Harish Rajagopal

Fourth Year Undergraduate
Computer Science and Engineering · Indian Institute of Technology Kanpur
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Educational Qualifications

Degree	Year	Institution/Board	CGPA/%
B. Tech	2016 - Present	IIT Kanpur	9.7/10.0
Sr. Secondary	2016	Maharashtra HSC	90.46%
Secondary	2014	Maharashtra SSC	93.6%

Academic Achievements

- Secured 7 **A⋆** grades across 6 semesters.
- Awarded **Academic Achievement Awards** for outstanding performance in 1st and 2nd years.
- Secured All India Rank of **185** in **JEE Advanced 2016**.
- Secured All India Rank of **205** in **JEE Mains 2016**.

Internships

- **Research Intern, NYU Tandon**
  May '19 - July '19
  - Researched robust image hashes that are immune to typical image transformations, while being sensitive to malicious image edits such as face swaps & deep fakes.
  - Developed a *framework* for testing against compression, contrast changes, gamma, blurring, warping.
  - Trained various network architectures on the *triplet loss* along with *mining* of examples for improved training.
  - Tested the networks against *adversarial attacks* such as *FGSM*, *Projected Gradient Descent*, *Boundary Attack*.
- **Research Intern (Remote), NYU Tandon**
  May '18 - July '18
  - Researched *differentiable plasticity* for *domain transfer* in images using Convolutional Neural Networks.
  - Improved *efficiency* in the temporal update rule for the *Hebbian weights* by using *transpose convolution*.
  - Achieved notable improvement in classification accuracy using full plasticity, when adapting models trained on the SVHN dataset for the MNIST dataset.
- **Intern, Machine Learning Team, New York Office of IIT Kanpur**
  May '17 - July '18
  - Developed an *online* text clustering model using a fully-online modification of the *DBSCAN* algorithm.
  - Implemented an *online* document vectorisation model using *Distributed Memory paragraph vectors*.
  - Developed a *Word2Vec* model to identify duplicate documents using *Word Mover's Distance* on word vectors.

Projects

- **Improving GANs through Test-Time Constraints**
  Jan '19 - Present
  - Pre-trained *Generative Adversarial Networks* (GANs) are fine-tuned using *interactive user input*.
  - The user provides edge sketches on the GAN's outputs, and a *difference-of-Gaussians* based loss is used to fine-tune it.
- **Multi-Agent GANs for Image Super-Resolution**
  Aug '18 - Dec '18
  - A *Multi-agent generalisation* of SRGAN inspired by MADGANs for image super-resolution in *TensorFlow*.
  - Four generators get the four corner sections of the input, and their outputs are joined to get the final image.
  - Each generator pairs with a discriminator, while a global discriminator acts on the final output.
- **Higher-Order Optimisation in Deep Learning**
  Sept '18 - Nov '18
  - Surveyed the use of *quasi-Newton methods* in deep learning.
  - Surveyed *Hessian-Free optimisation*, *AdaQN*, and *Sum of Functions Optimiser (SFO)*.
  - Benchmarked Hessian-Free optimisation on an MLP against the *Adam* and SGD optimisers in *TensorFlow*.
- **7th Inter-IIT Tech Meet (Silver Medal)**
  Dec '18
- **Compiler for Golang in Python**
  Jan '19 - Apr '19
- **6th Inter-IIT Tech Meet**
  Dec '17 - Jan '18
- **Reinforcement Learning in Atari Games**
  Jan '17 - July '17
- **Depression Therapy Chatbot**
  May '17 - July '17

Technical Skills

- **Programming Languages:** Python, Bash, C, C++, LaTeX, PHP, HTML+CSS, MySQL, Typescript
- **Software and Utilities:** TensorFlow, PyTorch, Keras, Numpy, Git, OpenCV, Hyperopt, Gensim, Ionic

Relevant Courses

Visual Recognition	Introduction to Machine Learning	Computational Cognitive Science
Probability and Statistics	Discrete Mathematics	Introduction to Linear Algebra (A⋆)
Algorithms II	Data Structures and Algorithms	Fundamentals of Computing (A⋆)