

# NIRANJAN RAJESH

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## EDUCATION

### Ashoka University

Postgraduate Diploma in Advanced Studies (DipASR) - Advanced Major

- Capstone Project and Thesis in Machine Learning

Bachelor of Science (Hons.) - Computer Science

- Graduated Magna Cum Laude with a 3.86 GPA

Haryana, India

Aug 2023 – Present

Aug 2020 – May 2023

## WORK EXPERIENCE

### Undergraduate Teaching Assistant

Computer Science Department, Ashoka University

- Assisted in 4 core Computer Science courses:
  - \* Introduction Computer Programming
  - \* Data Structures
  - \* Introduction to Machine Learning
  - \* Natural Language Processing
- Conducted weekly office hours and discussion sections to teach and guide students
- Managed course logistics including grading and setting exam papers
- Student Feedback: 4.7/5.0 (260+ students)

Jan 2022 – Present

Haryana, India

### Research Intern

Mphasis Lab for Computational Thinking and Trivedi School of Biosciences

- Employed Deep Learning techniques to analyse micro-environments in biopsy slides
- Conducted comprehensive literature review and model bench-marking
- Designed novel vision techniques to address class imbalance in histopathology data

April 2022 – May 2023

Haryana, India

### Full Stack Web Developer

Beyond Design Studio

- Served as one of the primary software developers for a design startup from day zero
- Engineered full stack mobile and web applications for companies and organisations
- Collaborated closely with peers from other departments to meet design requirements of clients

Sep 2020 – Jan 2022

Tamil Nadu, India

## RESEARCH EXPERIENCE

### CNN Manifold Identification | Prof. Venkat Ramaswamy, Prof. Debayan Gupta

in progress

- Analysing the underlying representational geometry within CNNs trained in Object Recognition
- Exploring manifold representation and disentanglement over hierarchical CNN layers
- Verifying CNN behaviour like adversarial robustness through the lens of manifolds

### NeuroCrypt Authentication System | Prof. Debayan Gupta

[in review]

- Developed an authentication system leveraging concepts from Cognitive Science
- Carried out literature review in Cryptography and conducted behavioural experiments
- Published work in the AAAI-22 Student Abstract and Poster Program [[link](#)]

### Developmental Pretraining for Image Classification Networks | Prof. Debayan Gupta

[arXiv]

- Conducted literature review in the field of Early Visual Development in infants
- Explored applications of insights from Developmental Psychology to Computer Vision
- Developed a phased pre-training approach for CNNs based on visual learning in infants

### Deep Learning in Histopathology | Prof. Subhasis Banerjee, Dr. Rintu Kutum

[website]

- Developed a suite of fine-tuned supervised CNNs for patch-level classification Biopsy Slide
- Explored unsupervised learning after several feature-extraction techniques
- Designed active learning algorithms to tackle annotation burden and class imbalance

### ML-based Analysis of Chemical Spectrograms | Prof. Debayan Gupta, Dr. Subhajyoti Chaudhuri

[report]

- Utilised ML algorithms to infer chemical features of a compound from its UV-vis spectra
- Evaluated viability of CNNs and Decision Trees on functional group classification

## OTHER ACTIVITIES

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### **IICSSS Tübingen 2023** | Computational Cognitive Science Summer School

- Presented a talk on brain-like CNNs and their consequences
- Won the ‘Cognitive Modelling of Human and LLM Data’ track in the Hackathon
- Engaged in workshops that covered Cognitive Modelling, Applied Machine Learning and Neuroscience

### **IEEE Ashoka Student Branch** | Chairperson (2023) and Founding Secretary (2022)

- Co-founded the official Student Branch of IEEE at Ashoka University
- Led a team of 30+ branch members and managed all branch affairs
- Organised and conducted technical workshops, fundraising events and research-oriented events

### **Neuromatch Academy 2021** | Computational Neuroscience Certification

- Learned emerging computational neuroscience tools and techniques
- Employed various machine learning models in the context of understanding brain activity
- Collaborated in a group project where Electrocorticography (ECoG) data was used to model visual perception

### **NEEV: The Community Engagement Club** | Curriculum Designer

- Designed weekly educational sessions for disadvantaged students in Sonipat
- Developed detailed lesson plans for Biology, Chemistry, Physics and Mathematics classes

## HONOURS AND AWARDS

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- Dean’s List for Academic Recognition (every semester) **2020-23**
- Teaching Assistant Excellence Award **2022**
- A-Levels High School Distinction **2020**
- HSK Mandarin Level 3 Proficiency **2018**
- Duke of Edinburgh International Award (Silver and Bronze) **2018**

## TECHNICAL SKILLS AND INTERESTS

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**Programming Languages:** Python, C/C++, R, MATLAB, Java, JavaScript, Typescript, Haskell, SQL, HTML/CSS, Assembly

**Human Languages:** English, Hindi, Malayalam, Tamil, French, Mandarin

**Tools and Libraries:** High Performance Computing, TensorFlow, PyTorch, scikit-learn, SciPy, Keras, OpenCV, pandas, NumPy, Matplotlib,  $\LaTeX$ , NodeJS, Hyperledger Fabric

**Interests:** Deep Learning, Neuroscience, Computer Vision, Computational Cognitive Science, Software Development, Community (TV- 2009)

## REFERENCES

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**Professor Debayan Gupta** | Assistant Professor of Computer Science, Ashoka University

**Professor Subhashis Banerjee** | Head of Computer Science Department, Ashoka University

**Professor Venkat Ramaswamy** | Assistant Professor of Computer Science, BITS Pilani University

**Professor Bittu K** | Associate Professor of Biology and Psychology, Ashoka University