Govinda M. Kamath

Present Position

Doctoral Candidate, Department of Electrical Engineering, Stanford University.

Contact Information

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Research Objectives

To develop computationally feasible methods which have good theoretical grounding to solve practical problems in statistics.

Positions Held

Machine Learning Resident **July 2018 – September 2018**
Google X Development LLC, Mountain View, California

Research Intern **June 2017 – September 2017**
Microsoft Research,Bangalore, India
- Worked on block models in a semi-random model

Research Intern **June 2016 – September 2016**
Theory Group
Microsoft Research,Redmond, Washington, USA
- Worked on DNA storage project. Worked on trace reconstruction and did some data analysis.

Research Associate **August 2012 – May 2013**
Codes and Signal Design Lab, Department of Electrical Communication Engineering,
Indian Institute of Science (IISc), Bangalore, India
- Project : Codes for Distributed Storage.
- Funded by Netapp inc.

Education

Doctoral Candidate **June 2014 – Present**
Department of Electrical Engineering,
Stanford University, United States of America.
- Relevant Coursework (Credited) : Algorithms, Theory of Statistics, Introduction to compressed sensing, Statistical Learning theory, Optimization and Algorithmic Paradigms, Inference Estimation and Information Processing, Randomised Algorithms, Algorithmic Aspects of Machine Learning.
- GPA: 4.1/4.0

Doctoral Candidate **August 2013– May 2014**
Department of Electrical Engineering and Computer Science,
University of California, Berkeley, United States of America.
- Relevant Coursework : Convex Optimisation, *Seq: Methods and Applications.
- GPA: 4.0/4.0

Master of Engineering (M.E.) **August 2010 – July 2012**
Codes and Signal Design Lab, Department of Electrical Communication Engineering,
Indian Institute of Science (IISc), Bangalore, India
- Specialization: Telecommunications.

- Relevant Coursework (Credited): Random Processes, Communication Networks, Digital Communication, Error Correcting Codes, Wireless Communication, Information Theory, Detection and Estimation, Space Time Signal Processing and Coding, CDMA Systems and Multi-user Detection, Algebra, Linear Algebra.
- Relevant Coursework (Audited) : Topics in Information Theory and Coding, Graph Theory and Combinatorics, Analysis I.
- CGPA: 8.0/8.0
- M.E. Thesis: On codes for Distributed Storage and Locality of Error Correction.
- Thesis Grade: 8.0/8.0
- Class Rank : 1/28

Bachelor of Technology (B.Tech.) **August 2006 – May 2010**
Department of Electronics and Communication Engineering ,
National Institute of Technology - Karnataka (NITK), Surathkal, Mangalore, India

- Specialization: Electronics and Communication Engineering
- B.Tech. Project: Energy Efficient Modulation and Coding Schemes for Wireless Sensor Networks
- CGPA: 9.67/10.00
- Class Rank 1/74

Publications

Preprints

- Vivek Bagaria*, Govinda M. Kamath*, David N. Tse, "Adaptive Monte-Carlo Optimization", Submitted to NIPS 2018. Preprint at `https://arxiv.org/abs/1805.08321`

  * co-first authors

Journal

- Lee Organick, Siena Dumas Ang, Yuan-Jyue Chen, Randolph Lopez, Sergey Yekhanin, Konstantin Makarychev, Miklos Z Racz, Govinda M. Kamath, Parikshit Gopalan, Bichlien Nguyen, Christopher Takahashi, Sharon Newman, Hsing-Yeh Parker, Cyrus Rashtchian, Kendall Stewart, Gagan Gupta, Robert Carlson, John Mulligan, Douglas Carmean, Georg Seelig, Luis Ceze, Karin Strauss "Scaling up DNA data storage and random access retrieval", Nature biotechnology . Available at `https://www.nature.com/articles/nbt.4079`

  This was a large project that I was a part of as an intern at MSR, Redmond. My work was mainly in analysing the data, modelling and characterising the storage channel.

- Govinda M. Kamath*, Ilan Shomorony*, Fei Xia*, Thomas A. Courtade, and David N. Tse, "HINGE: Long-Read Assembly Achieves Optimal Repeat Resolution." Genome research. 2017 May 1;27(5):747-56. Available at: `http://genome.cshlp.org/content/27/5/747.full.pdf`

  Code at: `https://github.com/HingeAssembler/HINGE`

  Analysis at: `https://github.com/HingeAssembler/HINGE-analyses`

  * co-first authors

- Vasilis Ntranos*, Govinda M. Kamath*, Jesse Zhang*, Lior Pachter, and David N. Tse, "Fast and accurate single-cell RNA-Seq analysis by clustering of transcript-compatibility counts", published in Genome Biology special issue on single cell omics.Available at `http://genomebiology.biomedcentral.com/articles/10.1186/s13059-016-0970-8`.

