Manasi Malik

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Education

Johns Hopkins University (JHU) — Jan'21 – Present
Ph.D. in Cognitive Science
Computational Cognitive Science Track
PI: Dr. Leyla Isik

Brains, Minds, & Machines Summer School (BMM) — Aug'23 – Sept'23
Organized by MIT and Harvard, at Marine Biological Laboratory in Woods Hole, MA

Indraprastha Institute of Information Technology, Delhi, India (IIIT Delhi) — Jul'15 – May'19
Bachelor of Technology **(Honors)**
Major: Electronics & Communication Engineering
Minor: Computational Biology

Industry Experience

Researcher at TCS Research and Innovation — Aug'19 – Dec'20

I developed deep-learning methods to improve effectiveness of advertising using user behaviour data. I designed and implemented a **deep reinforcement learning model** that dynamically allocates budget across campaigns based on user behaviour data so as to optimize the overall return on investment [Patent] [Paper]

Publications & Selected Presentations

Publications

Malik, M., Isik, L. Relational visual representations underlie human social interaction recognition., Nature Communications 14, 7317 (2023).

Qin, W., **Malik, M.**, & Isik, L. Relational Information Predicts Human Behavior and Neural Responses to Complex Social Scenes., Proceedings of the Annual Meeting of the Cognitive Science Society, 47 (2025).

M. Malik, G. Gupta, L. Vig, and G. Shroff, BCQ4DCA: Budget Constrained Deep Q-Network for Dynamic Campaign Allocation in Computational Advertising, IEEE International Joint Conference on Neural Networks, 2021 (IJCNN '21).

Yashaswi Rauthan, Vatsala Singh, Rishabh Agrawal, Satej Kadlay, Niranjan Pedanekar, Shirish Karande, **Manasi Malik**, and Iaphi Tariang, Avoid Crowding in the Battlefield: Semantic Placement of Social Messages in Entertainment Programs, International Workshop on AI for Smart TV Content Production, Access and Delivery (AI4TV '20)

Manasi Malik, Ganesh Bagler, and Arpan Banerjee. Network analysis of neuro-cognitive processes: studying mcgurk effect using EEG data, IIITD, 2019.

Talks

Contributed Talk, Cognitive Computational Neuroscience Conference (CCN), 2025
Symposium Talk, Social & Affective Neuroscience Society Conference (SANS), 2024
Talk sessions, Vision Sciences Society Conference (VSS), Florida, USA, 2022
Invited Talk, Philosophical and Computational Foundations of Cognition Group, Yale, 2025
Invited Talk, IMPression in ACTion Lab, UCSD, 2025
Invited Talk, NeuroAILab, Stanford, 2025
Invited Talk, Social Computation Representation and Prediction Lab (SCRAP), Dartmouth, 2024
Invited Talk, Social & Cognitive Origins Group, JHU, 2023
Invited Talk, Computational Cognitive Science Group, MIT, 2022
Brown Bag Talks, JHU Cognitive Science, 2022 & 2025

Patents

Gupta, G., Vig, L., Shroff, G., & **Malik, M.** (2024). Budget constrained deep q-network for dynamic campaign allocation in computational advertising. U.S. Patent No. 11,915,262.

Posters

Manasi Malik, Minjae Kim, Shari Liu, Tianmin Shu, Leyla Isik, A Novel fMRI Dataset to Study the Neural and Computational Basis of Social Scene Understanding, Vision Sciences Society (VSS'25), Florida, USA

Manasi Malik, Minjae Kim, Shari Liu, Tianmin Shu, Leyla Isik, Investigating the neural computations underlying visual social inference with graph neural networks, Conference on Cognitive Computational Neuroscience (CCN'24), Boston, USA

Manasi Malik, Tianmin Shu, Josh Tenenbaum, Leyla Isik, Investigating the neural computations underlying visual social inference with graph neural network and inverse planning models, Vision Sciences Society (VSS'24), Florida, USA

Manasi Malik, Leyla Isik, Human Social Interaction Judgements are Uniquely Explained by both Bottom-up Graph Neural Networks and Generative Inverse Planning Models, Conference on Cognitive Computational Neuroscience (CCN'23), Oxford, UK

Manasi Malik, Leyla Isik Both Purely Visual and Simulation-based Models Uniquely Explain Human Social Interaction Judgements, Vision Sciences Society Annual Meeting (VSS '23), Florida, USA.

Manasi Malik, Leyla Isik, Social Inference from Relational Visual Information: An Investigation with Graph Neural Network Models, Conference on Cognitive Computational Neuroscience (CCN'22), San Francisco, USA (poster)

Selected Projects

Social Inference from Relational Visual Information Jan'21 – Present

Advisor: Dr. Leyla Isik

In this project, I developed a relational graph-neural-network (SocialGNN) and compared it to traditional bottom-up visual and generative bayesian models to evaluate competing theories of visual social inference. SocialGNN produces more human-like judgments than traditional visual models and does so far more efficiently than bayesian approaches. We've now collected fMRI data to assess how these models align with brain representations of social interactions.

Cross-Species Comparison of Visual Representations Aug'23 – Aug'23

Advisor: Colin Conwell

I explored visual information processing differences between monkeys and humans, analyzing brain responses to 1000 images from the Coco dataset. Using encoding models with deep learning features from self-supervised AlexNet, we probed the representational similarities between human fMRI and monkey electrophysiological data. This approach enables us to investigate the features that drive the visual cortex responses in each species.

Network Analysis of Neuro-Cognitive Processes: Studying McGurk Effect using EEG Data May'18 – May'19

Advisors: Dr. Arpan Banerjee, Dr. Ganesh Bagler, Dr. Dipanjan Roy

We investigated the underlying mechanism of multi-sensory perception, using an audio-visual illusion called the McGurk Effect. Using EEG and behaviour data from multiple subjects, we applied graph theory concepts to understand differences in brain network organizations during different percepts. [LINK]

Teaching & Service

Teaching Assistant, NeuroAI Summer School, CAJAL Advanced Neuroscience Training Programme, Portugal	Summer 2025
Teaching Assistant, Introduction to Computational Cognitive Science (JHU)	Spring 2023
Teaching Assistant, Introduction to Cognitive Neuropsychology (JHU)	Fall 2022
Teaching Assistant, Visual Cognition (JHU)	Spring 2022
Teaching Assistant, Computational Social Cognition (JHU)	Fall 2021
Diversity and Representation Committee Member, Dept. of Cognitive Science, JHU	Jan 2022 - Present
Curator for TEDxIIITD '18	2018
Student Council Representative for ECE batch, IIITD	2017-18

Awards and Achievements

- **All Rounder Award, ECE department** 2019 graduating batch
- **Qualified for DST INSPIRE Scholarship** - 2015 (Through Admission to IISER Mohali)

Skills

Programming skills	– Proficiency in Python, MATLAB – Exposure to R, C/C++, SQL, HTML – Competitive programming course (CodeChef challenges, Summer 2016)
Deep Learning & AI Skills	– Neural Network architectures: GNN, CNN, RNN – Deep Reinforcement Learning – Training and optimization techniques: gradient descent, regularization, etc. – Frameworks: Tensorflow, PyTorch
Research & Data Analysis Skills	– Collecting and Analyzing Behavioral & fMRI Data – Statistical analysis (Permutation Testing, Regression, Hypothesis Testing) – Mathematical modeling, Linear Algebra, Graph Theory – Experimental Design