

---

**EDUCATION**

---

- **Indian Institute of Technology, Roorkee** Roorkee, India  
*Bachelor of Technology in Electronics and Communication Engineering; GPA: 8.36/10.0* July.2016 - Present

---

**RESEARCH EXPERIENCE**

---

- **Undergraduate thesis** Shanghai, China  
*Supervised by Dr Lu Hongtao and Dr Debasis Ghosh* August 2019 - Present
  - Undergraduate thesis; partly being carried out at Shanghai Jiaotong University
  - Studying the problem of continual learning in neural networks and the problem of catastrophic interference
  - Specifically interested in a setting where the information signal from the task boundaries is not made available to the model beforehand
- **Research Project** Roorkee, India  
*Dr Partha Pratim Roy* September 2018 - December 2018
  - Worked on the problem of text detection from images especially text inclined at an angle
  - Experimented with an approach which could learn a more general quadrilateral shape instead of a regular rectangular bounding box by introducing parameters to offset the co-ordinates of a rectangular bounding box
  - Designed experiments to test this idea against the present state of the art approaches in text detection
- **Research Project** Roorkee, India  
*Dr Biplab Banerjee* December 2017 - February 2018
  - Designed and conducted experiments on various architectures that were based on the idea of Siamese neural networks
  - Conducted an extensive literature survey over the problem of stereo vision

---

**INTERNSHIPS**

---

- **BCMI Lab, SJTU** Shanghai, China  
*Supervised by Dr Lu Hongtao* May 2018 - July 2018
  - Studied the literature on the then state of the art object detection networks
  - Performed a comparative study on two-stage and one-stage object detectors to determine the advantages and disadvantages of each approach
  - Put together an implementation of Mask R-CNN to gain a better understanding of some of the ideas introduced in that particular paper
- **American Express** Bengaluru, India  
*Machine Learning Engineer* May 2019 - July 2019
  - Involved in the development of architectures based on CNN's as an alternative to the RNN based architectures; effort to achieve better performances in terms of time and speed
  - Implemented a CNN model using the principles established in Neural Ordinary Differential Equations; established the initial benchmarks for this model to motivate further internal research
  - Proposed a change in the data preparation strategy which led to a significant increase over the previously established in-house benchmarks

## PROJECTS

---

### ○ **ExpertNet-PyTorch**

[\[link\]](#)

- Implemented and open-sourced the ideas presented in the CVPR 2017 paper "Expert-gate: Lifelong learning with a network of experts"
- Designed and conducted experiments to enable testing these ideas on a lower scale (in terms of the size of the datasets used and computational resources required)

### ○ **MaS-PyTorch**

[\[link\]](#)

- Implemented and open-sourced the ideas presented in the ECCV 2018 paper "Memory Aware Synapses: Learning what (not) to forget"
- Minimized the redundancies present in the author's implementation

### ○ **Mask RCNN**

[\[link\]](#)

- Worked on developing an open sourced version of Mask R-CNN built using PyTorch
- Was a part of GitHub Trending when released to the public

### ○ **PredictX: Open Health Hackathon**

[\[link\]](#)

- A recommender system that the team built which predicted colleges (among a limited number of options) and grades using the datasets of the students from Kaggle
- Trained model gave a commendable accuracy of 77.6 % on the predictions made. Model was also substantially resistant to outliers

### ○ **Course Project: Computer Architecture**

[\[link\]](#)

- Developed an implementation of a 24 bit RISC processor in Verilog
- Used a self developed Instruction Set Architecture
- Optimized performance by implementing necessary pipelining protocols

### ○ **Course Project: Digital Image Processing**

[\[link\]](#) [\[report\]](#) [\[slides\]](#)

- Implemented and open sourced the ideas presented in the paper "When sparsity meets low-rankness: Transform learning with non-local low-rank constraint for image restoration" in Python
- Developed an experimental procedure to prove the solution of the optimization equation proposed and used by the authors

### ○ **Optical Character Recognition for the submission of forms**

[\[link\]](#)

- Part of a team responsible for the development of a module that could recognize the package number (delivery services) using convolutional neural networks

### ○ **Steps: Smart India Hackathon**

[\[link\]](#)

- Developed a chatbot for a proposed platform for startups and investors to enable direct communication regarding funding between the interested parties

## RELEVANT COURSES (INCLUDING ONLINE)

---

- **CS231N:** CNNs for Visual Recognition; Stanford course by Dr Andrej Karpathy
- **Reinforcement Learning:** UCL course by Dr Dave Silver
- **deeplearning.ai:** Coursera courses by Dr Andrew Ng
- **Digital Image Processing:** Part of coursework at IIT Roorkee
- **Linear Algebra:** Part of coursework at IIT Roorkee

## ACHIEVEMENTS

---

- **ComedK 2016:** Ranked 3 among a pool of more than ten thousand applicants for the examination
- **JEE Advanced 2016:** Ranked 1247 among a pool of hundred thousand applicants for the examination
- **Smart India Hackathon:** The team made it to the final round alongside 250 other teams selected nation-wide

## PROGRAMMING SKILLS

---

◦ **Languages:** Python, C++, Verilog

**Technologies:** PyTorch, Keras, Tensorflow, Git, Linux