall'21)
Reviewer, **Interspeech** 2021
Reviewer, **CISS** 2021

Leadership Roles

Tech Hiring Lead, CaRPM (2016)
Student Representative, EEE, IIT Guwahati (2013-15)
Joint Secretary, Electronics Club, IIT Guwahati (2014-15)

References

Dr. Archana Venkataraman, **Assistant Professor, ECE**, JHU
Dr. Amitabh Basu, **Associate Professor, AMS**, JHU
Dr. Nicolas Charon, **Assistant Professor, AMS**, JHU