Venkata Gandikota

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Summary

I am interested in well-motivated problems with algebraic flavor. My research so far has focused on near neighbor search and its variants on algebraic objects such as lattices and error-correcting codes.

Education

Ph.D. - Computer Science Advisor: Dr. Elena Grigorescu *May 2017*
Purdue University, West Lafayette, IN

M.S. - Computer Science *Dec 2012*
Purdue University, West Lafayette, IN

M.Sc. - Mathematics *May 2010*
BITS Pilani, Goa Campus, Goa, India

B.E. - Computer Science *May 2010*
BITS Pilani, Goa Campus, Goa, India

Publications

- *NP-Hardness of Reed-Solomon Decoding and the Prouhet-Tarry-Escott Problem*, Venkata Gandikota, Badih Ghazi, Elena Grigorescu. IEEE Symposium on Foundations of Computer Science (FOCS) 2016.
- *Nearly Optimal Sparse Group Testing*, Venkata Gandikota, Elena Grigorescu, Sidharth Jaggi, Samson Zhou. Proceedings of Allerton Conference, 2016.
- *Local Testing of Lattices*, Karthik Chandrasekaran, Mahdi Cheraghchi, Venkata Gandikota, Elena Grigorescu. Foundations of Software Technology and Theoretical Computer Science (FSTTCS) 2016.
- *Deciding Orthogonality in Construction-A Lattices*, Karthik Chandrasekaran, Venkata Gandikota, Elena Grigorescu. Foundations of Software Technology and Theoretical Computer Science (FSTTCS) 2015.
- *On the NP-hardness of Bounded Distance Decoding of Reed-Solomon Codes*, Venkata Gandikota, Badih Ghazi, Elena Grigorescu. IEEE International Symposium on Information Theory (ISIT) 2015.

Research Experience

- **Decoding Problems on Lattices and Error-Correcting Codes**
  Research Assistant at Purdue University, Aug 2013 - Present

  Studied the complexity of fundamental problems on lattices and error-correcting codes in two models of computation: the classical global model in which the algorithm can access its entire input, and local model in which the algorithm has partial access to its input via queries to entries of the input.

- **Approximate Nearest Neighbor Search using Lattices**
  Research Intern at CWI, Amsterdam, Aug - Nov 2016.

  Work in progress on approximate nearest neighbor search algorithm using data-independent Locality Sensitive Hashing. A space-efficient hash function is constructed using random lattices which is expected to achieve near optimal collision guarantees.

- **Optimization Framework for Load Management problem**
  Research Intern at IBM Research India, Bangalore, May - Aug 2012.

  Modeled the Non-Intrusive Load Management problem as an Integer Program (IP) based on certain assumptions about the load patterns of appliances. The IP assumes a pseudo-polynomial time dynamic programming solution which was analyzed using The Reference Energy Disaggregation Data Set (REDD) dataset.

- **NP Completeness of TaskLet Resilience**
  Research Intern at HP Labs India, Bangalore, Jan - May 2010.

  The problem of *TaskLet* (cloud based application designed at HP-Labs) *resilience* is to find a segment in a webpage which is closest to a given input segment according to an appropriate notion of distance. Proved NP-hardness TaskLet resilience by reduction from change-detection problem on unordered labelled trees.

- **Similarity of Websites with respect to a Tasklet**
  Research Intern at HP Labs India, Bangalore, Aug - Dec 2009.

  Semantic similarity of websites is a measure of how similar two websites are with respect to the semantics of the text content. Proposed an algorithm using ontologies to measure semantic similarity between websites. The results were published in IJEIT, Vol2, Issue 2, 184-192.

Teaching Experience

- TA for Undergraduate Numerical Methods, Discrete Mathematics, Cryptography at Purdue University.
- TA for Undergraduate Systems Programming, Java & Python Programming at Purdue University.
- Taught recitations and labs, prepared homework assignments, exams and taught some lectures.
- Undergraduate TA for Introduction to Abstract Algebra at BITS-Goa, India

Poster Presentations and Talks

- *Testing Membership in Lattices.* FSTTCS, Chennai, India. Dec 2016.
- *NP-Hardness of Decoding Reed-Solomon codes.* Microsoft Research India, December 2016.
- *NP-Hardness of Decoding Reed-Solomon codes.* N&O Seminar, CWI, Amsterdam. November 2016.
- *Testing Membership in Lattices.* Poster Session, Workshop on Local Algorithms, Oct 2016.
- *Testing Membership in Lattices.* Poster Session, Workshop on Algorithmic Coding Theory, June 2016.
- *Testing Membership in Lattices.* Poster Session, Sublinear-time Algorithms Workshop, Jan 2016.
- *Testing Membership in Lattices.* Indian Institute of Science (IISc), Bangalore, India. Dec 2015.
- *Deciding Orthogonality in Construction-A Lattices.* FSTTCS, Bangalore, India. Dec 2015.
- *Bridging Computation on Codes and Lattice.* Purdue University, West Lafayette, IN. Dec 2015.
- *NP-Hardness of decoding Reed Solomon Codes.* Purdue University, West Lafayette, IN. June 2015.

Research Internships

- Centrum Wiskunde & Informatica (CWI), Amsterdam, The Netherlands. *Aug-Nov 2016*
- IBM Research (IBM-IRL), Bangalore, India. *May-Aug 2012*
- HP-Labs, Bangalore, India. *Aug 2009 -May 2010*
- Tata Institute of Fundamental Research (TIFR), Bangalore, India. *May-Aug 2008*

Programming Skills

Python, Sage, Java, C

Awards and Honours

- Travel Grant for FOCS 2016.
- Graduate School Summer Research Grant in 2013.
- Travel Grant for STOC 2013, STOC 2014 and STOC 2016.
- Travel Grant for CCC 2013.

Relevant Coursework

Randomized Algorithms, Sublinear-time Algorithms, Numerical Linear Algebra, Mathematical Toolkit, Real Algebraic Geometry, Theory of Computation, Computational Complexity, Cryptography, Advanced Cryptology, Elliptic Curves and Cryptography