Chitralekha Gupta, Senior Research Fellow

Contact Information

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Research Interests

My research interests lie at the intersection of computing, speech and music, particularly in singing voice analysis, applications of automatic speech recognition (ASR) in music, and audio synthesis.

Education

Ph.D. 2015 - 2019
National University of Singapore (NUS)
Dept. of Comp. Sci. (Scholarship: NUS Graduate School for Integrative Sciences and Engineering);
Thesis: Comprehensive evaluation of singing quality
Advisor: Haizhou Li and Ye Wang

Master of Technology 2008 - 2011
Indian Institute of Technology Bombay (IIT-Bombay)
Communication & Signal Processing, Dept. of Electrical Eng.;
Thesis: Objective assessment of ornaments in Indian singing
Advisor: Preeti Rao

Bachelor of Engineering 2004 - 2008
M.S. University, Baroda
Electronics, Dept. of Electrical Eng.;
Thesis: An obstacle detector for the visually challenged
Advisor: M. S. Gosavi

Work Experience

1. **Senior Research Fellow** Mar 2023 - Present
   Augmented Human Lab, School of Computing, NUS (*Suranga Nanayakkara*)
   Topics: VR video recognition, ASR for speech therapy, affective audio synthesis.
2. **Research Fellow**
   Human Language Technology lab, Electrical and Comp Engg., NUS (*Haizhou Li*) 2019-2021
   Communications and New Media, Faculty of Arts, NUS (*Lonce Wyse*) 2021-2022
   Augmented Human Lab, School of Computing, NUS (*Suranga Nanayakkara*) Aug 2022 - Feb 2023
   Topics: Singing voice evaluation, applications of ASR in music, neural audio synthesis.
3. **Co-Founder of MuSigPro Pte. Ltd.** Aug 2019 – Present
   An online gamified singing contest platform powered by the state-of-the-art AI singing quality assessment technology that motivates users to learn and improve singing skills.
4. **Research Engineer at Airbus Defense and Space, Bangalore** March 2013 - July 2014
   Clutter rejection techniques for radar applications.
5. **Software Developer at Dell R&D, Bangalore** Aug 2011 - Feb 2013
   Developing a scriptable interface for local and remote control of Dell servers.

Selected Achievements and Awards

- **DCASE Challenge 2023:** Our generative model system for the Foley Sound Synthesis Task at this international challenge ranked 3rd amongst 26 submitted systems.
- **MIREX 2020 and 2019:** Our *"Automatic Lyrics-to-Audio Alignment and Lyrics Transcription"* system has outperformed all other systems in the International Music Information Retrieval Evaluation eXchange platform for two consecutive years 2019 and 2020. (Press Release)

- **NUS Graduate Research Innovation Program (GRIP) Award**, July 2019, a start-up grant for MuSigPro Pte. Ltd.
- **NUS Dean's Graduate Research Achievement Award**, School of Computing, NUS, 2018.
- **Best Student Paper Award**, for the paper *Perceptual Evaluation of Singing Quality* at APSIPA 2017.
- **Best Employee of the Quarter**, Airbus Defense and Space, Bangalore, 2014

Patent (Pending)

Inventors: Chitralekha Gupta, Haizhou Li, and Ye Wang,
Invention: "System and Method for Assessing Quality of A Singing Voice";
as described in **U.S. Patent Application No. 17/631,646** filed on 8 February 2022.

Selected Journal Publications

1. Purnima Kamath, **Chitralekha Gupta**, Lonce Wyse, Suranga Nanayakkara, *Example-Based Framework for Perceptually Guided Audio Texture Generation*,
submitted to IEEE/ACM Transactions of Audio, Speech, and Language Processing, 2023.
2. **Chitralekha Gupta**, Haizhou Li, and Masataka Goto, *Deep Learning Approaches in Topics of Singing Information Processing (Overview Paper)*,
IEEE/ACM Transactions of Audio, Speech, and Language Processing, 2022.
3. Xiaoxue Gao, **Chitralekha Gupta**, and Haizhou Li, *Automatic Lyrics Transcription of Polyphonic Music with Lyrics-Chords Multi-Task Learning*,
IEEE/ACM Transactions of Audio, Speech, and Language Processing, 2022.
4. Xiaoxue Gao, **Chitralekha Gupta**, and Haizhou Li, *PoLyScriber: Integrated Training of Extractor and Lyrics Transcriber for Polyphonic Music*,
IEEE/ACM Transactions of Audio, Speech, and Language Processing, 2022 (Under Review).
5. Lonce Wyse, Purnima Kamath, **Chitralekha Gupta**, *Sound Model Factory: An Integrated System Architecture for Generative Audio Modelling*,
EvoMUSART 2022, Lecture Notes in Computer Science (LNCS), vol. 13221, Springer, 2022.
6. **Chitralekha Gupta**, Haizhou Li, and Ye Wang, *Automatic Leaderboard: Evaluation of Singing Quality without a Standard Reference*
IEEE/ACM Transactions on Audio, Speech, and Language Processing, 2019.
7. **Chitralekha Gupta**, Haizhou Li, and Ye Wang, *A Technical Framework for Automatic Perceptual Evaluation of Singing Quality*
APSIPA Transactions on Signal and Information Processing, Vol. 7, Cambridge University Press, 2018.
8. **Chitralekha Gupta** and Preeti Rao, *Objective Assessment of Ornamentation in Indian Classical Singing*,
S. Ystad et al. (Eds.): CMMR/FRSM 2011, Springer Lecture Notes on Computer Science (LNCS) 7172, pp. 1-25, 2012.

