Satvik Venkatesh

Website: http://satvik-venkatesh.github.io
Email: satvikvenkatesh@gmail.com
Position: PhD student at University of Plymouth, UK (2nd year)

Education

- **University of Plymouth (UK), Doctor of Philosophy** (Oct 2019 – Present)
  Expected graduation in Sept 2022.
  Thesis: Deep Learning for Audio Segmentation and Intelligent Remixing.

- **University of Plymouth (UK), Master of Research** (Sept 2017 – July 2019)
  Thesis: Investigation into Stand-alone Brain-computer Interfaces for Musical Applications. [DOI]

- **SASTRA University (India), Bachelor of Engineering** (July 2013 – June 2017)
  Specialization: Information and Communication Technology.
  CGPA: 7.34/10

- **Other Courses**
  Deep Learning Specialization by deeplearning.ai on Coursera. Certificate earned in March 2020.

Experience

- **Associate Lecturer** (Sept 2021 – Present)

  Leading the module titled Programming, Interfaces, and Interaction for the BSc (Hons) programme on Computing, Audio and Music Technology.

  Key contents of Module: C++, Object-oriented programming, Agile development, Threading, Microcontroller boards, UI and UX design, MIDI, and JUCE.

- **Audio Segmentation** (Sept 2019 – Sept 2022)

  Ongoing PhD project funded by EPSRC to investigate music-speech detection and intelligent remixing of radio broadcast.

  Current progress:

  - Developed state-of-the-art algorithm for music-speech detection. Relative improvement of 56.55% and 1.15% for music and speech F-measures respectively on the MIR eXchange competition dataset 2018. Research published in IEEE ICASSP 2021.
  - Developed a novel algorithm called You Only Hear Once (YOHO) for audio segmentation and sound event detection that generalizes better and faster than the state-of-the-art Convolutional Recurrent Neural Network. Pre-print available on ArXiv.

  Skills: Python, Tensorflow, Keras, Convolutional and Recurrent Neural Networks, End-to-end Deep Learning, and Audio Signal Processing.

- **Retention Project** (Dec 2020 – Feb 2021)

  Been appointed by the Associate Dean for Education and Student Experience at the University of Plymouth.

Role: Data analyst to investigate the reasons for dropouts in students and develop tactics to mitigate this trend.

Skills: Python, Statistics, and Data Visualisation.

- **Brain-computer Interface** (April 2018 - Feb 2019)

  Project developed during Master of Research degree.

  Funded by VOLVO cars and GREY to develop neurotechnology for a musician suffering from severe motor disabilities.

  Role: Research Engineer. Key outcomes of the project:

  - Optimised signal processing and detection of brain signals (Relative improvement of 36.56% in communication rate)
  - Developed a stand-alone and portable brain-computer interface that can be used for musical composition and performance at home.

  Skills: C++, JUCE, MATLAB, statistical signal processing, FIR/IIR/zero-phase filtering, OpenGL, and Biomedical engineering.

- **Biocomputing for Music** (Jan 2017 – Present)

  The biological substrate *Physarum polycephalum* is harnessed for musical creativity.

  Project was started during undergraduate degree and is on-going ever since.

  Have held multiple research assistant appointments within this project, funded by SWCTN and internal University grants.

  Skills: C, Arduino, Electronic Circuits, Raspberry Pi, and Machine Learning.

Awards and Achievements

- Studentship awarded by EPSRC for PhD at University of Plymouth (Sept 2019 – Sept 2022).
- Tuition fee-waiver for Master of Research degree (Sept 2017 – April 2019).

List of Publications and Talks

Journal Papers

Venkatesh, S., Moffat, D., & Miranda, E. R. (2021). You Only Hear Once: A YOLO-like Algorithm for Audio Segmentation and Sound Event Detection. *arXiv preprint* *arXiv:2109.00962*.

