

Ahmed R. Mahmood

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Research Interests

Big data, distributed data stream management systems, indexing, scalability and optimization of spatio-textual and spatio-temporal data management systems.

Education

- **Ph.D. Candidate**, Computer Science
Purdue University, West Lafayette, IN Fall 2011 - present
Thesis - Efficient query processing over spatial-keyword data *Advisor: Prof. Walid G. Aref.*
 - **M.Sc.**, Computer Science
Alexandria University, Alexandria, Egypt Jan 2011
Thesis - Defending against energy efficient data-link layer jamming attacks in Wireless Sensor Networks.
 - **B.Sc.**, Computer Science
Alexandria University, Alexandria, Egypt June 2006
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Awards

- First place winner, Student Research Competition, ACM SIGSPATIAL, USA, 2017
 - ACM SIGMOD Travel Award, USA, 2017
 - ACM SIGSPATIAL Travel Award, USA, 2016–2017
 - CS Teaching Fellow Program, Purdue University, USA, 2015-2016
 - Teaching Academy Graduate Teaching Award, Purdue University, USA, 2015
 - Raymond Boyce Graduate Teacher Award, Purdue University, USA, 2015
 - Faculty Certificate of Honor, Alexandria University, Egypt, 2001-2006
 - Prof. Naeem Abo Taleb prize for the top students of the Computer Science and Automatic Control department, Alexandria University, Egypt, 2006
 - National Scholarship for Academic Excellence, Egyptian Ministry of Higher Education 2001.
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Professional Experience

- *Research Assistant* *Purdue University, August 2011 - present*
Supervised by Prof. Walid G. Aref and contributed to the following projects:
 - **Tornado:** Designed and implemented an adaptive and a distributed streaming system for spatio-textual queries. Tornado uses spatio-textual indexes to achieve high throughput with minimal latency. Tornado is implemented in JAVA and extends Storm streaming system.
 - **The Trails-tree:** Designed and implemented a disk-based trajectory index for storing recent historical data. The Trials-tree is implemented in C++.
 - **The Palm-tree:** Designed and implemented a crowdsourcing-based index that uses human workers to index data. This project involves client-server web application for testing human worker behavior in task related to crowdsourcing indexing using GWT, MySQL.

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- **AQWA:** I collaborated in AQWA that is an adaptive and a distributed spatial system over Hadoop. My contributions include devising an efficient algorithm for measuring the workload across the Hadoop cluster.
 - **Software Developer** Purdue University, August 2011 - present
 - Assisted in building the *MyCs* system for the management of faculty and student information using python, javascript and JQuery.
Project website: <https://my.cs.purdue.edu/>
 - Worked as a research assistant in Purdue Cyber Center. Participated in the development of the CRIS project for automating research cycle. Involving Web application development using Dojo, JSP, Ajax, Spring, Hibernate and PostgreSQL.
Project website: <https://cris.cyber.purdue.edu/>
 - **Backend Engineering Intern** Yahoo! Inc., Sunnyvale, CA, USA, June 2014 - Aug 2014
 - Worked in developing Oozie workflows for big data processing using Pig latin.
 - **Applied Science Intern** Turn Inc., Redwood City, CA, USA, July 2013 - Sept 2013
 - Worked in Optimizing continuous aggregate queries over big data streams using the Storm streaming system.
 - **Software Engineer** Ejada, Egypt, October 2009 - July 2011
 - EJADA is a company that provides solutions for enterprises in the Middle East and North Africa. Worked in web application development using Java, GWT, and Oracle Database.

