

# MOHIT KULKARNI

Sophomore Undergraduate  
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## EDUCATIONAL QUALIFICATIONS

Year	Degree	Institution(Board)	CGPA/%
July'19 – June'23 (expected)	B.S., Mathematics	Indian Institute of Technology, Kanpur	8.3/10.0
2019	SSC – XII	Vidyadham Junior, Aurangabad	87.8%
2017	ICSE – X	Podar International School, Aurangabad	95.6%

## INTERESTS

**Open Source, Computational Neuroscience, Robotics, Image Processing, Machine Learning, AGI**

## SKILLS

**Prog. Language:** C, C++, Python, Java, Bash  
**Web:** HTML, CSS, JavaScript, Jekyll  
**Utilities:** OpenCV, ROS, Brian2, PyTorch, Tensorflow, Gazebo, Makefile, Git, MATLAB, L<sup>A</sup>T<sub>E</sub>X

## ACHIEVEMENTS

- AIR 615, JEE Advanced - 2019, amongst 200,000 candidates
- AIR 637, JEE Main - 2019, amongst 1.2 million candidates
- Awarded INSPIRE scholarship by Department of Science and Technology, Government of India,
- Selected for the National Undergraduate Program at Chennai Mathematical Institute,

## POSITIONS OF RESPONSIBILITY

### Robotics Club, IIT Kanpur

- Secretary* April'20 - Present
- Part of team responsible to suggest and execute ideas to increase participation in robotics related activities.
  - Worked along side 25 people to develop curriculum for a Robotics Summer Camp.
  - Conducted lectures on Raspberry Pi, NodeMCU and on Sensors and Actuators in Robotics.

### National Service Scheme

- Student Volunteer* August'19 - May'20
- Taught Computer and Digital Literacy to Underprivileged students in rural parts of India

## CAMPS AND WORKSHOPS

### Neuromatch Academy 2020

- An online school for Computational Neuroscience* July'20
- A 15 day 15 topics intensive workshop where we were introduced to various methods and principles in Computational Neuroscience.
  - Worked alongside 7 participants and a TA

### Vijyoshi Camp 2019

- IISER, Kolkata* Dec'20
- Selected for the National Science Camp funded by the Department of Science and Technology, India
  - Interacted with Leading Researchers from various fields of science.

## RELEVANT COURSES

Introduction to Programming  
Introduction to Electronics<sup>1</sup>  
Linear Algebra and ODE  
Sequence Models\*

Real Analysis  
Set Theory and Mathematical Logic<sup>1</sup>  
Classical Mechanics  
Introduction to Tensorflow\*

Foundations of Cognitive Science<sup>1</sup>  
Algorithmic toolbox\*  
Neural Networks and Deep Learning\*  
Convolutional Neural Networks\*

(<sup>1</sup>): Ongoing Courses    (\*): Coursera online course

## PROJECTS

### The Omniglot Project

- Brain and Cognitive Society, IIT Kanpur* May'20 - July'20 [Github](#)
- This project was aimed at understanding and solving the problem of one-shot learning.
  - Implemented SOTA meta-learning models to solve one-shot classification and generative problem.
  - Used architectures like GANs, VAEs, LSTMs and bayesian statistics to develop models in PyTorch.

### Autonomous Humanoid(AUTOMI)

- Team Humanoid, IIT Kanpur* Sep'19 - Present [Github](#)
- Involved in the development of a complete, highly optimised software stack for AUTOMI.
  - AUTOMI v1 is designed for autonomous navigation in a static environment using techniques like depth estimation, SLAM, object recognition, avoidance, lane detection etc.
  - The software stack is based on ROS, with image processing using OpenCV.

### DumE

- Robotics Club, IIT Kanpur* May'20 - July'20 [Github](#)
- The aim was to create a Robotic arm that mimicks human arm, particularly useful in high precision environments.
  - The simulation was based on ROS and Gazebo, with arm detection using custom joint detection algorithms.
  - Secured the Best Innovation Award from amongst 50 summer projects under Science and Technology Council, IITK .

### Following Sub-Population Signals

- Mentor: Prof. James Murray, University of Oregon* July'20 [Github](#)
- The goal was to reveal more insights about the connection between different brain areas and how the sub-populations communicate, like order of firing of specific neuronal type, and the correlation between order of firing between different brain regions.
  - This analysis was performed on Steinmetz dataset, as a part of Neuromatch Academy 2020.
  - Techniques such as Granger Causality, PCA, dPCA, Markov Models were used.

### PETcat

- Robotics Club, IIT Kanpur* April'20 - Present [Github](#)
- Aimed at developing a biologically inspired robotic cat.
  - Simultaneous Localization and Planning Algorithms like orb-SLAM, gmapping, roVIO were implemented and benchmarked.
  - Currently involved in optimization of software stack using storage optimization, multi-threading etc.