Dakshitha B Anandakumar

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Education

Georgia Institute of Technology & Emory University — Atlanta, GA
Ph.D. in Biomedical Engineering, Advisor: Dr. Robert C Liu — Aug 2018–Dec 2022

- **Major**: Auditory Neuroscience **Minor**: Computer Engineering
- Relevant Coursework: Quantitative & systems neuroscience, Information processing models in neural systems

Georgia Institute of Technology — Atlanta, GA
M.S. in Electrical and Computer Engineering, **GPA: 4.00/4.00** — Aug 2016–May 2018

- Relevant coursework: Advanced computer architecture, Advanced programming techniques, Advanced operating systems, Advanced digital signal processing, Real time systems

Industry Experience

Qualcomm
Software Engineering Intern — May 2017 - August 2017

- Designed an algorithm to track transitions between various stages in the 5G down-link communication. Each stage is represented as a state in a finite state machine that corresponds to communication handshake protocols

Honeywell Technology Solutions
Software Development Intern — January 2016 - July 2016

- Developed a gateway device that interfaces sensors with an embedded hardware board and translates the messages between them through the use of communication protocols I2C and CAN

Research Experience

Georgia Institute of Technology

A robust model for Human Object Recognition using Deep Neural Networks

- Modelled the hierarchical processing of stimuli in the visual cortex by a convolutional neural network that incorporated contextual cues to determine identity of objects irrespective of differing viewpoints. Accuracy dropped from 73% to 52% with decrease in contextual cues such as color and symmetry similar to the brain

Closed loop feedback control of localized neural activation

- Implemented a feedback control network to localize the activation of a population of neurons and decouple the effect of causal interactions on their characteristics by using PID controllers

Cable theory modelling of a nerve cell

- Implemented a passive cable theory model of biological neurons using mathematical models of parallel connection of resistors and capacitors. Communication between neurons is represented as electrical signals

Center for Neuroscience, Indian Institute of Science (IISc)
Summer Fellowship, Mentor: Dr. Supratim Ray

Real time neuro feedback of Local Field Potential (LFP)

- Devised an algorithm to analyse electroencephalography (EEG) signals in real time while subjects performed different tasks. Provided alpha neurofeedback to subjects during the task to control the alpha power in their brain rhythms within less than 5 seconds of presentation of auditory stimulus

Current Research

- **Investigating the contribution of neural manifolds in the auditory cortex to influence perception of sounds that give rise to social behaviors**
  - Identified the impact of social experience on the temporal response properties of neurons in the auditory cortex of the brain that in turn influence behaviors.
  - Incorporating neural population coding techniques to establish the relationship between acoustic features of natural sounds and the corresponding neural representation in the auditory cortex of the brain.
  - The knowledge about functioning of cortical circuits in natural, ethological environments is a step towards developing intelligent algorithms that process sounds without ignoring the intrinsic ways in which the brain is wired to respond to them.

Skills

- **Programming Languages** Python, MATLAB, C
- **Open Source Libraries:** PyTorch, Tensorflow, NEURON

Publications

[1] K. K. Chong, **D. B. Anandakumar**, A. G. Dunlap, D. B. Kacsoh, and R. C. Liu, "Experience-dependent coding of time-dependent frequency trajectories by off responses in secondary auditory cortex", in *Journal of Neuroscience*, 2020, pp. 4469–4482.

[2] R. C. Liu, **D. B. Anandakumar**, and K. Lu, "Parent TRAP: Discriminating Infant Cries Requires a Higher-Order Auditory Association Area in Mice", in *Neuron 107.3*, 2020, pp. 399–401.

[3] N. Wang, R. Liu, N. Asmare, **D. B. Anandakumar**, and F. A. Sarioglu, "Decoding of Code-Multiplexed Coulter Sensor Signals via Deep Learning", in *20th International Conference on Solid-State Sensors, Actuators and Microsystems Eurosensors*, 2019, pp. 202–205.

[4] **D. B. Anandakumar**, D. Venkatesaiah, and K. Manikantan, "A novel Bi-level Artificial Bee Colony algorithm and its application to image segmentation", in *International Conference on Computational Intelligence Computing Research*, 2015.

Teaching

Graduate Teaching Assistant
Georgia Institute of Technology

- High Performance Computing (CS 6290), Introduction to Computer Network Security (ECE 4894)

Scholarships and Awards

- Women in Technology Scholarship, Zonta International 2019
- Outstanding community service award, Georgia Tech 2020
- Research award from Vision Group on Science and Technology, Government of Karnataka, India. 2016
- Best Project Award for the project 'Novel method of automated counting of silkworm eggs using Looped Erosion technique' at Ramaiah Institute of Technology 2016
- Outstanding Graduating Student Award at Ramaiah Institute of Technology 2016