

CURRENT PROFILE

Assistant Professor in the department of Computer Science and Engineering at the Indian Institute of Technology, Kanpur (March 2016 – present).

EDUCATION

Ph.D. Computer Science, Rensselaer Polytechnic Institute, Troy NY, USA (Jan 2007 - Aug 2011)
M.Tech. Computer Science and Engineering, IIT Bombay, India (Aug 2002 - June 2004)
B.E. Production Engineering, College of Engineering, Pune, India (July 1996 - June 2000)

RESEARCH WORK

Extending “Left Bit Right” for a larger fraction of SPARQL:

Currently working on extending the “Left Bit Right” algorithm (see below) for other SPARQL constructs, which can benefit from its novelty.

“Left Bit Right” – A novel memory efficient algorithm for SPARQL left-outer-joins:

This system is an extension of BitMat (see below), which combines the previously known classical left-outer-join and inner-join properties in a novel way, for handling the SPARQL OPTIONAL pattern queries, i.e., left-outer-joins.

Distributed query processing over large graphs:

As a part of the postdoctoral work at the University of Pennsylvania, worked on the design and development of a system for processing graph pattern queries using *view-based optimization* technique over a shared-nothing peer-to-peer query processing system.

BitPath – constrained reachability queries over large graphs:

As a part of the Ph.D. thesis, worked on the development of an algorithm for reachability queries with constraints on the edge labels on the path between given two nodes in a graph.

BitMat – A bit-matrix of RDF triples with a novel query processing algorithm:

BitMat, developed as a part of the Ph.D. thesis, indexes an RDF graph using compressed bit-vectors, and processes SPARQL Basic Graph Pattern (a.k.a. SQL inner-join) queries, using a 2-phase query processing algorithm. The algorithm guarantees tighter upper bounds on the memory consumption than the conventional join query processors.

PUBLICATIONS

- Jyoti Leeka, Srikanta Bedathur, Debajyoti Bera, Medha Atre: *Quark-X: An Efficient Top-K Processing Framework for RDF Quad Stores*, Intl. Conference on Information and Knowledge Management (CIKM), Indianapolis, IN, USA (to appear).
- Medha Atre: *For the DISTINCT Clause of SPARQL Queries*, Intl. Conf. on the World Wide Web Poster Track 2016, Montreal, Canada.
- Medha Atre: *Left Bit Right: For SPARQL Join Queries with OPTIONAL Patterns (Left-outer-joins)*, in ACM SIGMOD 2015, Melbourne, Australia.
- Medha Atre, Vineet Chaoji, Mohammed J. Zaki: *BitPath – Label Order Constrained Reachability Queries over Large Graphs*, Technical Report, March 13 2012, arXiv:1203.2886.
- Medha Atre, Vineet Chaoji, Mohammed J. Zaki, James A. Hendler: *Matrix “Bit”loaded: A Scalable Lightweight Join Query Processor for RDF data*, Intl. Conf. on the World Wide Web 2010, Raleigh NC, USA.
- Gregory Todd Williams, Jesse Weaver, Medha Atre, James A. Hendler: *Scalable Reduction of Large Datasets to Interesting Subsets*, Journal of Web Semantics, Special Issue: Science, Services, and Agents on the world wide web 2010 ([invited paper as an extension of the champion submission in Billion Triple Challenge at the International Semantic Web Conf. 2009, Washington DC, USA](#)).
- Medha Atre, James A. Hendler: *BitMat: A Main Memory Bit-matrix of RDF Triples*, SSWS workshop at the International Semantic Web Conf. 2009, Washington DC, USA.

- Seema Sundara, Medha Atre, Vladimir Kolovski, Souripriya Das, Zhe Wu, Eugene Chong, Jagannathan Srinivasan: *Visualizing Large-Scale RDF Data Using Subsets, Summaries, and Sampling in Oracle*, IEEE International Conference on Data Engineering 2010, Long Beach CA, USA.
- Medha Atre, Jagannathan Srinivasan, James A. Hendler: *BitMat: A Main-memory Bit Matrix of RDF Triples for Conjunctive Triple Pattern Queries*, International Semantic Web Conference, Posters and Demo track 2008, Karlsruhe, Germany (**winner of the 1st runner-up award**).

PATENT

- Medha Atre, Jagannathan Srinivasan, Seema Sundara: Data visualization with summary graphs (US-8126926-B2).

TEACHING

- CS698F – Advanced Data Management (Fall 2016)

PREVIOUS POSITIONS

University of Pennsylvania, Philadelphia PA, USA (Postdoctoral Researcher)

(October 2011 – June 2014):

Worked on the design and development of a system for processing graph pattern queries (SQL join queries on graphs) using a *view-based optimization* technique, over a distributed shared-nothing database system.

IBM T. J. Watson Research, Hawthorne NY, USA (Research Intern)

(Sept 2010 – November 2010):

Worked on building a distributed RDF graph store on top of Hadoop with an algorithm to process keyword queries for the discovery of associativity between graph nodes containing those keywords.

Oracle, Nashua NH, USA (Research Intern)

(May 2008 – August 2008):

Developed a graphical visualizer for very large RDF data, based on the concept of 3S – Subsets, Summaries, and Sampling. Speed, scale, and dynamic relationship discovery are the main aspects of this tool. US-8126926-B2 patent is issued for this work.

GS Lab, Pune, INDIA (Senior Member of Technical Staff)

(July 2004 - Dec 2006):

Implemented application layer network protocol decoders and analyzers. Reverse engineered the file transfer protocol in MSN messenger, and contributed to its open source documentation. Designed and developed a plugin for MS Exchange server, a file sharing IPv6 application, and a peer presence protocol for tunneling the IPv6 traffic through IPv4.

Persistent Systems Ltd, Pune, INDIA (Member of Technical Staff)

(Sept 2000 - July 2002):

Enhanced automated test-suits for the compliance verification of network servers like LDAP, WebDAV and Internet storage space providers. Enhanced an open source WebDAV client library Neon, and contributed to its open source development.

PROFESSIONAL ACTIVITIES

Workshop track co-chair – WWW 2016.

Program committee member – CIKM Research track 2016 ICDE Demo 2016, SIGMOD Demo 2015, ISWC (2009, 2013–2016).

External reviewer – KDD 2009, AAMAS 2009, ACM Transactions on Database Systems 2009.

Invited reviewer – the Journal of Information Processing and Management 2011, IEEE Transactions on Knowledge and Data Engineering (TKDE) 2011, 2012, 2013, and ACM Transactions on the Web (TWeb) 2013.

HONORS

- Ranked 6th in the third year of engineering in Pune University (among 150 students).
- Ranked 2nd in the second year of engineering in Pune University (among 150 students).
- Ranked 5th in Mumbai University's Secondary School examination held all over the state (among 200,000 students).