LOKESH BOOMINATHAN

Ph: +1-832-682-9963 · lb36@rice.edu · lokesh-boominathan.github.io · Houston, TX 77005

EDUCATION

Rice University - Ph.D. in Electrical and Computer Engineering *Expected May 2024*

Rice University - M.S. in Electrical and Computer Engineering *Aug 2021*

NIT Calicut - B.Tech. in Electronics and Communication Engineering *June 2015*

RESEARCH EXPERIENCE

Lab for the Algorithmic Brain (LAB) - Rice University, Houston, TX *2018 - Present*
Research Assistant, Advisor: Dr. Xaq Pitkow

- Developed reinforcement learning models to study mice foraging strategies and motivation. The models were created using the OpenAI Gym toolkit and Stable Baselines3 Python library and validated on experimental data from collaborators at the Baylor College of Medicine.
- Derived a mathematical theory to model how the brain performs optimal inference under biological constraints. Developed theory also has applications in designing energy-efficient systems such as drones with low-power requirements [P1].

Computational Imaging Lab - Indian Institute of Technology Madras, India *2017 - 2018*
Research Assistant, Advisors: Dr. Kaushik Mitra and Dr. Shanti Bhattacharya

- Developed state-of-the-art deep learning algorithm in TensorFlow for phase retrieval in Fourier Ptychographic Microscopy. Collaborated with a medical imaging startup, *Aindra*, to validate the algorithm using clinical datasets [P2].

Video Analytics Lab (VAL) - Indian Institute of Science Bangalore, India *2015 - 2016*
Research Assistant, Advisor: Dr. Venkatesh Babu

- Developed state-of-the-art deep learning algorithm in DeepLab for estimating crowd density from dense crowd images [P3]. Used Bayesian optimization with deep learning to compensate for large in-plane rotations in photographs [P4].

RELEVANT SKILLS

Programming	Python, MATLAB, Mathematica, LaTeX, Shell
Tools	PyTorch, TensorFlow, OpenAI Gym, Stable Baselines3, NumPy, Matplotlib, Git

RELEVANT PUBLICATIONS

[P1] **Boominathan L**, Pitkow X., "Phase transitions in when feedback is useful" in *Advances in Neural Information Processing Systems* (**NeurIPS**), 2022.

[P2] **Boominathan L**, *et al.*, "Phase retrieval for Fourier Ptychography under varying amount of measurements" in *British Machine Vision Conference* (**BMVC Spotlight**), 2018.

[P3] **Boominathan L**, Kruthiventi SS, Babu RV, "CrowdNet: A Deep Convolutional Network for Dense Crowd Counting" in *ACM Multimedia Conference* (**ACM MM**), 2016.

[P4] **Boominathan L**, Srinivas S, Babu RV, "Compensating for Large In-Plane Rotations in Natural Images" in the *Indian Conference on Computer Vision, Graphics and Image Processing* (**ICVGIP**), 2016.

CO-CURRICULAR ACTIVITIES

- International School for Advanced Studies - Invited research talk at TEX2022 conference. *Summer 2022*
- Rice University - Teaching Assistant for Neural Computation course. *Spring 2021, 22*
- Marine Biological Laboratory - Attended Methods in Computational Neuroscience course. *Summer 2021*