LOKESH BOOMINATHAN

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EDUCATION

Ph.D. in Electrical and Computer Engineering, Rice University, Houston, TX — Aug 2021 - Expected Dec 2023

M.S. in Electrical and Computer Engineering, Rice University, Houston, TX — Aug 2018 - Aug 2021

B.Tech. in Electronics and Communication Engineering, NIT Calicut, India — July 2011 - June 2015

RESEARCH EXPERIENCE

Lab for the Algorithmic Brain (LAB) - Rice University, Houston, TX — 2021 - Present
Ph.D. candidate, Advisor: Dr. Xaq Pitkow

- Building reinforcement learning based models to understand the trade-off between attention cost and task performance in a mice foraging task.

Lab for the Algorithmic Brain (LAB) - Rice University, Houston, TX — 2018 - 2021
M.S. candidate, Advisor: Dr. Xaq Pitkow

- Developed a theory of optimal brain inference in the presence of noisy sensation, prediction, and feedback, with separate costs for feedforward and feedback signals.
- Showed how the usefulness of feedback undergoes phase transitions depending on the structure of the environment, architectural constraints, and computational costs.

Computational Imaging Lab - IIT Madras, India — 2017 - 2018
Research Assistant, Advisors: Dr. Kaushik Mitra and Dr. Shanti Bhattacharya

- Developed a state-of-the-art deep learning based phase retrieval algorithm for Fourier Ptychographic Microscopy.

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

- Developed a state-of-the-art deep learning algorithm for estimating crowd density from static images of highly dense crowds.
- Developed an algorithm using deep learning and Bayesian optimization to compensate for large in-plane rotations present in photographs.

RELEVANT SKILLS

Programming	Python, MATLAB, Mathematica, LaTeX, Shell
Tools	PyTorch, NumPy, Matplotlib, Illustrator

PUBLICATIONS

- **Boominathan L**, Pitkow X., "Phase transitions in when feedback is useful" in Conference on Neural Information Processing Systems (**NeurIPS**) 2022.
- **Boominathan L**, et al., "Phase retrieval for Fourier Ptychography under varying amount of measurements" in British Machine Vision Conference (**BMVC** Spotlight) 2018.
- **Boominathan L**, Kruthiventi SS, Babu RV, "CrowdNet: A Deep Convolutional Network for Dense Crowd Counting" in ACM Multimedia Conference (**ACM MM**) 2016.
- **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

- Teaching Assistant for Rice University course ELEC 589: Neural Computation (Spring 2021, and 2022).
- Attended summer school on Methods in Computational Neuroscience at the Marine Biological Laboratory in Woods Hole, MA (Summer 2021).