Venkatesh, S., Moffat, D., & Miranda, E. R. (2021). Investigating the Effects of Training Set Synthesis for Audio Segmentation of Radio Broadcast. *Electronics, 10*(7). [DOI]

Braund, E., Venkatesh, S., & Miranda, E. R. (2019). PhyBox: A Programmable Interface for Physarum polycephalum-based Memristors. *International Journal of Unconventional Computing, 14*, 217–233. [DOI]

Miranda, E. R., Braund, E., & Venkatesh, S. (2018). Composing with Biomemristors: Is Biocomputing the New Technology of Computer Music? *Computer Music Journal, 42*, 28–46. [DOI]

Conference Proceedings

Venkatesh, S., Moffat, D., Kirke, A., Shakeri, G., Brewster, S., Fachner, J., . . . Miranda, E. R. (2021). Artificially Synthesising Data for Audio Classification and Segmentation to Improve Speech and Music Detection in Radio Broadcast. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)* (pp. 636–640). [PDF]

Venkatesh, S., Braund, E., & Miranda, E. R. (2020). Composing Popular Music with Physarum Polycephalum-based Memristors. *International Conference on New Interfaces for Musical Expression (NIME)* (pp. 514–530). The Royal Birmingham Conservatoire. [PDF]

Venkatesh, S., Braund, E., & Miranda, E. R. (2020). Designing Brain-computer Interfaces for Sonic Expression. *International Conference on New Interfaces for Musical Expression (NIME)* (pp. 525–530). The Royal Birmingham Conservatoire. [PDF]

Venkatesh, S., Moffat, D., & Miranda, E. R. (2019). Radiome: Artificially Intelligent Radio for People with Dementia. *Digital Music Research Network One-day Workshop: DMRN+14.* [PDF]

Book Chapters

Miranda, E. R., Braund, E., & Venkatesh, S. (2021). On Growing Computers from Living Biological Cells. In E. R. Miranda (Ed.), *Handbook of Artificial Intelligence for Music: Foundations, Advanced Approaches, and Developments for Creativity* (pp. 933-961). Springer International Publishing. [DOI]

Venkatesh, S., Braund, E., & Miranda, E. R. (2019). A Nonlinear Approach to Generate Creative Data using Physarum polycephalum-based Memristors. In A. Adamatzky (Ed.), *Slime Mould in Arts and Architecture.* River Publishers. [PDF]

Talks and Research Seminars

RadioMe: Real-time Radio Content Analysis and Remixing. (July 2021). *Webinar*. Audio Engineering Society (AES), UK Section.

Music and Artificial Intelligence. (Dec 2020). *Chidaakaasham: International Webinar on Music and Dance*. Aatmalaya Academy and Trikalaa Gurukulam, India.

Audio Segmentation and Remixing using Deep Learning. (May 2020). *Research Seminar*. Interdisciplinary Centre for Computer Music Research (ICCMR), University of Plymouth.

Robust Portable Brain- Computer Music Interface for Real-World Applications. (Feb 2019). *Research Seminar*. Interdisciplinary Centre for Computer Music Research (ICCMR).

Brain-computer Music Interface Systems by using JUCE. (Nov 2018). *Audio Developer Conference*. ROLI, London, UK.

Other Roles and Contributions

- Reviewer for Sound and Music Computing (SMC) Conference 2021.
- Conference committee of BFE/RMA Research Students' Conference 2022
- Contributed to the Wave-U-net GitHub repository. Re-implemented the network architecture in TensorFlow 2/Keras.

Skills

- Programming: C, C++, C#, Java, JavaScript, PHP, HTML, SQL, and GLSL.
- Machine Learning: TensorFlow, Deep Learning, Hyperparameter Tuning, Sequence Models, Multi-label Models, and Transfer Learning.
- Signal Processing: IIR and FIR filters, zero-phase filtering, Z-transforms, Fourier transforms, Mel spectrograms, MFCC, and canonical correlation analysis.
- Biomedical Engineering: EEG, brain-computer interface, evoked potentials, and event-related potentials.
- Personal: Highly motivated, work independently and with a team, and problem-solving abilities.

Extra-curricular Achievements

- Conducted workshops for lesser privileged children in music and soft skills at NGOs in India such as Aatmalaya Academy and Agastya Foundation.
- Multi-instrumentalist and composer with knowledge of Indian and Western genres. Link to compositions.
- Won many trophies in national cultural festivals for high school and University in India.
- Website designer and content manager for the ICCMR lab (University of Plymouth) and Aatmalaya Academy.
- FIDE rated (International) chess player (Rating: 1700)
- University's student ambassador to support many departments during recruitment and other on-campus events