Neeraj Sharma

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Education

PhD in Electrical Communication Engineering *Bengaluru, India*
ADVISOR: T. V. SREENIVAS, INDIAN INSTITUTE OF SCIENCE *March 2017*
Thesis title: Information-rich sampling of time-varying signals

MTech in Electrical Communication Engineering *Bengaluru, India*
INDIAN INSTITUTE OF SCIENCE *Dec 2012*

BTech in Instrumentation and Electronics Engineering *Bhubaneswar, India*
COLLEGE OF ENGINEERING AND TECHNOLOGY *June 2009*

Job Experience

Teaching Assistant *USA*
NEUROMATCH ACADEMY, USA *June 2020 – July 2020*
- Provided teaching service for an intense 3 week online school on computational neuroscience

Postdoctoral Researcher *Pittsburgh, USA*
CARNEGIE MELLON UNIVERSITY, USA *July 2017 – Feb 2020*
- Mentors **Profs. Lori Holt** and **Barbara Shinn-Cunningham**
- Research and Development to analyze human brain response to talker changes in audio signals
- Designed speech stimuli, built experiment setup using electro-enchephalography, collected human brain signals data, and followed it by analysis, summarization, and dissemination of findings

Visiting Postdoctoral Researcher *Bengaluru, India*
  Mar – Jun 2017, Feb - Apr 2018, Dec - Jan 2019
INDIAN INSTITUTE OF SCIENCE, INDIA
- Mentor: **Prof. Sriram Ganapathy**
- Built computational approaches to analyze talker changes in audio signals

Project Staff *Bengaluru, India*
INDIAN INSTITUTE OF SCIENCE, INDIA *Apr 2016 - Dec 2017*
- Mentor: **Prof. T. V. Sreenivas**
- Large scale modulation analysis of speech and audio

Visiting Researcher *Paris, France*
ÉCOLE NORMALE SUPÉRIEURE, PARIS *Apr 2014 - Jul 2014*
- Mentors **Profs. Daniel Pressnitzer** and **Laurent Daudet**
- Designed auditory sketches using 4-D features extracted by spectro-temporal analysis of speech signals

Interests

Speech Signal Processing, Neuroscience, Machine Learning, and Perception

Skills

Coding	Python, MATLAB, HTML, JavaScript
Documentation	Latex
Signal processing	Digital signal processing, Speech and audio signal processing
Psycho-acoustics	Behavioral and EEG experiment design, and statistical analysis
Machine learning	Theory and implementation of classification and regression models
Research	Critical thinking, technical writing, and collaboration

Publications

COVID-19 and Respiratory disease diagnosis   *2020*

SIGNAL PROCESSING FOR HEALTHCARE   *IISc*

- Neeraj Sharma, N., Krishnan, P., Kumar, R., Ramoji, S., Chetupalli, S. R., Ghosh, P. K., and Ganapathy, S., "Coswara–A Database of Breathing, Cough, and Voice Sounds for COVID-19 Diagnosis", *in Proc. Interspeech*, October 2020, Shanghai, China.

Talker Change Detection   *2017-Present*

USING PERCEPTION EXPERIMENT DESIGN, FEATURE EXTRACTION, AND MACHINE LEARNING   *IISc, CMU*

- Neeraj Sharma, Venkat Krishnamohan, Sriram Ganapathy, Ahana Gangopadhayay, Lauren Fink, "On the impact of language familiarity in talker change detection", *IEEE Intl. Conf. on Acoustics, Speech, and Signal Processing (ICASSP)*, May 2020, Barcelona, Spain.
- Neeraj Sharma, Shobhana Ganesh, Sriram Ganapathy, Lori L. Holt, "Talker Change Detection: A comparison of human and machine performance", *Journal of Acoustic Society of America (JASA)*, 2019. **Selected as a Technical Area Pick for the year (Journal)**.
- Neeraj Sharma, Shobhana Ganesh, Sriram Ganapathy, Lori L. Holt, "Analyzing human reaction time for talker change detection", *IEEE Intl. Conf. on Acoustics, Speech, and Signal Processing (ICASSP)*, May 2019, Brighton, UK.
- Neeraj Sajjan, Shobhana Ganesh, Neeraj Sharma, Sriram Ganapathy, Neville Ryant, "Leveraging LSTM Models for Overlap Detection in Multi-Party Meetings", *IEEE Intl. Conf. on Acoustics, Speech, and Signal Processing (ICASSP)*, April, 2018, Canada.
- F. K. Dick, L. L. Holt, H. Nusbaum, N. Sharma, and B. Shinn-Cunningham, "Dimension-based Attention in Learning and Understanding Spoken Language", 40th Annual Meeting of the Cognitive Science Society, 2018, Wisconsin-Madison, USA.

