

# Sishir Kalita

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## CONTACT INFORMATION

Data Scientist

Armsofttech.air, Chennai  
*Mobile:* +91-94353-79331  
*e-mail:* sisiitg@gmail.com

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## RESEARCH INTERESTS

Speech Technology, Pathological Speech Processing, Machine Learning

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## EDUCATION

- **Ph.D.** (2014 August – 2019 November)  
Dept. of Electronics and Electrical Engineering,  
Indian Institute of Technology Guwahati, Assam (India)
    - Thesis Title: *Objective assessment of cleft lip and palate speech intelligibility*
    - Supervisors: Prof. S. R. Mahadeva Prasanna & Prof. S. Dandapat
    - Cumulative GPA: 8.8 out of 10.0
  - **M.Tech.** (2012)  
Dept. of Electronics and Communication Engineering,  
Tezpur University, Tezpur (India)  
Rank: 2<sup>nd</sup>, (Cumulative GPA : 9.08 out of 10.0)
  - **M.Sc.** (2010)  
Dept. of Electronics and Communication Technology,  
Gauhati University, Guwahati (India)  
Rank: 4<sup>th</sup>, (Cumulative GPA : 8.56 out of 10.0)
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## RELEVANT COURSES DONE:

- Digital signal processing, Speech technology, Probability and random process, Linear algebra and optimization, Pattern recognition and machine learning, and Biomedical signal processing.
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## ASSOCIATED PROJECTS:

- “NASOSPEECH: Development of a Diagnostic system for Severity Assessment of the Disordered Speech” funded by the Department of Biotechnology, Govt. of India.
  - “ARTICULATE +: A system for automated assessment and rehabilitation of persons with articulation disorders” funded by the Ministry of Human Resource Development, Govt. of India.
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JOURNAL  
PUBLICATIONS

- [1] Upashana Goswami, S. R. NirmalaEmail, C. M. Vikram, **Sishir Kalita**, S. R. M. Prasanna, “Analysis of Articulation Errors in Dysarthric Speech”, *Journal of Psycholinguistic Research*, pp 1–12, 28 October (2019), DOI: 10.1007/s10936-019-09676-5.
- [2] **Sishir Kalita**, Girish K S, Pushpavathi M, S. R. M. Prasanna, S. Dandapat, “Objective assessment of cleft lip and palate speech intelligibility using articulation and hypernasality measures”, *The Journal of the Acoustical Society of America*, 146(2), August (2019).
- [3] **Sishir Kalita**, S. R. M. Prasanna, S. Dandapat, “Intelligibility assessment of cleft lip and palate speech using joint spectro-temporal features based gaussian posterioriogram”, *The Journal of the Acoustical Society of America*, 144(4), October (2018), PMID: 30522275.
- [4] **Sishir Kalita**, S. R. M. Prasanna, S. Dandapat, “Importance of glottis landmark for the assessment of cleft lip and palate speech intelligibility”, *The Journal of the Acoustical Society of America*, 144(5), October (2018), PMID: 30404473.
- [5] C M Vikram, Ayush Tripathy, **Sishir Kalita**, S. R. M. Prasanna, “Acoustic analysis of misarticulated trills in cleft lip and palate children”, *The Journal of the Acoustical Society of America*, 143(6), EL474-EL480, June 2018, doi: 10.1121/1.5042339.

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COMMUNICATED  
JOURNALS

- [6] **Sishir Kalita**, Akhilesh Kumar Dubey, C. M. Vikram, Protima Nomo Sudra, S. R. M. Prasanna, and S. Dandapat, “Excitation source based analysis of cleft lip and palate speech”, [In review, *Speech Communication*].

