CURRICULUM VITAE

Srinivas Karthik V.

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EDUCATION

Ph.D. Indian Institute of Science, Bangalore, 2013 - Present
Department: Computer Science & Automation
CGPA: 6.5/8

M. Tech. Indian Institute of Technology, Bombay, 2009-2011
Department: Computer Science & Engineering
CGPA: 8.6/10

B. E. Bangalore Institute of Technology, Bangalore, 2005-2009
Department: Information Science & Engineering
Percentage: 77.6%

WORK EXPERIENCE

Software Engineer at IBM, India Research Lab, Bangalore, 2011 - 2013

RESEARCH INTERESTS

Database Systems (Query Processing and Optimization)

AWARDS and HONOURS

1. Received the **Best Student Paper Award** in 32nd IEEE International Conference on Data Engineering (ICDE), May 2016.
2. Best of IEEE ICDE 2016 research papers, **invited to IEEE TKDE** journal special issue.
3. **Invited talk** at COMAD and CoDS conference, March 2017.
4. Received the **Best Presentation Award** at EECS Symposium, IISc, April 2017.

RESEARCH EXPERIENCE

Ph.D. Thesis. (Ongoing) I.I.Sc., Bangalore, Aug'13 – Present

Title: "**Database Engine Design for Robust Query Processing**"
Advisor: Prof. Jayant Haritsa

The goal of the thesis is to find new query processing techniques that are robust in terms of bounding the worst-case execution times for queries. It is a folklore that there are queries for which the current optimizers could take orders of magnitude worst-case sub-optimal performance compared to the *idealized* systems. We proposed new algorithms called *SpillBound* (ICDE '16) and *AlignedBound* (TKDE '17), which provide platform-independent theoretical guarantees on the worst-case execution performance for a given user query. The proposed algorithms empirically collapse the enormous worst-case sub-optimality (upto a million!) of benchmark queries with contemporary query optimizers down to a single order of magnitude. Furthermore, in order to take the above algorithms towards practicality, we propose *dimension-reduction* techniques to handle complex queries and a low-overhead version of SpillBound to support ad-hoc queries (PVLDB '18). Finally, we build a machine learning based *taxonomer* to choose to the *best* query processing algorithm in a class for a given query instance.

Projects at IBM Research, India, Aug'11 - July'13

Title: "**Social Network Analysis: Inferring Network of Influence**"

The problem of Social Network Inference is to infer the structure of an unknown social network graph (say twitter network) based on observations of propagations of different contagions in the network. We introduced and proposed a solution to a variant of the network inference problem wherein these observed information are revealed in batches.

Title: "**Business Continuity and Resiliency in Organizations**"

The goal of the project was to develop software framework to help organizations reach advanced levels of resiliency, in the sense of rapidly adapting and responding to external dynamic changes. From the research front, we proposed algorithms for "recourse actions" in case of disruptions, and to find "high risk" points in a complex network having intricate dependency. I was part of development and deployment of a tool which captures the above mentioned.

M. Tech. Thesis. Indian Institute of Technology (I.I.T.) Bombay, Jun'10 - Jun'11

Title: "**Multi-type Exclusive Facility Location Problem**"
Advisor: Prof. Abhiram Ranade, I.I.T. Bombay
Reviewers: Prof. Ajit Diwan and Prof. Sundar Vishwanathan, I.I.T. Bombay

Facility Location problem is one of the most well studied problems in operations research. We proposed a generalization of the problem where every client needs to be facilitated with two types of facilities, instead of

one as in the former case. We gave two 7-approximation algorithms for the problem which were based on LP-Rounding and Primal-Dual techniques, respectively.

B. E. Thesis. Bangalore Institute of Technology, Bangalore, Aug'08 - Jun'09

Title: "**Hyperspectral Image Processing**"
Advisor: Dr. P. G. Diwakar, ISRO, Bangalore

The project dealt with design and implementation of classification algorithms on Hyperspectral images. As the name suggests, these images have high spectral resolution which are used to capture satellite images.

Teaching Experience

- Worked as a teaching assistant for *Algorithms and Complexity* course at I.I.T. Bombay, for which Prof. Abhiram Ranade was the instructor (Aug'10 - Dec'10).
- Worked as a teaching assistant for *Algorithms and Programming* course at I.I.Sc. Bangalore, for which Dr. Minati De was the instructor (Aug'16 - Dec'16).
- Worked as a teaching assistant for *Topics in Database Systems* at I.I.Sc. Bangalore, for which Prof. Jayant Haritsa was the instructor (Jan'18 - Apr'18). For the same instructor, worked as a teaching assistant for the *Database Systems* course on multiple occasions.

Research Publications

1. *Srinivas Karthik, Jayant Haritsa, Sreyash Kenkre, Vinayaka Pandit.*
A Concave Path to Low-overhead Robust Query Processing. In PVLDB Journal vol. 11, no. 13, pgs. 2183-2195, September 2018.
Link: www.vldb.org/pvldb/vol11/p2183-venkatesh.pdf

2. *Sanket Purandare, Srinivas Karthik, Jayant Haritsa.*
Dimensionality Reduction Techniques for Robust Query Processing. Under Submission.
Link: http://dsl.cds.iisc.ac.in/publications/report/TR/TR-2018-02.pdf

3. *Srinivas Karthik, Jayant Haritsa, Sreyash Kenkre, Vinayaka Pandit, Lohit Krishnan.*
Platform-independent Robust Query Processing. In IEEE Transactions on Knowledge and Data Engineering (TKDE), 2017. **(Invited Paper)**.
Link: http://ieeexplore.ieee.org/document/7843652/

4. *Srinivas Karthik, Jayant Haritsa, Sreyash Kenkre, Vinayaka Pandit.*
Platform-independent Robust Query Processing. In proceedings of 32nd IEEE International Conference on Data Engineering (ICDE), May 2016, Helsinki, Finland (Received the Best Student Paper Award).
Link: http://ieeexplore.ieee.org/document/7498251/

5. *Srinivas Karthik.*
   Robust Query Processing. In PhD Symposium of 32nd IEEE International Conference on Data Engineering (ICDE), May 2016, Helsinki, Finland.
   Link: http://ieeexplore.ieee.org/document/7495653/

6. *Ramakumar Pasumarthi, Srinivas Karthik, Ayush Choure, Vinayaka Pandit*. **Online network inference under dynamic cascade updates: A node-centric approach.** In proceedings of workshop on social networks at 6th IEEE International Conference on Communication Systems and Networks (COMSNETS) January 2014, Bangalore, India.
   Link: http://ieeexplore.ieee.org/document/6734938/

7. *Srinivas Karthik, Sreyash Kenkre, Krishnasuri Narayanam, Vinayaka Pandit*. **Recourse Aware Resource Allocation for Contingency Planning in Distributed Service Delivery**. In proceedings of 7th IEEE International Conference on Service Operations and Logistics, and Informatics (SOLI), July 2012, Suzhou, China.
   Link: http://ieeexplore.ieee.org/document/6273503/

8. *Srinivas Karthik, Sreyash Kenkre, Krishnasuri Narayanam, Vinayaka Pandit*. **Resiliency Analytics Framework for Service Delivery Organizations**. In proceedings of IEEE SRII Global Annual Conference, July 2012, San Jose, USA.
   Link: http://ieeexplore.ieee.org/document/6311053/

REFERENCES

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Prof. S. Sudarshan

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