Speech signal analysis, manipulation, and synthesis   *2016-2018*

USING SINUSOIDAL MODELING, MODULATION ANALYSIS, AND PARAMETERS ESTIMATION   *IISc*

- Neeraj Sharma, and T. V. Sreenivas, "Time-varying Sinusoidal Demodulation for Non-stationary Modeling of Speech", in *Elsevier Speech Communication*, 2018**(Journal)**.
- Neeraj Sharma, Shreepad Potadar, Srikanth Raj Chetupalli and T. V. Sreenivas, "Mel-Scale Sub-band Modelling for Perceptually Improved Time-Scale Modification of Speech and Audio Signals", *in Proc. 23rd National Conference on Communications (NCC)*, March 2017, Madras, India.
- Jitendra Dhiman, Neeraj Sharma and Chandra Sekhar Seelamantula, "Multicomponent 2-D AM-FM Modeling of Speech Spectrograms", *in Proc. Interspeech*, Sept, 2018, India.

Signal processing, sampling and reconstruction   *2012-2015*

USING CONVEX OPTIMIZATION, AND COMPRESSED SENSING   *IISc*

- Neeraj Sharma, and T. V. Sreenivas, "Event-triggered sampling using signal extrema for instantaneous amplitude and instantaneous frequency estimation", in *Elsevier Signal Processing*, 2015**(Journal)**.
- Neeraj Sharma, "Time-instant sampling based encoding of time-varying acoustic spectrum", *AIP Conf. Proc. of Intl. Conf. on Mechanics of Hearing*, 2015.
- Neeraj K. Sharma and T. V. Sreenivas, "Event-triggered sampling and reconstruction of sparse trigonometric polynomials", *IEEE Intl. Conf. on Signal Processing and Communications (SPCOM)*, July 2014, Bangalore, India.
- Neeraj Sharma and T. V. Sreenivas, "Sparse signal reconstruction based on non-uniform signal dependent samples", *IEEE Intl. Conf. on Acoustics, Speech, and Signal Processing (ICASSP)*, March 2012, Kyoto, Japan.

Awards

March 2017, 2018	**BrainHub CMU-IISc Postdoctoral Fellowship**, Recognized for research accomplishments in PhD and future research ideas	*CMU*
Sept 2017	**IEEE-Eta Kappa Nu (IEEE-HKN) Membership**, Recognized for contributions to technical activities in the area of PhD research	*The Honor society of IEEE*
2013	**IEEE MV Chauhan Paper Contest First Prize Winner**, Recognized for scholarly writing and presentation of research idea	*IEEE India Council*
2012-13	**IEEE-IISc Student Branch Best Volunteer Award**, Recognized for organizing technical activities in and around Bangalore	*IEEE India Council*
2012-13	**PhD Scholarship**, Recognized for pursuing higher education	*Ministry of Human Resource and Development, Govt. of India*
2012-13	**Motorola Scholar Program Finalist**, Train Informatics System (Undergraduate Project)	*Motorola Corporation, India*
2005-09	**Undergraduate Merit Scholarship**, Recognized for excelling in undergraduate studies	*Govt. of Odisha*
2008	**Winning entry in the UMO Boycott Bad Design Contest**, Identifying alternative position for placement of fuel tank in scooters in India	*UMO*
2004	**Selected in State Level Chemistry Olympiad**,	*Orissa Chemical Society*

Travel Grants

June 2014	**Mechanics of Hearing (MoH) Student Travel Grant**, To attend MoH Workshop held in Athens (Greece)	
April 2014	**SPIE Officer Travel Grant**, To attend Leadership Workshop held in Brussels (Belgium)	
March 2012	**IEEE Signal Processing Society Student Travel Grant**, To attend ICASSP held in Kyoto (Japan)	

Organizational Skills

2019	**Winter School on Speech and Audio Processing (WiSSAP)**, Program Committee Member	*ISCA*
2013-14	**IEEE-IISc Student Branch**, Executive Committee Member	*IEEE*
2015-18	**Open Day**, Conceptualized and organized events demonstrating research to public	*IISc*
2012-19	**Volunteer**, SPCOM and WiSSAP - conference and workshop related to signal processing	*IISc*

Academic Service

2013-Present	**Reviewer**, IEEE Transaction in Signal Processing, Nature Scientific Reports, Elsevier Signal Processing, Elsevier Speech Communication, Annual ISCA Interspeech conference, IEEE Signal Processing Letters, IEEE Connect conference, IEEE Signal Processing and Communication (SPCOM) Conference, and Sadhana	
2012-19	**Mentoring**, Seven undergraduate students working as summer interns	*IISc, CMU*
2014-15	**Website maintenance**, Dept. of Electrical Communication Engineering	*IISc*
2013-14	**IEEE-IISc Student Branch**, Executive Committee Member	*IISc*

Selected Talks

Jan, May 2019	**Talker Change Detection: Humans, Machines and the Gap**, invited talk at University College London (UK), Indian Institute of Science (India), and Boston University (US)
Jun 2018	**Dimension-based Attention in Learning and Understanding Spoken Language**, in CogSci 2018, Madison, USA
Jan 2015	**Throwing Light into the Tunnel: auditory models and perception**, invited talk at Winter School on Speech and Audio Processing (WiSSAP)
May 2015	**Sound signal analysis: Some knowns and unknowns**, invited talk in SIAM-IISc Chapter, Indian Institute of Science (India)
Oct 2013	**Detect and Sample: Questioning uniform Nyquist-rate sampling**, invited talk in IEEE Day Celebrations, Oct 2013, Indian Institute of Science (India)