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CONFERENCE  
PUBLICATIONS

- [7] **Sishir Kalita**, Protima Nomo Sudro, S. R. M. Prasanna and S. Dandapat, “Nasal Air Emission in Sibilant Fricatives of Cleft Lip and Palate Speech” in *Proc. Interspeech 2019*, Graz, Austria, September 2019.
- [8] **Sishir Kalita**, S. R. M. Prasanna and S. Dandapat, “Self-similarity matrix based intelligibility assessment of cleft lip and palate speech” in *Proc. Interspeech 2018*, Hyderabad, India, September 2018.
- [9] **Sishir Kalita**, “Objective assessment of cleft lip and palate speech intelligibility”, *4<sup>th</sup> Doctoral consortium, Interspeech 2018*, Hyderabad, India, September 2018.
- [10] Protima Nomo Sudro, **Sishir Kalita**, S. R. M. Prasanna, “Processing Transition Regions of Glottal Stop substituted /s/ for Intelligibility Enhancement of Cleft Palate Speech” in *Proc. Interspeech 2018*, Hyderabad, India, September 2018.
- [11] C. M. Vikram, Ayush Tripathi, **Sishir Kalita**, S. R. M. Prasanna, “Estimation of Hypernasality Scores from Cleft Lip and Palate Speech” in *Proc. Interspeech 2018*, Hyderabad, India, September 2018.
- [12] Sarfaraz Jelil, **Sishir Kalita**, S. R. M. Prasanna and Rohit Sinha, “Exploration of Compressed ILPR Features for Replay Attack Detection” in *Proc. Interspeech 2018*, Hyderabad, India, September 2018.
- [13] Pamir Gogoi, **Sishir Kalita**, Parismita Gogoi, Ratree Wayland, Priyankoo Sarmah, S. R. M. Prasanna, “Analysis of Breathiness in Contextual Vowel of Voiceless Nasals in Mizo” in *Proc. Interspeech 2018*, Hyderabad, India, September 2018.

- [14] **Sishir Kalita**, Pushpavathi M, Ajish K Abraham, Girish K S, S. R. M. Prasanna, S Dandapat, “Relative contribution of hypernasality, consonant production errors, and voice disorders on the intelligibility of cleft lip and palate speech” in *Proc. Workshop on Speech Processing for Voice, Speech and Hearing Disorders (WSPD)*, Mysuru, India, September 2018.
- [15] K Nikitha, **Sishir Kalita**, C. M. Vikram, M Pushpavathi, S. R. M. Prasanna, “Hypernasality Severity Analysis in Cleft Lip and Palate Speech Using Vowel Space Area” in *Proc. Interspeech 2017*, Stockholm, Sweden, August 2017.
- [16] **Sishir Kalita**, W Lalhminghlui, Luke Horo, Priyankoo Sarmah, S. R. M. Prasanna, S. Dandapat, “Acoustic Characterization of Word-Final Glottal Stops in Mizo and Assam Sora” in *Proc. Interspeech 2017*, Stockholm, Sweden, August 2017.
- [17] **Sishir Kalita**, Luke Horo, Priyankoo Sarmah, S. R. M. Prasanna, S. Dandapat, “Analysis of Glottal Stop in Assam Sora Language” in *Proc. Interspeech 2016*, San Francisco, USA, September 2016.
- [18] **Sishir Kalita**, S. R. M. Prasanna, S. Dandapat, “Analysis of glottal stops using pitch synchronous integrated linear prediction residual” in *Proc. National Conference on Communications (NCC)*, Guwahati, Assam, India, March 2016.

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## EXPERIENCES

### **Data Scientist,**

**2019 November – Present**

Armsofttech.air, Chennai.

#### Activities involving

- Development of automatic speech recognition (ASR) system for Indian languages.
- Development of speech emotion recognition system for the monitoring of all the calls in a call center.
- Development of language identification system for Indian context.
- Currently, I am using the Kaldi toolkit, Keras/TF, and Scikit-learn for development of speech technology systems. In this context, I am exploring the deep neural network based frameworks to develop the above-mentioned speech technologies.

### **Research,**

**2014 August – Present**

Indian Institute Technology Guwahati, Assam, India

#### Works done

- Developed a pathological speech database from children with cleft lip and palate, and normal healthy children in collaboration with All India Institute of Speech & Hearing (AIISH), Mysore, India.
- Developed algorithms for the objective assessment of speech intelligibility for cleft lip and palate individuals.
- Design of machine learning algorithms for the detection of hypernasal speech.
- A software developed by our group related to a Govt. of India funded project titled “NASOSPEECH: Development of a Diagnostic system for Severity Assessment of the Disordered Speech” is currently using by the speech-language pathologist in the diagnosis of hypernasality of cleft lip and palate at All India Institute of Speech & Hearing, Mysuru, India.

- Supervised Masters students in their final project work related to pathological speech analysis.
- Supervised several interns of different parts of India to develop their knowledge about speech signal processing.

