

Saurabhchand Bhati

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EDUCATION	Johns Hopkins University, USA PhD candidate, Electrical and Computer Engineering Research Interests: Unsupervised learning, Speech processing, Deep learning Indian Institute of Technology Hyderabad, India B.Tech.(Hons.)-M.Tech Dual Degree, Department of Electrical Engineering	2018-ongoing 2012-2017
WORK EXPERIENCE	Amazon Alexa: Applied Scientist Intern • Large scale self-supervised learning for Bilingual ASR Indian Institute of Technology Hyderabad: Senior Research Scientist • Unsupervised acoustic unit discovery for language identification	May'21-Aug'21 May'17-Aug'18
RELEVANT PUBLICATIONS [SCHOLAR]	Conference Papers <ul style="list-style-type: none">• Bhati S., Villalba, J., Želasko, P., Moro-Velazquez, L. and Dehak, N. “<i>Segmental Contrastive Predictive Coding for Unsupervised Word Segmentation.</i>” in Proc. Interspeech - 2021 [pdf]• Bhati S., Villalba, J., Želasko, P., and Dehak, N. “<i>Self-expressing autoencoders for unsupervised spoken term discovery.</i>” in Proc. Interspeech - 2020 [pdf]• Bhati S., Nayak, S., Murty, K.S.R. and Dehak, N, “<i>Unsupervised Acoustic Segmentation and Clustering Using Siamese Network</i> ” in Proc. Interspeech - 2019 [pdf]• Bhati S., Velazquez, L.M., Villalba, J. and Dehak, N.. “<i>LSTM Siamese Network for Parkinson’s Disease Detection from Speech.</i>” In 2019 IEEE Global Conference on Signal and Information Processing (GlobalSIP), 2019.• Bhati S., Kamper H. and Murty, K.S.R., “<i>Phoneme Based Embedded Segmental K-Means for Unsupervised Term Discovery</i>” in International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2018 [pdf]• Bhati S., Nayak S., and Murty, K.S.R., “<i>Unsupervised Segmentation of Speech Signals Using Kernel-Gram Matrices,</i>” in Proc. NCVPRIPG 2017, Communications in Computer and Information Science, Springer. [pdf]• Bhati S., Nayak S., and Murty, K.S.R., “<i>Unsupervised Speech Signal to Symbol Transformation for Zero Resource Speech Application,</i>” in Proc. Interspeech - 2017 [pdf] Journal Papers <ul style="list-style-type: none">• Bhati S., Villalba, J., Želasko, P., Moro-Velazquez, L. and Dehak, N., “<i>Unsupervised Speech Segmentation and Variable Rate Representation Learning using Segmental Contrastive Predictive Coding,</i>” IEEE/ACM Transactions on Audio, Speech, and Language Processing. [pdf]• Bhati S., Nayak S. and Murty, K.S.R., “<i>Unsupervised Speech Signal to Symbol Transformation for Language Identification,</i>” Circuits, Systems, and Signal Processing. [pdf]	
RESEARCH PROJECTS	Segmental Contrastive Predictive Coding (SCPC) <i>Advisor: Dr. Najim Dehak, JHU</i> <ul style="list-style-type: none">• Proposed SCPC to perform unsupervised phone and word segmentation jointly• State-of-the-art performance on unsupervised phone and word segmentation Self-expressing Auto-encoders (SEA) for unsupervised feature learning <i>Advisor: Dr. Najim Dehak, JHU</i> <ul style="list-style-type: none">• Proposed SEA to highlight the underlying class information in unsupervised manner• Outperforms MFCC in unsupervised, partial supervision and supervised scenarios (pytorch, kaldi)	Ongoing Ongoing

	Unsupervised Term Discovery in Speech July '18 - Oct '19 <i>Advisor: Dr. Najim Dehak, JHU</i> <ul style="list-style-type: none"> Developed a system for automatic discovery of word like units, in untranscribed speech State-of-the-art performance on Zero Resource 2015 (15 hours) and Zero Resource 2017 (70+ hours) benchmarks (kaldi, keras, Matlab)
	Unsupervised Speech Segmentation July '16 - Oct '16 <i>Advisor: Dr. K. Sri Rama Murty, IIT Hyderabad</i> <ul style="list-style-type: none"> Developed a new kernel gram based segmentation method for locating the phoneme boundaries in raw speech signal Achieved highest boundary detection rate (6.5 % higher F-score) on TIMIT (Matlab, keras, kaldi)
OTHER PROJECTS	Parkinson's detection from Speech and accelerometer data Aug '18 - Mar '20 <i>Advisor: Dr. Najim Dehak, JHU</i> <ul style="list-style-type: none"> Proposed a Siamese networks based method Parkinson detection from Speech data BeatPD challenge for detecting Dyskinesia, Termor from accelerometer data (Pytorch, kaldi)
	Instantaneous Frequency based Automatic Speech Recognition July '16 - Feb '17 <i>Advisor: Dr. K. Sri Rama Murty, IIT Hyderabad</i> <ul style="list-style-type: none"> MFCC features are used for speech recognition which don't utilize phase information Combined the proposed IFCC features with traditional MFCC to improve ASR performance by 6% relative on TIMIT dataset (Matlab, kaldi, keras)
SKILLS	Programming Languages: Python, bash Tools/Frameworks: Pytorch, Matlab, keras, kaldi, Tensorflow, Theano, SciKit, HTK
INVITED TALKS	Hidden Markov Models for Speech Recognition <ul style="list-style-type: none"> TEQIP workshop, Rajiv Gandhi Institute of Technology, Kerala, 2017 Self-expressing autoencoders for unsupervised feature learning <ul style="list-style-type: none"> University of Illinois at Urbana-Champaign, 2020 Segmental Contrastive Predictive Coding for Unsupervised Acoustic Segmentation <ul style="list-style-type: none"> ISCA SIGML Seminar Series, 2021
TEACHING EXPERIENCE	Teaching Assistant <ul style="list-style-type: none"> EN.520.612: Machine learning for signal processing, JHU Aug '19 - Dec '19 <i>Introduces PCA, PPCA, ICA, NMF, GMMs, HMMs, DNNs, RNNs.</i> EE7390: Pattern recognition and Machine learning, IIT Hyderabad Aug '15 - Dec '15, Jan '17 - May '17 <i>Introduces k-means, K-NN, GMMs, HMMs, DNNs, Linear and Fisher discriminators etc.</i> EE5370: Introduction to Machine learning, IIT Hyderabad Aug '16 - Dec '16 <i>Introduces Naive Bayes classifier, Support vector machines, and clustering techniques.</i>
TRAVEL GRANTS	ISCA travel grant for Interspeech 2017 MHRD travel grant for TEQIP workshop ISCA grant for JSALT workshop
REVIEWING	Journal of Selected Topics in Signal Processing, IEEE National Conference on Communications