Amar Viswanathan Kannan

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I am a doctoral candidate at the Tetherless world Constellation, RPI and my advisor is James A. Hendler. I focus on reformulating large-scale Knowledge Graph Queries. I have worked extensively with Freebase, DBpedia, YAGO and they encompass information in the form of billions of triples ($\approx$ 23 billion with size $\approx$ 75 GB for DBpedia,YAGO alone). My research also enables finding *interesting, relevant and diverse* information from these Knowledge Graphs. I also work with Deborah McGuinness on Knowledge Graph Evaluation and Correction. In addition to this I have worked on the Watson UIMA Pipeline deployed at RPI to develop QA systems for Knowledge Graphs. In summary my interests can be broadly summed as the intersection of Knowledge Graphs, Natural Language Processing and Applied Machine Learning.

Research Interests

- Semantic Web, RDF, SPARQL, Ontologies, Knowledge Graph Evaluation
- Query Reformulation, Query Diversity, Search Result Diversity
- Natural Language Processing, Sentiment Analysis, Information Extraction, Question Answering
- Applied Machine Learning, Unsupervised Learning for Knowledge Graphs

Education

Academic

- **Rensselaer Polytechnic Institute** — **Troy, New York**
  PhD Computer Science , CGPA 3.7 — *2011–2018(Spring)*
- **Rensselaer Polytechnic Institute** — **Troy, New York**
  M.S. Computer Science , CGPA 3.9 — *2011–2017*
- **Anna University** — **Chennai, India**
  B.E. Computer Science, 84% with Distinction — *2003-2007*

Other Certifications

- **Udacity Nanodegree** — **Udacity,Online Verified Degree**
  Machine Learning Engineer — *2016–2017*

Employment

- **Rensselaer Polytechnic Institute** — **Troy**
  Research Assistant — *August 2012– current*
- **IBM T.J. Watson Research Center** — **Yorktown Heights**
  Summer Research Intern, ***Mentor: Dr.Geeth De Mel*** — *Summer 2015*
- **IBM T.J. Watson Research Center** — **Yorktown Heights**
  Summer Research Intern, ***Mentor: Dr.Kaoutar el Maghraoui*** — *Summer 2014*
- **Rensselaer Polytechnic Institute** — **Troy**
  Teaching Assistant, ***Data Structures*** — *August 2011– May 2012*
- **Infosys Technologies Limited** — **Bengaluru**
  Senior Systems Engineer, Infosys Labs — *October 2007– July 2011*

Research Projects

Academic

- **Pragmatics and Instance Data Aware Querying in Knowledge Graphs:** Fall 2014 - Current
  The focus of my work is on providing contextual reformulations to Knowledge Graph queries using a *Schema- and Data-Aware Framework*. The initial part of this work was selected at the AAAI Doctoral Consortium in 2016. You can find the talk at http://tinyurl.com/aaaidc16
- **Question Answering Systems, Watson and Beyond:** Fall 2013 - Summer 2014
  I developed an extension for the Watson QA pipeline to answer Knowledge Graph queries. We used a corpus of $\approx$ 8 billion triple statements to train our system. More details on the system at http://tinyurl.com/watsonrdf
- **Large Scale Text Analysis of International Open Government Metadata:** Summer 2013

I worked on the textual understanding of the metadata collected by the IOGDS project and analyzed the textual metadata using traditional Named Entity Recognition and Information Retrieval measures. The results were also presented in different visualizations developed using d3.js. The details can be found at http://tinyurl.com/logd2.

Other

- **Udacity & Coursera:** 2016-2017: In addition to regular research, I completed the Udacity Machine Learning Nanodegree research projects . For the nanodegree requirements I completed projects in Unsupervised Learning, Supervised Learning, Reinforcement Learning and basic Deep Learning. My capstone was on Sentiment Analysis. I also enjoyed Andrew Ng's Machine Learning and Deep Learning MOOC.