**Teaching Assistant,**

**2014 August – Present**

Department of Electronics & Electrical Engg.,  
Indian Institute Technology Guwahati, Assam, India

Activities involved:

- Assisted faculties in teaching undergraduate courses.
- Courses: (i) Electrical Sciences (include year and semester), (ii) Signal and System (2 times), (iii) Speech Technology (1 time), (iv) Probability and Random Process (1 time), and (v) Digital Image Processing (1 time).
- Handling courses with the course instructors and problem formulation for tutorials, evaluation, project guidance and practical works.
- Assisted undergraduate students in the practical works.
- Supervised undergraduate students in final fourth year projects (2 students).

**Guest Faculty,**

**2013 January – July 2014**

Department of Electronics & Telecommunication Engg.,  
Assam University, Assam, India

Activities involved:

- Taught the undergraduate courses: (i) Basic Electronics, (ii) Electrical Technology, (iii) Circuit Theory and Networks, (iv) Signals and Systems, (v) Analog Communication, (vi) Digital Communication, and (vii) Measurement and Instrumentation.
- Supervised undergraduate students in the lab works.
- Supervised undergraduate students in the final projects.

**Guest Faculty,**

**2012 October – 2012 December**

Department of Basic Science & Social Sciences,  
North-East Hill University (NEHU), Meghalaya, India

Activities involved:

- Taught the under graduate courses: (i) Basic Electronics, and (ii) Electrical Technology.

**M.Tech Project Trainee,**

**2011 July - 2012 Aril**

Machine Vision Lab, CSIR-CEERI, Pilani, Rajasthan, India  
*Supervisor:* Dr Ing. Jagdish Lal Raheja, Scientist

Activities involved:

- Developed the people tracking and counting systems, incorporating shadow detection and removal algorithms.

AWARDS,  
SCHOLARSHIPS,  
AND GRANTS

- Received international travel grant from Science and Engineering Research Board (SERB), Govt. of India for attending Interspeech 2019 conference, Graz, Austria.
  - Received travel grant from Indian Speech Communication Association (IndSCA) for attending Interspeech 2019, Graz, Austria.
  - Received Microsoft Research India (MRI) travel grant for attending Interspeech 2017, Stockholm, Sweden.
  - Received International Speech Communication Association (ISCA) student travel grant for attending Interspeech 2017, Stockholm, Sweden.
  - Recipient of *Samsung Innovation Award 2015*, Samsung R&D Institute, India–Bangalore
  - Recipient of MHRD, Govt. of India Scholarship (2014 - present) for pursuing Ph.D.
  - Recipient of North Eastern Council (NEC) Scholarship, Govt. of India, 2010-2012.
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ACHIEVEMENT

- A software developed by our group related to the project titled “NASOSPEECH: Development of a Diagnostic system for Severity Assessment of the Disordered Speech” is currently using by the speech-language pathologist in the diagnosis of hypernasality of cleft lip and palate at All India Institute of Speech & Hearing, Mysuru, India.
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INVITED TALK

- *Speech signal processing: its application & scopes*, 13th August, 2018, Department of Electronics Science, Lalit Chandra Bharali College, Guwahati.
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RESOURCE  
PERSON

- Short-term course on *Multimedia Signal Processing, and Selected topics on Control System*, 29th July, 2018, Department of Electrical Engineering, Jorhat Engineering College, Jorhat, Assam, India.
  - National-level workshop on *MATLAB for all*, Department of Electronics and Communication Engineering, Gauhati University, Guwahati, Assam, India.
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ORGANIZATIONAL  
SKILLS

- Technical program committee member for the *Workshop on Speech Processing for Voice, Speech and Hearing Disorders*, ( a satellite workshop of INTERSPEECH 2018) organized by All India Institute of Speech and Hearing (AIISH), Mysore, Karnataka, India, 8–9 September 2018.
- Student organizer in the Global Initiative of Academic Networks (GIAN) course on *Brain-computer interfaces for speech communication: theory and applications* organized by the Department of Electronics and Electrical Engineering, Indian Institute of Technology Guwahati and sponsored by MHRD, Govt. Of India, 26<sup>th</sup> February – 2<sup>nd</sup> March, 2018.

