Ajay Subramanian

Department of Psychology
New York University
6 Washington Place, New York 10003

Email: ajay.subramanian@nyu.edu
Website: ajaysubramanian.com
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EDUCATION

Ph.D.: **New York University, USA** 2021 - 2026
Cognition & Perception, Department of Psychology
Advisor: Dr. Denis Pelli

B.E.: **Birla Institute of Technology and Science Pilani, India** 2017 - 2021
Electronics and Communication Engineering

PUBLICATIONS & PREPRINTS

PREPRINTS

1. **Subramanian, A.**, Price, S., Sizikova, E., Kumbhar, O., Majaj, N. J., Pelli, D. G. (2022). SATBench: Benchmarking the speed-accuracy tradeoff in object recognition by humans and dynamic neural networks. *arXiv*. [Paper]

PUBLICATIONS

2. Turner, J. P., Knight, J. C., **Subramanian, A.**, & Nowotny, T. (2022). mlGeNN: accelerating SNN inference using GPU-enabled neural networks. *Neuromorphic Computing and Engineering*, *2*(2), 024002. [Paper]
3. **Subramanian, A.**, Chitlangia, S., & Baths, V. (2022). Reinforcement learning and its connections with neuroscience and psychology. *Neural Networks*, *145*, 271-287. [Paper]

POSTER PRESENTATIONS

1. **Subramanian, A.**, Price, S., Sizikova, E., Kumbhar, O., Majaj, N., Pelli, D. G. (2022). Benchmarking dynamic neural-network models of the human speed-accuracy tradeoff. *Vision Science Society (VSS) Meeting*, St. Pete Beach, USA. [Poster]
2. **Subramanian, A.**, Patil, R., Baths, V. (2019). Word2Brain2Image. Visual Reconstruction from Spoken Word Representations. *Annual Conference of the Association for Cognitive Science in India (ACCS)*, Goa, India. [Poster]

TALKS

1. **Subramanian, A.** (2022). Benchmarking the speed-accuracy tradeoff in object recognition by humans and dynamic neural networks. *First year talk, Program in Cognition & Perception 43rd Annual Miniconvention*, New York University, USA. [Video]
2. **Subramanian, A.** (2022). The temporal dimension of object recognition. *Guest talk: Introduction to Cognitive Neuroscience,* BITS Pilani, Goa, India. Virtual.
3. **Subramanian, A.** (2020). Word2Brain2Image: A data-driven approach towards understanding representations in the brain. *Round table track: Data issues in Cognitive Neuroscience*, International CCCP Symposium. Virtual.
4. **Subramanian, A.** (2019). Open Source Development and Google Summer of Code. *Technology Incubator Programme Seminar*, BITS Pilani, Goa, India.

RESEARCH AND WORK EXPERIENCE

2021 - present: **New York University**
Graduate Student Researcher. Supervisor: Denis Pelli
Benchmarking the speed-accuracy tradeoff in object recognition by humans and dynamic neural networks

2020 - 2021: **Harvard University & Massachusetts Institute of Technology**
Research Intern. Supervisors: Samuel Gershman, Pedro Tsividis
Human-level reinforcement learning through theory-based modeling, exploration and planning

2020: **Center for Computational Brain Research (CCBR), Indian Institute of Technology Madras**
Senior Thesis. Supervisor: Partha Mitra, Jaikishan Jayakumar
Automated detection of neuroanatomical features in gigapixel histological images using deep learning

2019 - 2020: **Cognitive Neuroscience Lab, BITS Pilani**
Undergraduate Researcher. Supervisor: Veeky Baths
Deep learning for visual reconstruction from spoken word representations;
Review on reinforcement learning and its connections with neuroscience and psychology

2019: **Biologically Inspired Neural Network (BINN) Labs, BITS Pilani**
Undergraduate Researcher. Supervisor: Basabdatta Sen Bhattacharya

Simulating LGN response to background irradiance using spiking neural networks on SpiNNaker

2019: **GeNN Team, University of Sussex & International Neuroinformatics Coordinating Facility (INCF)**
Google Summer of Code Intern. Supervisors: James Knight, Thomas Nowotny
Deep learning in spiking neural networks using GPU-enabled neural networks (GeNN)

2019: **LetsTransport**
Summer Intern. Supervisor: Nilay Sahu
Optimizing database querying and file upload speeds from a native Android application

AWARDS

2021: MacCracken Fellowship for doctoral studies, New York University.
2019: Matic Bounty Prize, InOut Hackathon, Bangalore, India.
2018: Literacy and Cognition Project research award, Max Planck Institute for Psycholinguistics.
2015: National Talent Search Scholarship, Government of India.

TEACHING AND OPEN-SOURCE

2020: **Co-creator,** *GenRL*
Open-source library for reproducible, generalizable reinforcement learning (github.com/SforAiDl/genrl)
2019: **Project Mentor**, *Learning to play games with deep reinforcement learning*
Technology Incubator Programme, BITS Pilani Goa, India
2018: **Course Instructor**, *Deep Learning*
Technology Incubator Programme, BITS Pilani Goa, India
2018: **Teaching Assistant,** *Computer Programming (CS F111)*
BITS Pilani, Goa, India

ACADEMIC SERVICE

2022: Reviewer, NeurIPS SVRHM Workshop
Reviewer, IOPScience Journal of Neural Engineering
Reviewer, NeurIPS Datasets and Benchmarks Track
External Reviewer, ECML-PKDD
2020: Co-organizer, Summer Symposium on AI Research (SAiDL and APPCAIR, BITS Pilani Goa)

MEMBERSHIP

2021 - present Member, Vision Science Society
2018 - present Core Member, Society for Artificial Intelligence and Deep Learning (SAiDL)

TECHNICAL SKILLS

Programming: Python, C++, Java, C, MATLAB
Frameworks: PyTorch, TensorFlow, Keras, Flask
Tools: GCP, Travis CI, Docker, Slurm, LaTeX, Git, DialogFlow, Android Studio, MongoDB
Operating Systems: Mac OS, Linux, Windows

RELEVANT COURSEWORK

Formal coursework:
At New York University: Mathematical Tools for Cognitive and Neural Science, Perception, Computer Vision, Computational Cognitive Modeling, Motion & Depth Processing (in progress), Neuroeconomics & Decision Making (in progress)
At BITS Pilani: Calculus, Probability & Statistics, Computer Programming, Linear Algebra, Differential Equations, Foundations of Data Science, Control Systems, Signals & Systems, Introduction to Cognitive Neuroscience, Digital Signal Processing, Information Theory & Coding, Digital Image Processing
Summer courses: Google Research India AI Summer School - Computer Vision track (2020)
Reinforcement Learning, Indian Institute of Technology Madras (2018)
Online courses: Machine Learning (Stanford, Coursera)
Deep Learning for Computer Vision (Stanford)
Deep Learning Specialization (deeplearning.ai, Coursera)