

DAKSHITHA.B.ANANDAKUMAR

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EDUCATIONAL QUALIFICATIONS

Ph.D.	Biomedical Engineering	Georgia Tech and Emory University	May 2023	3.9/4.0
M.S.	Electrical & Computer Engineering	Georgia Institute of Technology	Aug 2018	4.0/4.0
B.Tech.	Electronics & Communications Engg.	Ramaiah Institute of Technology (RIT)	Apr 2016	9.8/10

WORK EXPERIENCE

Qualcomm, Software Engineering Intern

May 2017 – August 2017

- Worked with 5G New Radio down-link team to create a tool to visualize transitions between various stages in 5G communication. The stages are represented as a finite state machine and the tool can be used to track transition from one state to the next.
- Included features in the tracker to add checkpoints in the code. This helps to observe the state changes at these checkpoints graphically on the tool to determine the state transitions in various parts of the code.
- The tool is primarily aimed to help debugging 5G code base and identify the reason behind any code crashes.

Honeywell Technology Solutions, Software Development Intern

January 2016 – July 2016

- Worked on project Excel Flash GW development, a gateway device which interfaces the sensors with xls1000 panel modules and translates the messages between them.
- Interfaced freescale tower boards through various communication protocols like I2C, CAN in embedded C.

Center for Neuroscience, Indian Institute of Science (IISc), Summer Fellowship

June 2015 – August 2015

- Analyzed electroencephalography (EEG) and electromyographic (EMG) signals in real time to obtain information about the person's state of mind or muscular activity.
- Recorded electrical activity of neurons in the brain and muscles, used TCP/IP to interface the EEG & EMG signals from the device to MATLAB. Obtained the time & frequency domain plots of the signals.

CURRENT RESEARCH

Contribution of the perirhinal and entorhinal cortex in mediating experience dependant changes in neural mechanisms of auditory categorization of social sounds

- The auditory cortex (AC) is hierarchically organized into core and non core regions. In rodents, the primary auditory cortex (A1) forms the core while secondary auditory cortex (A2) represents the non core region.
- From literature, we are aware that A1 encodes simple sounds whereas neurons in non core regions encode complex sounds like vocalizations and abstract information. However, the contribution of these regions to elicit a social behavior in mice is still controversial. One such social behavior which is preserved in many species is maternal interactions. Pup vocalizations can evoke a strong maternal response in mice. I am interested in studying the changes in core and A2 that lead to maternal auditory cortical plasticity. As a result of learning social sounds such as pup calls there might be several underlying changes in the hippocampal formation. I am particularly keen on understanding the contribution of perirhinal and entorhinal cortex in mediating these changes seen in the auditory cortex since they are key nodes in forming new memories.

PUBLICATIONS

- B A Dakshitha, V Deekshitha, K Manikantan “**A novel Bi-level Artificial Bee Colony algorithm and its application to image segmentation**”, International Conference on Computational Intelligence & Computing Research, 2015.
- N Wang, R Liu, N Asmare, D Anandakumar, AF Sarioglu “**Decoding of Code- Multiplexed Coulter Sensor Signals via Deep Learning**”, accepted at International Conference on Solid-State Sensors, Actuators and Microsystems & Eurosensors, 2019

B.TECH. PROJECT

Automated counting of silkworm eggs & its application to sericulture

Python, OpenCV

- Devised an algorithm to process the image of a sheet of silkworm eggs using connected components and erosion techniques to provide a final count of eggs. Each sheet contains around 300 eggs and the algorithm was implemented on a Raspberry Pi processor and verified the results using simulations in MATLAB.

KEY ACADEMIC PROJECTS

Localizing neural activation with Feedback Control

MATLAB

- Implemented a feedback control network to localize the activation of a system under study and nullify the impact of adjacent systems on its characteristic.
- Simulated a biological neuron using transfer functions representing its function. Incorporated a PID controller in the feedback loop to offer a modulated control.

A robust model for Human Object Recognition using Deep Neural Networks

TensorFlow, Python

- Conducted human psychophysics experiments to test the hypothesis that human visual cortex incorporates contextual clues, to determine probable viewpoint of an object before determining its identity.
- Compared human performance to an established neural network (Google Inception v3). Constructed a CNN to understand how the layers processed the images and compare its structure to established hypotheses about human visual cortex.

Cable theory modelling of a nerve cell

NEURON, MATLAB

- Implemented a single and multi compartment model of a neuron in MATLAB and obtained same results for the model in NEURON. Critically analyzed the two simulation environments in modelling a neuron.
- Modelled a neuron as a Hodgkin Huxley circuit and a passive cable model. Also worked on obtaining a simulation of a propagating action potential in a multi-compartment active cable in MATLAB and NEURON.

Multi-label signal classification

Python, PyTorch

- Devised a neural network to identify components of a mixed signal and the sources responsible for the generation of the signal. Incorporated Pytorch to train the 1D convolutional neural network and signal processing techniques to preprocess the data.

TEACHING ASSISTANTSHIP DUTIES

- Fall 2019: Grad Groups course (GT 8801)
- Spring 2018: High Performance Computing (CS 6290)
- Fall 2017: Introduction to Computer Network Security (ECE 4894)

RELEVANT COURSEWORK

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| • Neuroanatomy & Systems Neuroscience | • Advanced Digital Signal Processing |
| • Quantitative Neuroscience | • Advanced Operating Systems |
| • Information Processing Models in Neural Systems | • Advanced Programming Techniques |
| • Real Time Systems | • Advanced Computer Architecture |

SOFTWARE SKILLS

- **Advanced** level programming expertise in **Python, C, C++, MATLAB**
- Proficient with **GNU Linux** operating systems like Ubuntu
- Programming experience in NEURON

LEADERSHIP AND VOLUNTEERING EXPERIENCE

- Graduate student mentor in the Pipeline program at Emory University.
- Volunteer at Atlanta Hospital Hospitality House through Volunteer Emory.
- Volunteer with Asha at Georgia Tech.
- Served as a mentor in the mentorship program at Women in Technology, Atlanta organization.
- Deputy Vice President of Student Life at Student Government Association at Georgia Tech.
- Mentored undergraduate students in the SURE summer program at Emory University.
- Serve as an advisor in India Club organization at Georgia Tech.