Girish Varma

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1 Career Summary

Education

PhD in Computer Science 2011 - 2015
School of Computer and Systems Sciences, **Tata Institute of Fundamental Research, Mumbai.**
Thesis advised by Prof. Prahladh Harsha on "Hardness of Approximate Coloring".

Masters in Computer Science 2008 - 2011
School of Computer and System Sciences, **Tata Institute of Fundamental Research, Mumbai.**
Thesis advised by Prof. Manoj Gopalkrishnan on "Uniform Sampling and Approximation using MCMC Methods".

Bachelor of Technology in Computer Science and Engineering 2004 - 2008
National Institute of Technology, Calicut.

Empolyment

Senior Project Scientist 2016 - Now
Machine Learning Lab, Kohli Center for Intelligent Systems, **IIIT Hyderabad**, Gachibowli.
Worked with Prof. C V Jawahar.

Postdoctoral Researcher 2015 - 2016
Faculty of Mathematics and Computer Science, **Weizmann Institute of Science, ISRAEL.**
Advised by Prof. Irit Dinur.

Fellowships & Awards

JTCF Novel Technology paper award for Amusement Culture Finalist at IROS, 2018

Best Runner-Up Award for a paper at CVPR Embedded Vision Workshop, 2018

Qualcomm Innovation Fellowship 2018 Finalist. Among 20 finalists out of 95 participating teams.

Dean's Postdoctoral Fellowship, Faculty of Math and Computer Science, Weizmann Institute, ISRAEL 2015 - 2016

Google India PhD Fellowship in Algorithms 2011 - 2015
Microsoft PhD Fellowship, 2011 (Declined)

Ranked 5th in the Kerala State Engineering Entrance Exam 2004

Internships & Visits

Weizmann Institute of Science, ISRAEL (3 months) 2014
Worked with Prof. Irit Dinur on Graph Product Testing.

Courant Institute, NYU (1 week) 2014
Worked with Prof. Subhash Khot on proving restricted versions of Unique Games Conjecture.

MPI Institute for Informatik, Saarbrucken (4 months) 2010
Worked with Prof. Kurt Melhorn and Prof. Vincenzo Bonifaci on a mathematical model of a Slime Mold solving a maze.

Google India (3 months) 2007
Development of a generic load testing platform for http based services. Used to test Google Map Maker servers.

2 Research

Citations: 161 · h-index: 6 · i10-index: 4 · Link to Google Scholar Profile

Publications in Theoretical Computer Science

— Journal —

Super-polylogarithmic hypergraph coloring hardness via low-degree long codes. Venkat Guruswami, Prahladh Harsha, Johan Håstad, Srikanth Srinivasan & Girish Varma. *SIAM Journal on Computing* **(SICOMP)**, *2016.*

Physarum can compute shortest paths. Vincenzo Bonifaci, Kurt Mehlhorn, & Girish Varma. *Journal of Theoretical Biology* **(JTB)**.

Streaming algorithms for some language recognition problems. Ajesh Babu, Nutan Limaye, Jaikumar Radhakrishnan & Girish Varma. *Theoretical Computer Science Journal* **(TCS)**. **Invited Paper.**

Reducing uniformity in Khot-Saket hypergraph coloring hardness reductions. Girish Varma. *Chicago Journal of Theoretical Computer Science* **(CJTCS)**, *2015(3).*

A Characterization of hard-to-cover CSPs. Amey Bhangale, Prahladh Harsha & Girish Varma. *Theory of Computing Journal* **(ToC)**.

— Conference —

Super-polylogarithmic hypergraph coloring hardness via low-degree long codes. Venkat Guruswami, Prahladh Harsha, Johan Håstad, Srikanth Srinivasan & Girish Varma. *In Proc. 46th ACM Symp. on Theory of Computing* **(STOC'14)**.

Physarum can compute shortest paths. Vincenzo Bonifaci, Kurt Mehlhorn, & Girish Varma. *Sym. on Discrete Algorithms* **(SODA'11)**.

On Fortification of Projection Games. Amey Bhangale, Ramprasad Saptrishi, Rakesh Venkat & Girish Varma. *Randomized Algorithms* **(RANDOM'15)**.

A Characterization of hard-to-cover CSPs. Amey Bhangale, Prahladh Harsha & Girish Varma. *Computational Complexity Conference* **(CCC'15)**.

Derandomized graph product results using the low degree long code. Irit Dinur, Prahladh Harsha, Srikanth Srinivasan & Girish Varma. *Symp. on Theoretical Aspects of Computer Science* **(STACS'15)**.

Streaming algorithms for some language recognition problems. Ajesh Babu, Nutan Limaye, Jaikumar Radhakrishnan & Girish Varma. *Theory and Applications of Models of Computation* **(TAMC'10)**.

— Thesis —

Hardness of Approximate Coloring. Girish Varma. *Ph.D. Thesis with guidance of Prof. Prahladh Harsha,* **TIFR, Mumbai.**

Approximate Counting, Uniform Generation and Rapidly Mixing Markov Chains. Girish Varma. *MS. Project Report with guidance of Dr. Manoj Gopalkrishnan,* **TIFR, Mumbai.**

— Unreviewed Manuscripts —

Playing games in an uncertain world. Manoj Gopalkrishnan & Girish Varma. arXiv.

Conductance and Eigenvalue. Girish Varma. arXiv.

Publications in Machine Learning and Computer Vision

Deep Expander Networks: Efficient Deep Networks from Graph Theory. Girish Varma*, Ameya Prabhu*, & Anoop Naboothiri. *European Conference on Computer Vision* **(ECCV'18)**, *2018.* **Oral Presentation** (**4%** acc. rate).