Selected Conference Publications

1. **Chitralekha Gupta***, Purnima Kamath*, Yize Wei, Zhuoyao Li, Suranga Nanayakkara, and Lonce Wyse, *Towards Controllable Audio Texture Morphing*, ICASSP 2023.
2. Purnima Kamath, Zhuoyao Li, **Chitralekha Gupta**, Kokil Jaidka, Suranga Nanayakkara, and Lonce Wyse, *Evaluating Descriptive Quality of AI-Generated Audio Using Image-Schemas*,
In Proceedings of ACM IUI, Sydney, 2023.
3. **Chitralekha Gupta**, Yize Wei, Purnima Kamath, Zhuoyao Li, and Lonce Wyse, *Parameter Sensitivity of Deep-Feature based Evaluation Metrics for Audio Textures*, ISMIR, Bengaluru, India, 2022.
4. Xiaoxue Gao, **Chitralekha Gupta**, and Haizhou Li, *Music-robust Automatic Lyrics Transcription of Polyphonic Music*,
In Proceedings of Sound and Music Computing (SMC), Saint Etienne, France, 2022.

5. Xiaoxue Gao, **Chitralekha Gupta**, and Haizhou Li, *Genre-conditioned Acoustic Models for Automatic Lyrics Transcription of Polyphonic Music*,
In Proceedings of ICASSP, Singapore, 2022.

6. Jinhu Li, **Chitralekha Gupta**, and Haizhou Li, *Training Explainable Singing Quality Assessment Network with Augmented Data*,
In Proceedings of APSIPA ASC, Tokyo, 2021.

7. **Chitralekha Gupta**, Jinhu Li, and Haizhou Li, *Towards Reference-Independent Rhythm Assessment of Solo Singing*,
In Proceedings of APSIPA ASC, Tokyo, 2021.

8. **Chitralekha Gupta**, Purnima Kamath, and Lonce Wyse, *Signal Representations for Synthesizing Audio Textures with Generative Adversarial Networks*,
In Proceedings of Sound and Music Computing (SMC), Virtual, 2021.

9. Lin Huang, **Chitralekha Gupta**, and Haizhou Li, *Spectral Features and Pitch Histogram for Automatic Singing Quality Evaluation with CRNN*,
In Proceedings of APSIPA, Auckland, 2020.

10. **Chitralekha Gupta**, Lin Huang, and Haizhou Li, *Automatic Rank Ordering of Singing Vocals with Twin-Neural Network*
In Proceedings of ISMIR, Virtual, 2020.

11. **Chitralekha Gupta**, Emre Yılmaz, and Haizhou Li, *Automatic Lyrics Alignment and Transcription in Polyphonic Music: Does Background Music Help?*
In Proceedings of ICASSP, Barcelona, 2020.

12. **Chitralekha Gupta**, Emre Yılmaz, and Haizhou Li, *Acoustic Modeling for Automatic Lyrics-to-Audio Alignment*
In Proceedings of Interspeech, Graz, 2019.

13. **Chitralekha Gupta***, Bidisha Sharma*, Haizhou Li, and Ye Wang, *Automatic lyrics-to-audio alignment on polyphonic music using singing-adapted acoustic models*
In Proceedings of ICASSP, Brighton, 2019 (*equal contributors).

14. **Chitralekha Gupta**, Haizhou Li, and Ye Wang, *Automatic Evaluation of Singing Quality without a Reference*
In Proceedings of APSIPA ASC, Hawaii, 2018.

15. **Chitralekha Gupta**, Haizhou Li, and Ye Wang, *Automatic Pronunciation Evaluation of Singing*
In Proceedings of Interspeech, Hyderabad, 2018.

16. **Chitralekha Gupta**, Rong Tong, Haizhou Li, and Ye Wang, *Semi-supervised Lyrics and Solo-Singing Alignment*
In Proceedings of International Society of Music Information Retrieval (ISMIR), Paris, 2018.

17. **Chitralekha Gupta**, Haizhou Li, and Ye Wang, *Perceptual Evaluation of Singing Quality*
In Proceedings of APSIPA ASC, Kuala Lumpur, 2017 **(Best Student Paper Award)**.

18. Douglas Turnbull, **Chitralekha Gupta**, Dania Murad, Michael Barone, and Ye Wang, *Using Music Technology to Motivate Foreign Language Learning*
In Proceedings of International Conference on Orange Technologies (ICOT), Singapore, 2017.

19. **Chitralekha Gupta**, David Grunberg, Preeti Rao, and Ye Wang, *Towards automatic mispronunciation detection in singing*
In Proceedings of International Society of Music Information Retrieval (ISMIR), Suzhou, 2017.

20. Zhiyan Duan, **Chitralekha Gupta**, Graham Percival, David Grunberg, and Ye Wang, *SECCIMA: Singing and Ear Training for Children with Cochlear Implants via a Mobile Application*
In Proceedings of Sound and Music Computing (SMC), Helsinki, 2017.

21. Vishweshwara Rao, **Chitralekha Gupta**, and Preeti Rao, *Context-aware features for singing voice detection in polyphonic music*, *In 9th International Workshop on Adaptive Multimedia Retrieval*, Barcelona, July 2011.

Research Community Service

- *Conference Organizing Committee Member*: ISMIR 2017, ASRU 2019, SIGDIAL 2021, ICASSP 2022, ISMIR 2022
- *Reviewer*: IEEE Transactions on Multimedia, IEEE/ACM Transactions of Audio, Speech and Language Processing, ISMIR, ICASSP, Interspeech, ICME, APSIPA Transactions, Springer International Journal of Social Robotics, IEEE Access, Springer Multimedia Systems Journal.