SHASHANK MANJUNATH

Boston, MA ⋄ shashankmanjunath14@gmail.com ⋄ https://shashankmanjunath.github.io/

EDUCATION

Northeastern University   *September 2022 - Present*
Ph.D. in Computer Science, Overall GPA: 3.95

Boston University   *September 2020 - May 2022*
M.S. in Electrical Engineering
Thesis: Machine Learning Techniques for Reconstruction and Segmentation of Nanoparticle Interferometric Signatures

Vanderbilt University   *September 2014 - May 2018*
B.Eng., Biomedical Engineering & Mathematics

EXPERIENCE

Northeastern University   September 2022 - Present
Graduate Research Assistant   *Boston, MA*
· Performed research into time-series signal processing and machine learning methods with a focus on health applications
· Developed and implemented topological data analysis and dynamical systems techniques in Python for analysis of sleep apnea using time-series EEG signals
· Leveraged Fourier analysis, topological data analysis, and machine learning/deep learning techniques for automated sleep staging and analysis of sleep disordered breathing
· Applied time-series signal processing techniques to EEG signals for epileptic spike identification

Linus Health   February 2022 - August 2022
Senior Data Scientist   *Boston, MA*
· Developed novel signal processing and machine learning techniques to improve brain health assessment
· Contributed Python code to the Linus Health data science codebase

Charles River Analytics   May 2018 - February 2022
Research Scientist   *Cambridge, MA*
· Performed novel research into signal processing and computer vision techniques through funding provided by the DoD
· Acted as Project Engineer and Principal Investigator on projects investigating real-time machine learning based image denoising techniques in the presence of complex noise sources for the Naval Undersea Warfare Center
· Developed algorithms for vehicle identification from airborne laser doppler vibrometry for Air Force Research Laboratory
· Led GPU programming efforts and designed, built, and administered a Linux/SLURM-based GPU compute cluster
· Won funding for novel research from the DoD through various grant sources

JOURNAL PAPERS

Manjunath, S., Wu, H.T., Sathyanarayana A. "Pediatric Sleep Staging from Airflow Signals via Persistence Curve Approximations." (Under Review).

Manjunath, S., Perea, J. A., Sathyanarayana A. "Electroencephalogram Signal Analysis Of Pediatric Obstructive Sleep Apnea with Topological Data Analysis." (Under Review).

C. M. McGraw, S. Rao, **S. Manjunath**, J. Jing, and M. B. Westover, "Automated quantification of periodic discharges in human electroencephalogram," Biomed. Phys. Eng. Express, vol. 10, no. 6, p. 065003, Sep. 2024, doi: 10.1088/2057-1976/ad6c53.

CONFERENCE PAPERS AND PROCEEDINGS

Manjunath, S., Sathyanarayana, A. "Detection of Sleep Oxygen Desaturations from Electroencephalogram Signals." IEEE Engineering in Medicine and Biology Conference, July 2024. https://arxiv.org/abs/2405.09566

Manjunath, S., Perea, J. A., Sathyanarayana, A. "Topological Data Analysis of Electroencephalogram Signals for Pediatric Obstructive Sleep Apnea." IEEE Engineering and Medicine in Biology Conference, July 2023. https://doi.org/10.1109/EMBC40787.2023.10340674

Bracken, B. K., **Manjunath, S**., German, S., Monnier, C., Farry, M. Application of the DeepSense Deep Learning Framework to Determination of Activity Context from Smartphone Data. Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 63(1), 792-796. October 2019. https://doi.org/10.1177/1071181319631002

ABSTRACTS

Manjunath, S., Wu, H., Sathyanarayana, A. "Sleep Staging from Airflow Signals Using Fourier Approximations of Persistence Curves" Machine Learning For Health Conference. December 2024.

Manjunath, S., Sathyanarayana A. "Real-time Detection of Oxygen Desaturation Using Electroencephalogram Signals." AASM/SRS Annual Sleep Meeting. June 2024.

Manjunath, S., Perea, J. A., Sathyanarayana A. "Analysis of Pediatric Sleep Electroencephalogram with Sleep Apnea using Topological Data Analysis" AASM/SRS Annual Sleep Meeting. June 2023.

Manjunath, S., Perea, J. A., Sathyanarayana A. "Applications of Topological Data Analysis to Electroencephalogram Signals." Third Graduate Student Conference: Geometry And Topology meet Data Analysis and Machine Learning. June 2023.

Manjunath, S., Bracken, B., German, S., Monnier, C., and Farry, M. "User Activity Context Recognition From Smartphone Data Using Deep Neural Networks." Biomedical Engineering Society, October 2019.

Grisham, C., **Manjunath, S.**, Perlin, B., Russo, A., Wigginton, N., Walker III, M. "Low-Level Light Therapy for Improvement of Diabetic Foot Ulcer Infection Outcomes." Biomedical Engineering Society, October 2018.

Manjunath, S., Manzanera-Esteve, I., Thayer, W., Does, M., Dortch, R. "Free-Water Elimination Diffusion Tensor Imaging to Assess Nerve Recovery in Excised Rat Nerve." International Society of Magnetic Resonance in Medicine, June 2018.

Hancock, M., **Manjunath, S.**, Dortch, R. "Sciatic Nerve Segmentation in MRI Volumes of the Upper Leg via 3D Convolutional Neural Networks." International Society of Magnetic Resonance in Medicine, June 2018.

Manjunath, S., Dortch, R., "Sciatic Nerve Segmentation in MR Images of the Upper Leg via Convolutional Neural Networks." Biomedical Engineering Society, October 2017.

TALKS

Manjunath, S., Thornton, W. "Deep Learning for Maritime Imagery." Submarine Technology Symposium, May 2019.

PREPRINTS

Manjunath, S., Nathaniel, A., Druce, J., German, S. " Improving the performance of fine-grain image classifiers via generative data augmentation." August 2020. https://arxiv.org/abs/2008.05381

PATENTS

Manjunath, Shashank; Sathyanarayana, Aarti. Diagnosing Sleep Apnea from Awake EEGs. U.S. Patent Application No. 63/481,123, filed January 23, 2023. Provisional Patent.

Agaron, Shamay; Tobyne, Sean; **Manjunath, Shashank**. Contextual Awareness for Unsupervised Administration of Cognitive Assessments Remotely or in a Clinical Setting. U.S. Patent US20240145044A1, filed September 28, 2022. Patent Pending.

AWARDS AND HONORS

- PhD Network Travel Funding Award (2024)

- AWS Cloud Credits for Research (2022)

- Graduate Merit Scholarship (2020)

- Thomas Arnold Prize for Biomedical Systems Design (2018)

- Thomas J. Watson Scholarship (2014)

MEDIA COVERAGE

Zoe Menezes, Brent Phillips, and Shashank Manjunath. Pitt Health and Explainable AI Podcast. "Shashank Manjunath on Pitt HexAI." Available on Spotify and Apple Podcasts. Posted December 5, 2023.