  Analysis at `https://github.com/govinda-kamath/clustering_on_transcript_compatibility_counts`

  * co-first authors

- Govinda M Kamath, Narayanamoorthy Prakash, Lalitha Vadlamani, and P Vijay Kumar."Codes with Local Regeneration and Erasure Correction". in IEEE Transactions on Information Theory, June 2014. available at `http://arxiv.org/abs/1211.1932`.

Conference

- Vivek Bagaria*, Govinda M. Kamath*, Vasilis Ntranos*, Martin Zhang*, David Tse, "Medoids in almost linear time via multi-armed bandits",presented at AISTATS-2018, available at `http://proceedings.mlr.press/v84/bagaria18a/`.

  * co-first authors
- Yuxin Chen, Govinda M. Kamath, Changho Suh, and David Tse, "Community Recovery in Graphs with Locality", published in International Conference on Machine Learning - 2016 (ICML - 2016). Online at `http://jmlr.org/proceedings/papers/v48/chena16.pdf`.
- Ilan Shomorony, Govinda M. Kamath, Fei Xia, Thomas A. Courtade, and David N. Tse, "Partial Assembly: A Rate-Distortion Perspective", published in IEEE International Symposium of Information Theory - 2016 (ISIT- 2016). Preprint at `https://arxiv.org/abs/1605.01941`
- Govinda M Kamath, Eren Sasoglu, and David Tse. "Optimal Haplotype Assembly from High-Throughput Mate Pair Reads", published in Proceedings of IEEE International Symposium of Information Theory - 2015 (ISIT 2015), Hong Kong. Preprint at `http://arxiv.org/abs/1502.01975`
- Govinda M Kamath, Narayanamoorthy Prakash, Lalitha Vadlamani, and P Vijay Kumar."Codes with Local Regeneration". to be published in *Proceedings of IEEE International Symposium of Information Theory - 2013 (ISIT 2013)*, Istanbul, Turkey.
- Govinda M Kamath, Narayanamoorthy Prakash, Lalitha Vadlamani, P. Vijay Kumar, Natalia Silberstein, Ankit S. Rawat, O. Ozan Koyluoglu, and Sriram Vishwanath, "Explicit MBR All-Symbol Locality Codes". to be published in *Proceedings of IEEE International Symposium of Information Theory - 2013 (ISIT 2013)*, Istanbul, Turkey. Preprint at `http://arxiv.org/abs/1302.0744`
- Narayanamoorthy Prakash, Govinda M Kamath, Lalitha Vadlamani, and P Vijay Kumar."Optimal Linear Codes with a Local-Error-Correction Property". in *Proceedings of IEEE International Symposium of Information Theory - 2012 (ISIT 2012)*, Cambridge, Massachusetts, USA.
- Govinda M Kamath and P Vijay Kumar. "Regenerating codes: a reformulated storage-bandwidth trade-off and a new construction."in *Proceedings. of the National Conference on Communication 2012 (NCC 2012)*, IIT Kharagpur, India.
- Lalitha Vadlamani, Narayanamoorthy Prakash, Govinda M Kamath, and P Vijay Kumar. "On t-designs and bounds relating query complexity to error resilience in locally correctable codes." in *Proceedings. of the National Conference on Communication 2012 (NCC 2012)*, IIT Kharagpur, India.

Scholastic Honors

- *Prof. SVC Aiya Medal* for best student of M.E. in telecommunications in the batch of 2012.
- *Meemamsi Award* for securing a CPA of 8.0/8.0 as an M.E. Student at Electrical Communication Engineering, Indian Institute of Science, Bangalore in 2010-2011.
- *Laxman Rao Kirloskar Prize* for best outgoing student of Electronics and Communication Engineering 2010 of National Institute of Technology- Karnataka (NITK).
- *Institute Gold Medal* for securing first rank in Electronics and Communication Engineering in National Institute of Technology- Karnataka (NITK) 2010.
- Graduate Aptitude Test in Engineering (GATE) 2010 : Rank 4 out of 104,291 applicants.
- Common Admission Test (CAT) 2009 : 99.07 percentile (around 250,000 applicants).
- All India Engineering Entrance Examination (AIEEE) 2006 : All India Rank 3350 (State Rank 50) out of 523,811 applicants.
- Karnataka State Common Entrance Test (CET) 2006 : Engineering Rank : 5, Medical Rank : 15 out of approximately 90,000 applicants.

Research Summary

My research during my Master's and time as a Research Associate has been mainly in the area of coding theory. The thrust of my work has been on the problem of characterising locality in codes, especially array codes, deriving bounds and constructing codes. The main application of such codes is in distributed storage. I also have done some work on coding for Hadoop and connections between coding theory and theoretical computer science.

Academic Activities

- Administrator of the lab compute server from May 2014 - present.
- Served as a reviewer for IEEE Transactions on Information Theory, IEEE Journal on Selected Areas of Communications, IEEE International Symposium on Information Theory and Workshop on Communications and Cryptography, IEEE International Symposium on Network Coding.
- Volunteer, organising committee, National Conference on Communication - 2011, IISc, Bangalore, 28-30 January 2011.

Date : 24 August 2018