Improved Visual Relocalization by Discovering Anchor Points. Soham Saha, Girish Varma & C V Jawahar. *British Machine Vision Conference* **(BMVC'18)**, *2018.* **Spotlight Presentation** (**10%** acc. rate).

Cityscale Road Audit System using Deep Learning. Sudhir Kumar, Girish Varma & C V Jawahar. *International Conference on Intelligent Robots* **(IROS'18)**, *2018.* **JTCF Novel Technology paper award for Amusement Culture Finalist.** Was featured in local print media The Hindu, Times of India etc.

IDD: A Dataset for Exploring Problems of Autonomous Navigation in Unconstrained Environments.. Girish Varma, Anbumani Subramanian, Anoop Namboodiri, Manmohan Chandraker, C V Jawahar. *IEEE Winter Conf. on Applications of Computer Vision* **(WACV'19)**.

Efficient Semantic Segmentation using Gradual Grouping. Nikitha Varullapalli, Sriharsha Annameni, Girish Varma, Manu Mathew, Nagori Soyeb & C V Jawahar. *CVPR, IEEE Embedded Vision Workshop, 2018.* **Best Runner-Up Award, Oral Presentation**.

Class2Str: End to End Latent Hierarchy Learning. Girish Varma*, Soham Saha* & C V Jawahar. *24th International Conference on Pattern Recognition* **(ICPR'18)**, *2018.*

Compressing Deep Neural Networks for Recognizing Places. Soham Saha, Girish Varma, & C V Jawahar. *Asian Conference on Pattern Recognition* **(ACPR'18)**, *2018.* **Spotlight Presentation.**

— Under Review/Ongoing —

Universal Semi-supervised Semantic Segmentation. Tarun Kalluri, Girish Varma, Manmohan Chandrakar & C V Jawahar. Under review.

Industry Projects

Intel Bangalore. Data Sets for Autonomous Navigation Research in Indian Traffic Conditions · PI's: Prof. C V Jawahar, Prof. Anoop M. Namboodiri · Involved creating a semantic segmentation/detection dataset for Indian road scenes. I authored the dataset specifications containing label hierarchy and definitions. A statistical analysis of the labels was done and the train/test/validations sets where decided. A challenge was conducted as ECCV'18 with participants from industry/academia from across the globe. A dataset paper with comparisons with other similar datasets was prepared.

Texas Instruments Bangalore. Model Compression for Semantic Segmentation · PI: Prof. C V Jawahar · Conducted 2 workshops of 1 day each on semantic segmentation and model compression for researchers from TI. A report of runtime and memory analysis of semantic segmentation models was share with TI. Based on the report, we focused on designing efficient CNNs for semantic segmentation. A research paper was published at CVPR IEEE Embedded Vision Workshop (won the Best Runners Up Award).

Reviewing, Workshops, Challenges, Research Events Organized

Member of PC for AMAS'19, AAAI'19, IJCAI'18, Auto. Nav. in Unconstrained Environments Workshop, ECCV '18.

Scene Understanding Challenge for AutoNUE, ECCV'18.

Tutorial on Computer Vision for Autonomous Navigation at NCVRPRIPG '17.

Autorickshaw Detection Challenge at NCVPRIPG '17.

3 Teaching

Courses

Foundations of AI and ML Jan, 2018
5 Lectures out of a 15 lecture course co-taught with Prof. C V Jawahar and Prof. Anoop Namboothiri · 400 participants with 5-15 years experience in Industry · Prepared reading material.

Complexity Theory Jan, 2017
13 Lectures · 110 Students · Course Notes and Assignements Available Online
A Student got selected for VSRP (fully supported internship program) at TIFR, Mumbai in Complexity Theory

Reading Groups/Independent Study

Reinforcement Learning July 2018
2 Students

Efficient CNNs Jan 2018
6 Students · Participants published 2 papers on Efficient CNNs

Matrix Sparsification Techniques for Model Compression July 2017
1 Student · Resulted in a publication on using Expander Graphs for Model compression

Multi-Object Tracking Jan 2018
4 Students

Computer Vision: Recent Developments Jan 2017

Short Term Courses and Schools

Summer School on Machine Learning and Computer Vision July 2018
2 weeks School · 250 participants mostly PhD students, but also some industry and faculty · Gave 2 Talks and labs

Deep Learning and Applications April 2018
AICTE funded training program at CET, Trivandrum · Gave 4 Lectures and 2 Labs in a 1 Week Program ·

Summer School on Machine Learning and Computer Vision July 2017
2 weeks School · 250 participants mostly PhD students, but also some industry and faculty · Gave 6 Talks

Winter School on Deep Learning Dec 2016
1 week school mostly aimed at industry participants · Gave 3 talks

Training programs for Industry Leadership in Microsoft, Amazon

Guiding

Soham Saha · MS student co-advised with Prof. C V Jawahar · Currently Data Scientist at Flipkart · Published 3 papers including one that got selected for Spotlight presentation at BMVC'18.

Ameya Prabhu · MS student co-advised with Prof. Anoop Namboodiri · Published 1 paper at ECCV'18 that was selected for oral presentation.

Sudhir Yarram · Intern co-advised with Prof. C V Jawahar · Accepted for PhD program at UIUC · Published 1 paper at IROS'18 that got selected as JTCF Novel Technology paper award finalist.

Nikitha Vallurpalli · MS student co-advised with Prof. C V Jawahar · Published 1 paper at Embedded Vision Workshop CVPR'18 that got selected for Best Runners Up Award.