SRUTI MALLIK

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SUMMARY

Current Ph.D. candidate actively seeking research internship opportunities with focus on projects related to machine learning and data analytics.

EDUCATION

Washington University in St. Louis — *St. Louis 63130, MO, USA*
Ph. D. in Electrical and Systems Engineering — *2016 – 2021(expected)*
M. S. in Electrical and Systems Engineering (GPA – 3.89) — *2016 – 2018*

Jadavpur University — *Kolkata 700032, WB, India*
B. E. in Electrical Engineering (GPA – 8.95) — *2011-2015*

SKILLS

- **Programming Languages:** MATLAB, Python, C/CPP, R (preliminary), SQL (preliminary)
- **Libraries:** Scikit-learn, Pandas, NLTK, Matplotlib, Seaborn
- **Deep Learning Frameworks:** TensorFlow, Keras

RESEARCH EXPERIENCE

Aug 2016- May 2021 (expected)

Normative modeling of neural circuit dynamics to meet control & detection objectives

- Developed a **computational model** (*mathematical model formulation and implementation*) of neural circuitry that mimics the function of **olfaction.**
    - Developed model is **predictive** of biological neural architectures and response trends under different stimulus regimes.

Modeling neural and behavioral adaptation over multiple timescales

- Developed **computational model** (*mathematical model formulation and implementation*) that provides **mechanistic understanding** of habituation or neural adaptation and its effect on behavioral response.
    - Model predictions were **validated using experimental data** from model organisms.

Using optimal control theory as a framework for analyzing and implementing neural dynamics

- Currently developing optimization frameworks for neural coding problems and analyzing both the **optimal solution** and **solution strategies** from the perspective of neural dynamics.
    - This work will be extended for implementation on **mobile robotic systems**.

MENTORSHIP & TEACHING EXPERIENCE

- Mentored undergraduate and graduate students in research projects. (Summer 2020)
- Contributed to designing course materials and assignments as a Teaching Assistant to both Undergraduate *(ESE 105 – Fall 2018, 2019, Class Size: 70)* and Graduate *(ESE 553 – Spring 2018, Class Size: 25)* courses.

PROJECTS

Independent Project

Summer 2020

- **Classification of images of flowers** *(Petals to the Metal - Kaggle)*
  - Deployed a deep learning model for **classification** of a large dataset of floral images.
  - Used **Transfer Learning** to improve performance.

Course Project

- **Epileptic Seizure Recognition** *Spring 2018*
  - Used **Kernel-Based Soft Margin SVM** to classify short duration EEG traces.

PUBLICATIONS

Refereed Journal Articles

- **Multiple timescale normative model of sensory and behavioral adaptation**
  Sruti Mallik, Hamilton P. White, Dirk Albrecht, ShiNung Ching
  In preparation (expected submission by October 2020 at PLoS Computational Biology)

- **Neural circuit dynamics for sensory detection**
  Sruti Mallik, Srinath Nizampatnam, Anirban Nandi, Debajit Saha, Baranidharan Raman, ShiNung Ching
  Journal of Neuroscience (April 2020)

Selected Presentations

- **Optimal tracking as a framework for normative synthesis of sensory networks.**
  Sruti Mallik, ShiNung Ching
  Bernstein conference 2020 (virtual)

- **Multiple timescale normative circuit model of C. elegans sensory adaptation & behavior**
  Hamilton White(*), Sruti Mallik(*), Baranidharan Raman, ShiNung Ching, Dirk Albrecht
  Cosyne 2020 (Denver, CO)
  (*) Co first authors

- **Normative modeling of sensory network dynamics for stimulus tracking**
  Sruti Mallik, Srinath Nizampatnam, Debajit Saha, Baranidharan Raman, ShiNung Ching, Dirk Albrecht
  Neuroscience 2019 (Chicago, IL)

RELEVANT COURSES

Introduction to Artificial Intelligence, Introduction to Machine Learning, Bayesian Machine Learning, Deep learning specialization (Coursera), Probability and Stochastic processes