AJAY SUBRAMANIAN

Website ◇ Email
GitHub ◇ LinkedIn ◇ Google Scholar

EDUCATION

New York University, New York, USA *2021 - 2026*
Ph.D. in Cognition & Perception
Department of Psychology

Birla Institute of Technology and Science Pilani, India *2017 - 2021*
Bachelor in Engineering (B.E.)
Electronics and Communication Engineering

PUBLICATIONS

1. ***Ajay Subramanian***, *Sharad Chitlangia, Veeky Baths.* Reinforcement Learning and its Connections with Neuroscience and Psychology. ***Under Review***. [PREPRINT]
2. ***Ajay Subramanian***, *Rajaswa Patil, Veeky Baths.* Word2Brain2Image: Visual Reconstruction from Spoken Word Representations. ***ACCS, 2019***. [POSTER]

RESEARCH EXPERIENCE

Harvard University & Massachusetts Institute of Technology *2020*
Supervisors: Samuel Gershman, Pedro Tsividis
Human-level learning in Atari-like video games using a model-based reinforcement learning approach inspired by theories of human cognition. Manuscript under preparation.

Center for Computational Brain Research, IIT Madras & Cold Spring Harbor Lab *2020*
Supervisors: Partha Mitra, Jaikishan Jayakumar | Senior Thesis
Developed a deep learning based cellular segmentation model for gigapixel resolution neuroanatomical images. [THESIS]

Cognitive Neuroscience Lab, BITS Pilani Goa *2019 - 2020*
Supervisor: Veeky Baths | Funded by Max Planck Institute for Psycholinguistics

1. Deep learning to understand how spoken words are visually represented in the brain. Collected EEG data from human subjects listening to spoken audio of numerical digits, and employed deep generative models to construct images of digits purely from EEG signals.
2. Survey paper on the neural and psychological basis for reinforcement learning algorithms.

Biologically Inspired Neural Network Labs, BITS Pilani Goa *2019*
Supervisor: Basabdatta Sen Bhattacharya | University of Manchester | Human Brain Project
Using a SpiNNaker spiking neural network model to validate experimental results relating to synchrony, periodicity and luminance response of the Lateral Geniculate Nucleus (LGN) in a mouse brain. [REPORT][POSTER]

International Neuroinformatics Coordinating Facility (INCF) *2019*
Supervisors: Jamie Knight, Thomas Nowotny | Google Summer of Code 2019
Developed TensorGeNN, an open source Python library to convert trained deep neural network models to spiking neural networks with minimal losses in performance. Library was benchmarked on MNIST and CIFAR-10 datasets.

OPEN SOURCE

GenRL
Co-creator | Society for Artificial Intelligence and Deep Learning (SAiDL)

- A PyTorch reinforcement learning library for generalizable and reproducible algorithm implementations with an aim to improve accessibility in RL. [LINK]
- more than 350 stars on GitHub.

TensorGeNN
Contributor | GeNN Team, University of Sussex
A high-level Python library to convert trained deep neural networks models to spiking neural networks. [LINK]

WORK EXPERIENCE

LetsTransport *2019*
Supervisor: Nilay Sahu
Worked on optimizing database querying and file upload speeds from an Android application.

NOTABLE ACHIEVEMENTS

- Selected as one of 150 students from India for the **Google Research India AI Summer School 2020** as part of the Computer Vision track.
- Recipient of the **Literacy and Cognition Project** Funding of 60,000 INR from **Max Planck Institute for Psycholinguistics**, Nijmegen, Netherlands for research in Cognitive Neuroscience
- Was amongst 1134 students in the world to be selected for **Google Summer of Code 2019**.
- Winners of Matic Bounty Prize, **InOut Hackathon 2019** for best Blockchain implementation.
- One of 750 high school students in India to receive the **National Talent Search Scholarship 2015** of 140,000 INR from National Council of Educational Research and Training, Government of India.

TEACHING AND LEADERSHIP ROLES

Core Member *2018 - Present*
Society for Artificial Intelligence and Deep Learning (SAiDL)

Involved in research projects and teaching courses on AI and deep learning as part of a 15 member team of motivated individuals.

Organising Team Member *Jul 25-26 2020*
Summer Symposium on AI Research

Organised and conducted a free student-led event featuring 15+ top AI researchers from diverse subdomains as speakers for an audience of over 3000 students worldwide. The aim of the event was to expose students to recent directions in AI research and thereby make cutting edge ideas more accessible.

Project Mentor *2019*
Technology Incubator Programme, BITS Goa

Leading a collaborative project for around 30 undergraduate students on 'Learning to play games with Deep Reinforcement learning'. This hands-on project is aimed at introducing freshers and sophomores to state-of-the-art methods in reinforcement learning.

Course Instructor - Deep Learning *2018*
Technology Incubator Programme, BITS Goa

Involved in teaching and preparing material for a course titled 'Deep Learning' aiming to introduce first and second year undergraduate students to introductory concepts in the field. [Course Material]

Teaching Assistant, Computer Programming *2018*
BITS Pilani, Goa

Was responsible for lab assignment evaluation for an introductory programming course (CS F111).

TALKS

- Delivered a talk titled *"Word2Brain2Image: A data-driven approach towards understanding representations in the brain"* for the *"Round table track: Data issues in Cognitive Neuroscience"* at International CCCP Symposium, 2020. [link]
- Delivered a Seminar titled "Open Source Development and Google Summer of Code" for an audience of 100+ people at BITS Pilani, Goa.

TECHNICAL SKILLS

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

RELEVANT COURSES

Online	Machine Learning (Stanford), CS231n (Stanford), CS224n (Stanford), Deep Learning Specialization (deeplearning.ai)
Offline	Reinforcement Learning (IIT Madras), Modern Control Systems, Intro. to Cognitive Neuroscience, Control Systems, Foundations of Data Science, Probability and Statistics, Linear Algebra, Calculus

EXTRA-CURRICULARS

- Runner-up in Tennis at the Inter-BITS Sports Tournament 2018.
- Member of Tennis team, BITS Pilani, Goa
- Captain of Tennis and Table-Tennis teams, National Public School Koramangala, Bangalore