MRUGSEN GOPNARAYAN

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ABOUT

My interest lie in the field of Decision-making. I wish to understand the factors that affect how people make decisions and then trace out the psychological and neural mechanisms of these processes. To achieve this I have collected Behavioural, EEG and Eye-tracking data. And I have used computational models and done statistical analysis to interpret peoples choices.

WORK EXPERIENCE

Research Assistant *August 2021 - Present*
Decision Lab, Prof. Arjun Ramakrishnan *Indian Institute of Technology, Kanpur.*
- Studying the effect of trait anxiety and depression on Decision Making.
- Installation and maintenance of software for data collection of EEG and Eye-tracking
- Collecting EEG and Eye-tracking data

EDUCATION

Indian Institute of Science, Bangalore *September 2020 - July 2021*
Master of Science, Biology.
- Masters thesis topic: Modeling sentence reading time
Thesis Advisor: Prof. SP Arun, Professor and Chair, Center for Neuroscience, IISc.

Indian Institute of Science, Bangalore *August 2016 - August 2020*
Bachelor of Science, Biology.
- Bachelor thesis topic: Evaluation of CryoEM structures
Thesis Advisor: Prof. N. Srinivasan, Professor and Former Chair, Molecular Biophysics Unit, IISc.

RESEARCH PROJECTS

Effect of Anxiety and Depression on Loss aversion bias [Prof. Arjun Ramakrishnan, IITK]
August 2021 - Present
- Used HDDM models and Prospect theory to show relationship between Decision parmeters and Anxiety and Depression levels - Designed the Gambling task in Psychopy, Currently doing Pilot with EEG and Eye tracking - Hypothesis is that lateralized readiness potential (LRPs) would be dependent on Anxiety and Depression levels

Dynamical Decision-making based upon an updating bias [Prof. Arjun Ramakrishnan, IITK]
Feb 2022 - Present
- Using Linear Dynamical Systems approach developed a decision making model - Estimated parameters using MLE and Functional optimisation - Showed that Dynamic model of Decision Making is better than static - Currently working on parameter retrieval

Correlation differences between BOLD responses to natural vs. man-made stimuli in the human visual cortex. [Prof. Kojhit Kar, York University]
Feb 2022 - Present
- Found differences in correlations for natural and man-made images across layers V4 and IT of the Cornet-S deep neural net - V1 and V2 layers showed no correlation differences between natural and manmade images in fMRI responses. - V4 and Lat Occ region showed a different fMRI response for for natural and man-made images

Single action bias in Climate change mitigation strategies[Prof. Varun Dutt, IIT Mandi]
September 2021 - Feb 2022
- Analysed the behavioural data analysed using a Interactive Climate change Simulator - Doing Statistical analysis in Pyhton and SPSS showed a presence of Single Action Bias

Modeling sentence reading time [Prof. SP Arun, CNS, IISc]
July 2020 - July 2021
- Designed four different reading tasks, after doing an extensive literature review - Collected data for five different reading experiments using Pavlovia - Explained the varience in reading time using a linear regression model validated with LOOCV

Evaluation of CryoEM structures [Prof.N Srinivasan, MBU, IISc]
May 2019 - July 2020

- Suggested the use of Packing density as a parameter for evaluating CryoEM structures - Did a comparison study between X-ray and Cryo-EM structures to prove the efficacy of this method. - Showed that improvements can be done in the Inter-facial region of the CryoEM structures

Designing Artificial Protein Sequences [Prof.N Srinivasan and Dr.Sandhya Sankaran , MBU, IISc]
June 2017 - Feb 2019
- Created a database of 1.6 Million protein sequences using a C program. - Analyzed and evaluated their performance for remote homology detection.

PEER-REVIEWED PUBLICATION

Ashraya Ravikumar, **Mrugsen Nagsen Gopnarayan,** Sriram Subramaniam and Narayanaswamy Srinivasan*. 2021. Comparison of side chain dispersion in protein structures determined by cryo-EM and X-ray crystallography. International Union of Crystallography Journal

SKILLS

Programming languages: C, Python(Scikit-learn, Numpy, matplotlib), R, MATLAB, Shell Script (Bash), Github, LaTeX
Psychophysics experimentation: Pavlovia, Pupil labs, LabStreamingLayer, LiveAmp (EEG), EEGLAB, PsychToolBox(Matlab), Qualtrics
Statistics skills: SciPy, Statistics and Machine Learning Toolbox (Matlab), SPSS
Bioinformatics skills: Blast, Jackhmmer, Clustal omega, CD-Hit
Languages: English, Hindi, Marathi (Native).

HONORS AND AWARDS

KVPY fellowship
(National fellowships for students interested in research careers) - Recipient for 5 consecutive years. - Selected based on National level KVPY exam 100,000 applicants. And then selected through interviews.

INSPIRE fellowship
- Innovation in Science Pursuit for Inspired Research Fellowship
Qualified by being in top 1% in the Maharashtra State board exams.

TEACHING EXPERIENCE

BSE 662: Brain and Decision making (Teaching Assistant)
- Grading assignments and resolving doubts
- Mentored 2 Student Groups with their course project examining sunk costs

BSE 658A: STATISTICS FOR MODERN BIOLOGY (Teaching Assistant)
- Helping students with coding in R
- Grading assignments and resolving doubts

RELEVANT COURSE WORK

- Cognitive Neuroscience - Systems Neuroscience - Molecular and Cellular Basis of Behaviour - Neural Networks and learning Systems - Foundations of Machine learning - Molecular Systems Biology - Numerical Solutions of Differential Equations - Experiments in Biochemistry and Physiology - Probability and Statistics - Algorithms and Programming - Linear Algebra I - Linear Algebra II

SUMMER SCHOOLS AND WORKSHOPS

- Neuromatch Academy Summer School on Computation Neuroscience 2022
- Summer school in Mathematics for Data science 2019
- Research Writing Workshop 2021
- Research illustration Workshop 2021

MEMBERSHIP

- SJDM (The Society for Judgment and Decision Making)
- Society of cognitive science