ARUNKUMAR KANNAN

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EDUCATION

The Johns Hopkins University, Baltimore, MD, United States *August 2022 - Present*
Ph.D., candidate
Department of Electrical and Computer Engineering
Thesis Advisor: Prof. Brian Caffo

University of British Columbia, Vancouver, BC, Canada *September 2019 - May 2022*
Master of Applied Science
School of Biomedical Engineering (CGPA: 4.00/4.33)
Thesis Title: Uncertainty-based Assessment of Hip Joint Segmentation and 3D Ultrasound Scan Adequacy in Paediatric Dysplasia Measurement Using Deep Learning
Thesis Advisor: Prof. Rafeef Garbi

SSN College of Engineering, Chennai, TN, India *July 2015 - April 2019*
Bachelor of Engineering
Department of Biomedical Engineering (CGPA: 9.04/10.00, *Rank: 2/948*)
Thesis Title: Analysis of Spatial Attention and Phonological Processing in Dyslexics Using EEG
Thesis Advisor: Prof. Geethanjali Balasubramanian

RESEARCH INTERESTS

Graph Neural Networks, Manifold Learning, Computational Neuroscience, Deep Learning for Medical Image Processing, Uncertainty Quantification in Deep Neural Networks, Biomedical Signal Processing

ACADEMIC AND RESEARCH POSITIONS

Graduate Teaching Assistant *August 2023 - Present*
Johns Hopkins University
Department of Electrical and Computer Engineering
Courses: ECE 651: Random Signal Analysis, ECE 623: Medical Image Analysis

Graduate Research Assistant *September 2019 - February 2022*
University of British Columbia
Supervisor: Prof. Rafeef Garbi
Projects: Uncertainty Estimation for Assessment of 3D US Scan Adequacy and DDH Metric Reliability, Leveraging voxel-wise segmentation uncertainty to improve reliability in assessment of paediatric dysplasia of the hip, Model Calibration Using Deep Ensembles for Enhanced Reliability of Paediatric Hip Dysplasia Assessment from 3D Ultrasound.

Graduate Teaching Assistant *June 2020 - April 2021*
University of British Columbia
Department of Electrical and Computer Engineering
Courses: Digital Signal and Image Processing, Signals and Systems

Research Intern *May 2019 - July 2019*
Healthcare Technology Innovation Centre, IIT Madras
Supervisor: Malay Shah
Projects: Development of an Automated Non-invasive Blood Pressure Measurement Device Using LabVIEW, Investigation of quality control specifications of an in-house medical device instrument *iQuant* - a point of care diagnostic instrument that reads quantitative test kits and provides numerical measurements including blood sugar, cholesterol level etc.

Undergraduate Research Assistant *July 2018 - April 2019*
SSN college of Engineering
Supervisor: Prof. Geethanjali Balasubramanian
Projects: Investigation of the dissemblance in cognitive activity in dyslexic children using EEG-based brain connectivity studies, Evaluation of various Brodmann cortical areas of the brain using relative power, coherence and phase delay of different frequency bands in EEG and visualized the interdependance of the same using derived correlation matrix.

AWARDS AND HONOURS

Johns Hopkins ECE Departmental Fellowship 2022-2023

Graduate Research Assistanship 2019-2022
Awarded by Prof. Rafeef Garbi to carry out master's thesis research in BiSICL lab at UBC.

International Tuition Award 2019-2021
UBC award incoming graduate students to recognize their outstanding academic achievement during the course of their undergraduate studies.

Dean's Medal of Honor 2019
Awarded by SSNCE for securing 2nd rank among 948 candidates in the biomedical engineering program for the best academic performance in the university examinations held during 2015-19.

Undergraduate Merit Scholarship 2016-2019
Awarded by SSNCE for three years under the category of exemplary and outstanding for the best academic performance in the university examinations held during 2015-19.

Smart India Hackathon Finalist 2018
Selected amongst 12 out of 200 teams all over India to participate in the finale of Smart India Hackathon under medical devices theme organized by the Ministry of India.

BOOK CHAPTERS AND VOLUMES

[B1] **Kannan, A**., Pavithran, P. G., Bagyaraj, S. (2020). *Design and development of command prompt assist device for locked in syndrome patients.* In Smart Healthcare for Disease Diagnosis and Prevention (pp. 7-13). Academic Press.

JOURNAL ARTICLES

[J1] **Kannan, A**., Hodgson, A., Mulpuri, K., Garbi, R. (2021). *Leveraging voxel-wise segmentation uncertainty to improve reliability in assessment of paediatric dysplasia of the hip.* International Journal of Computer Assisted Radiology and Surgery, 16(7), 1121-1129. *[Impact factor 3.421; 2021]*

PEER-REVIEWED CONFERENCE PROCEEDINGS

[C1] Sushmitha, S., Tanushree Devi, B., Mahesh, V., Geethanjali, B., **Kannan, A**., Pavithran, P. (2021). *Virtual Reality Therapy in Prolonging Attention Spans for ADHD.* In: Rizvanov, A.A., Singh, B.K., Ganasala, P. (eds) Advances in Biomedical Engineering and Technology. Lecture Notes in Bioengineering. Springer, Singapore.

[C2] **Kannan, A**., Hodgson, A., Mulpuri, K., Garbi, R. (2020). *Uncertainty Estimation for Assessment of 3D US Scan Adequacy and DDH Metric Reliability.* In Uncertainty for Safe Utilization of Machine Learning in Medical Imaging, and Graphs in Biomedical Image Analysis (pp. 97-105). Springer, Cham.

[C3] Pavithran, P. G., **Kannan, A**., Seshadri, N. G., Singh, B. K., Mahesh, V., Geethanjali, B. (2019, March). *Index of Theta/Alpha ratio to quantify visual-spatial attention in dyslexics using Electroencephalogram.* In 2019 5th International Conference on Advanced Computing and Communication Systems (ICACCS) (pp. 417-422). IEEE.

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[A1] Pal, B*., **Kannan, A***., Kathirvel, R. P., OToole, A. J., Chellappa, R. (2023). Gaussian Harmony: Attaining Fairness in Diffusion-based Face Generation Models. arXiv preprint arXiv:2312.14976.

DISSERTATIONS

[D1] **Kannan, A**. *Uncertainty-based assessment of hip joint segmentation and 3D ultrasound scan adequacy in paediatric dysplasia measurement using deep learning.* Master of Applied Science Thesis. University of British Columbia, Vancouver, Canada, 2022.

RELEVANT GRADUATE COURSES

- Probabilistic Machine Learning (JHU)
- Compressive Sensing and Sparse Recovery (JHU)
- High-dimensional Probability (JHU)
- Machine Perception (JHU)
- Statistical Theory (JHU)
- Causal Inference (JHU)
- Fundamentals of Visual Computing (UBC)
- Machine Learning and Data Mining (UBC)
- Advanced Machine Learning Tools for Engineers (UBC)

PROFESSIONAL ACTIVITIES

Reviewer, **MICCAI UNSURE workshop**, 2021
Chair, **IEEE EMBS society**, SSNCE, 2018

REFERENCES

Available upon request.