- Student organizer in the Global Initiative of Academic Networks (GIAN) course on *Speech enhancement for hearing aids* organized by the Department of Electronics & Electrical Engineering, Indian Institute of Technology Guwahati and sponsored by MHRD, Govt. Of India, 23 – 27 January 2018.
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#### VOLUNTARY SERVICES

- Student volunteer in the Interspeech 2018, Hyderabad, India held during 2 – 6 September 2018.
  - Student volunteer in the Winter School on Speech and Audio Processing (WiSSAP 2018) organized by the Center for Linguistic Science and Technology (CLST), Indian Institute of Technology Guwahati (IITG) held during 19 – 22 January 2018.
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#### PROFESSIONAL SERVICES/ MEMBERSHIPS

- Reviewer:
    - National Conference on Communications (NCC) 2017, Indian Institute of Technology Hyderabad, Hyderabad, India.
    - IEEE Computational Intelligence Magazine
    - Journal of Somatosensory & Motor Research, Taylor & Francis
  - Student member of IEEE, ISCA.
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#### SKILLS

- **Speech processing tools:** PRAAT, Kaldi, Voicebox, VoiceSauce, LibROSA
  - **Machine learning tools:** Keras, Tensorflow, LibSVM, Scikit-learn
  - **Scripting:** UNIX shell scripting
  - **Languages:** Matlab, Python
  - **Desktop editing:** LaTeX, Microsoft Office, OpenOffice.org
  - **Operating systems:** Microsoft Windows family, Linux variants
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#### WORKSHOP AND CONFERENCE ATTENDED

- 3rd summer school on Automatic Speech Recognition, Indian Institute of Technology Guwahati, Guwahati, Assam, India, 02–07 June, 2019.
- Workshop on Speech Processing for Voice, Speech and Hearing Disorders, All India Institute of Speech and Hearing, Mysore, Karnataka, India, 8–9 September 2018
- 4th Doctoral Consortium, Interspeech 2018, Hyderabad, India, 1st September 2018
- Interspeech 2018, Hyderabad, India, 2–6 September 2018

- Global Initiative of Academic Networks course on Brain-computer interfaces for speech communication: theory and applications, Indian Institute of Technology Guwahati, Guwahati, Assam, India, 26<sup>th</sup> Feb–2<sup>nd</sup> March 2018.
- Global Initiative of Academic Networks course on Speech enhancement for hearing aids, Indian Institute of Technology Guwahati, Assam, India, 23<sup>rd</sup> Jan–27<sup>th</sup> January 2018.
- The Winter School on Speech and Audio Processing (WiSSAP 2018), Indian Institute of Technology Guwahati, Assam, India, 19–22 January 2018.
- Global Initiative of Academic Networks course on Empirical mode decomposition and its applications, Indian Institute of Technology Guwahati, Assam, India, 23–27 October 2017.
- Interspeech 2017, Stockholm University, Stockholm, Sweden, 20–24 August 2017.
- The 22nd Himalayan Languages Symposium (HLS), Indian Institute of Technology Guwahati, Assam, India, 8–10 June 2016.
- The 22nd National Conference on Communications (NCC), Indian Institute of Technology Guwahati, Guwahati, Assam, India, 4–6 March 2016.
- Workshop on 3D Printing organized by AerotriX, Indian Institute of Technology, Guwahati, Assam, India, 21–22 March 2015.
- IEEE ARM Workshop on Embedded System organized by IEEE student branch at Indian Institute of Technology, Guwahati, Assam on 19–20 March 2015.
- MATLAB Fundamentals and Signal Processing, Assam University, Silchar, Assam, India, 28<sup>th</sup> April–2<sup>nd</sup> May 2014.
- Fundamentals of LATEX, Assam University, Silchar, Assam, India, held in 25<sup>th</sup> March 2014.
- Two weeks ISTE Workshop On Signals And Systems, conducted by IIT Kharagpur under the National Education through ICT (MHRD, Govt. of India), 2–12 January 2014.
- Geographical Information System (GIS) And Environment For Visualizing Images (ENVI) Tools, Work Flows And Analysis, Assam University, Silchar, Assam, India, 16<sup>th</sup>–27<sup>th</sup> December 2013.
- Workshop on Image And Speech Processing (WISP 2013), Indian Institute of Technology, Guwahati (IITG), Assam, India, 13–14 December 2013.
- Advances in Document Analysis And Retrival, Institute of Science and Technology, Gauhati University, Guwahati, Assam, 7–11 March 2013
- Embedded Systems And Related Applications Institute of Science and Technology, Gauhati University, Guwahati, Assam, 16–25 July 2012.
- International Conference on Artificial Intelligence and Soft Computing, Bhubaneswar, India, April 2011.
- Smart Nanostructures, Tezpur University, Tezpur, Assam, India, 18–20 Jan, 2011.
- Cybersecurity Indian Institute of Technology, Guwahati (IITG), Assam, India, 11–12 March 2010.