Published Articles

- **A. R. Mahmood**, W. G. Aref, and A. M. Aly : “*FAST: Frequency-Aware Indexing for Spatio-Textual Data Streams.*”, Full research paper to appear, ICDE 2018.
- **A. R. Mahmood**, and W. G. Aref: “*Streaming Big Spatial Data.*”, to appear, Encyclopedia of Big Data Technologies (Book Chapter).
- **A. R. Mahmood**: “*Tornado: A Distributed Spatio-Textual Stream Processing System.*”, to appear, SIGSPATIAL (2017), (Extended Abstract).
- **A. R. Mahmood**, and W. G. Aref: “*Query Processing Techniques for Big Spatial-Keyword Data.*” SIGMOD (2017), pp. 1777-1782 (Tutorial).
- **A. R. Mahmood**, W. G. Aref, A. M. Aly, and M. Tang: “*Atlas: On the Expression of Spatial-Keyword Group Queries Using Extended Relational Constructs.*” SIGSPATIAL (2016), pp.45-54.
- A. S. Abdelhamid, W. G. Aref, A. M. Aly, M. Tang, and **A. R. Mahmood**: “*Cruncher: Distributed In-Memory Processing for Location-Based Services.*” ICDE (2016), pp.1406-1409 (Demo).
- **A. R. Mahmood**, W. G. Aref, and S. Basalamah: “*Indexing with Crowds.*” Encyclopedia of Database Systems (2016), Springer (Book chapter).
- A. M. Aly, **A. R. Mahmood**, W. G. Aref, M. Ouzzani, M. S. Hassan, H. Elmeleegy, and T. Qadah, : “*AQWA: Adaptive Query-Workload-Aware Partitioning of Big Spatial Data.*” PVLDB (2015), pp.2062-2073.
- **A. R. Mahmood**, A. M. Aly, T. Qadah, E. Rezig, A. Daghistani, A. Madkour, A. S. Abdelhamid, W. G. Aref, M. S. Hassan, and S. Basalamah: “*Tornado: A Distributed Spatio-Textual Stream Processing Systems.*” PVLDB (2015), pp.2020-2023 (Demo).
- A. M. Aly, A. S. Abdelhamid, **A. R. Mahmood**, W. G. Aref, M. S. Hassan, H. Elmeleegy, and M. Ouzzani: “*A Demonstration of AQWA: Adaptive Query-Workload-Aware Partitioning of Big Spatial Data.*” PVLDB (2015), pp.2062-2073 (Demo).
- **A. R. Mahmood**, W. G. Aref, A. Aly, and S. Basalamah: “*Indexing Recent Trajectories of Moving Objects.*”, SIGSPATIAL (2014), pp.393-396 (Poster).

- **A. R. Mahmood**, W. G. Aref, E. Dragut, and S. Basalamah: “*The Palm-tree Index: Indexing with the crowd.*” DBCrowd (2013), pp. 26-31. (The First VLDB Workshop on Databases and Crowdsourcing).
- E. C. Dragut, P. Baker, J. Xu, M. I. Sarfraz, E. Bertino, A. Madkour, R. Agarwal, **A. R. Mahmood**, and S. Han: “*CRIS - Computational research infrastructure for science.*” International Conference on Information Reuse and Integration (2013), pp.301-308 (Invited paper).
- **A. R. Mahmood**, H. Aly, and M. El-Derini: “*Defending against Energy Efficient Link Layer Jamming Denial of Service Attack in Wireless Sensor Networks.*”, International Conference on Computer Systems and Applications (2011), pp.38-45.

Under preparation and review

- Paper: **A. R. Mahmood**, Sri Punni, and W. G. Aref: “*Spatio-Temporal Access Methods: a survey (2011 - 2017).*”
- Paper: **A. R. Mahmood**, A. Daghistani, A. M. Aly, W. G. Aref, M. Tang, S. Basalamah, and S. Prabhakar: “*Adaptive Processing of Spatial-Keyword Data Over a Distributed Streaming Cluster.*”
- Book Monograph : **A. R. Mahmood**, and W. G. Aref: “*Scalable Processing of Spatial-Keyword Queries.*”, Morgan and Claypool Monograph.

Teaching Experience

- *I received the Purdue Graduate Teacher Certificate (GTC)* December 2017
- *Instructor: Foundations of Computer Science (CS182)* Purdue University, Summer 2017
 - Class size: 71 students
 - TAs supervised: 3 TAs
- *Instructor (Teaching Fellow): Introduction to Algorithms (CS381)* Purdue University, Spring 2016
 - In the Purdue CS teaching fellowship, I shadowed a faculty member for one semester. Then I taught the course as the main instructor int the next semester.
 - Class size: 76 students
 - TAs supervised: 2 TAs
- *Teaching Assistant* Purdue University, Spring 2013-Fall 2015
 - Assisted in teaching undergraduate algorithms, data structures, and graduate databases courses
- *Teaching Assistant* Alexandria University - Egypt, Fall 2009 - Spring 2011
 - Assisted in teaching undergraduate courses at the department of Computer Science. Among the courses that I assisted in teaching: Digital Design, Programming, OOP, Operating Systems and Data Structures.

Service and Activities

- **Reviewer:** TODS Journal 2015, Alexandria Journal 2017
 - **External Reviewer:** SIGMOD 2017, TSAS 2017, VLDB 2016, MDM 2016, CIKM 2016, VLDB 2015
 - **Student Volunteer:** SIGSPATIAL 2016, ICDE 2014
 - **Treasurer** of the Egyptian Student Association, Purdue University ESAP, 2017
 - **Judge** at Purdue SURF Research Symposium, 2017
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Additional Information

- **Citizenship:** Egypt
- **Current Visa:** F1

References

- **Prof. Walid G. Aref**,
Computer Science Department
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- **Prof. Ahmed K. Elmagarmid**,
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