Awards

- **AAAI 2016:** SIGAI Doctoral Consortium Award
- **Finalist :** 3MT Three Minute Thesis at RPI's Gradaute Research Symposium 2016

Graduate Courses

- **Semantic Web:** Advanced Semantic Technologies, Ontology Engineering, Advanced Web Science, Semantic E-Science
- **Machine Learning:** Foundations of Data Science, Data Science, Database Mining
- **Natural Language Processing:** NLP with Watson, Knowledge Graphs from IE Text
- **Theory:** Analysis of Algorithms, Foundations of Network Science
- **Applied Math:** Linear Algebra, Numerical Computing

Skills

- **Programming Languages:** Proficient in: Java and Python,
- **Web Front-End:** XHTML, CSS, Bootstrap, jQuery, d3.js.
- **Ontology Development:** Protégé
- **Tools & Libraries:** NLTK, scikit-learn, numpy, pandas, jupyter, Stanford Natural Language Toolkit, Virtuoso, Apache Jena,

Publications

[Viswanathan et al., 2017]Viswanathan, A., Michaelis, J. R., de Mel, G. R., and Hendler, J. (2017). In context query reformulation for failing sparql queries. In *Ground/Air Multisensor Interoperability, Integration, and Networking for Persistent ISR VIII*.

[Rashid et al., 2017]Rashid, S., Viswanathan, A., Gross, I., Kendall, E., and McGuinness, D. (2017). Leveraging Semantics for Large-Scale Knowledge Evaluation. In *WebSci-17 Workshop on Industrial Knowledge Graphs*. **WebScience-17**.

[Viswanathan, 2016]Viswanathan, A. (2016). Pragmatic reformulation in knowledge graphs. In *AAAI-16 Doctoral Consortium*. **AAAI**.

[Viswanathan et al., 2016]Viswanathan, A., De Mel, G., and Hendler, J. (2016). Pragmatics and Discourse Knowledge Graphs. In *AAAI-16 Workshop on Symbiotic Cognitive Systems*. **AAAI**.

[Balakrishnan et al., 2013]Balakrishnan, R., Vasudevan, B. G., Viswanathan, A., Raghunathan, P. V., and Ravindran, U. (2013). Methods for analyzing user opinions and devices thereof. **US Patent App. 13/946,832**.

[Viswanathan et al., 2011]Viswanathan, A., Venkatesh, P., Vasudevan, B. G., Balakrishnan, R., and Shastri, L. (2011). Suggestion mining from customer reviews.

[Hussain et al., 2009]Hussain, T., Balakrishnan, R., and Viswanathan, A. (2009). Semantic wiki aided business process specification. In ***Proceedings of the 18th international conference on World Wide Web***, pages 1135–1136. ACM.

[Erickson et al.,]Erickson, J. S., Viswanathan, A., Shinavier, J., Shi, Y., and Hendler, J. A. Open government data: A data analytics approach. ***IEEE Intelligent Systems***, *number=5, pages=19–23, year=2013, publisher=**IEEE***.

Poster Presentations and Talks

2016

- Amar Viswanathan, Pragmatics Aware Querying in Heterogeneous Knowledge Graphs, Thirtieth AAAI Conference on Artifical Intelligence, Doctoral Consortium 2016, Phoenix, AZ (USA) 02/12/2016
- Amar Viswanathan, Geeth de Mel, James A .Hendler, Pragmatics and Discourse in Knowledge Graphs, Workshop on Symbiotic Cognitive Systems at the Thirtieth AAAI Conference on Artificial Intelligence, 2016, Phoenix, AZ(USA) 02/12/2016

2015

- Amar Viswanathan, Geeth de Mel, James A. Hendler, Pragmatic Query Reformulation and Answer Generation in Knowledge Graphs, IBM Cognitive Computing Symposium 2015, RPI, Troy, NY 11/09/2015. (Poster Session)
- Amar Viswanathan, Pragmatic Query Reformulation in Heterogeneous Knowledge Graphs, Intern Talk and Poster Session, 2015, IBM, Yorktown Heights, NY, 08/22/2015

2014

- Amar Viswanathan, Not Elementary, My dear Watson.."- Extending Watson for Question Answering on Linked Open Data, IBM Cognitive Computing Symposium 2014, IBM, Yorktown Heights, NY 10/30/2014 (Poster Session)
- Amar Viswanathan, Semi Supervised Pattern Summarization of Client Resolution Data, IBM Summer Intern Poster Event 2015, IBM, Yorktown Heights, NY, 08/22/2014 (Poster Session), Public talk on 08/06/2014

2013

- John Erickson, Amar Viswanathan, Josh Shinavier, Yongmei Shi, James A. Hendler, Text Analysis of International Open Government Data, NY State Health Data Codeathon, RPI, Troy, NY, 12/20,2013