

# PEDRAM GHODSNIA

## Work Address:

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## RESEARCH INTERESTS

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**Current:** exploiting modern hardware in data processing. In particular, I am interested in effective use of solid state drives (SSDs), graphics processing units (GPUs), multi-core processors, SIMD instructions, and large memory in database systems

**Past:** web information retrieval, search engines, indexing structures, web crawling, distributed processing, and distributed databases

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## SUMMARY OF QUALIFICATIONS

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- Over eight years research experience in academia and seven years work experience in industry
- Two patents and 12 published research papers in refereed international journals and conferences
- Co-founder and business developer of a successful IT company with +50 employees
- Comprehensive experience in technical and administrative management and supervision
- Quick learner, self-motivated, organized and result-oriented

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## EDUCATION

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- **PhD in Computer Science**, *University of Waterloo, Canada* 2009-Present  
Title: Effective use of solid state drives in database systems  
Supervisor: Dr. Ken Salem  
GPA: A+
- **M.Sc. in Software Engineering**, *University of Tebran, Iran* 2005-2008  
Title: Performance improvement of search engines using analytical techniques of web graph  
Supervisor: Dr. Nasser Yazdani  
GPA: 18.58/20.00
- **B.Sc. in Computer Science**, *University of Tebran, Iran* 2000-2004  
Title: Robocup Soccer Simulation  
Supervisor: Dr. Haydeh Ahrabian  
GPA: 17.23/20.00 (top student)

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## GRADUATE LEVEL COURSES

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- **Credit Courses**  
Database Applications of GPU Computing, Distributed Information Systems, Parallel Algorithms in Scientific Computing, Advanced Logic in Computer Science, Search Engines: From Design to Implementation, Advanced Software Engineering, Advanced Databases, Advanced Operating Systems, Principles of Computer Network Design, Theory of Computer Science, Performance Evaluation of Computer Systems, Information Technology Management, Customer Relationship Management
- **Audit Courses**  
Introduction to AI, Machine Learning, Non-Traditional Database Systems, Cloud Computing, Machine Learning for Information Retrieval

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**RESEARCH EXPERIENCE**


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- **Research Assistant** 2009-Present  
 University of Waterloo, Canada, <http://cs.uwaterloo.ca>  
 Conducted research on a wide spectrum of topics, including
  - Effective use of SSDs in database systems
  - Query processing and optimization, caching, and external sorting
  - Parallel processing using GPUs
  - Cloud computing and MapReduce framework
  - Dynamic data allocation in replicated distributed systems
  - Search engine, information retrieval, and indexing methods
- **Research Assistant** 2006-2008  
 University of Tebran, Iran, <http://ece.ut.ac.ir>  
 Conducted research on web information retrieval, with particular emphasis on
  - Ranking algorithms
  - Click streams and the explicit feedback of search engine users
  - Crawling algorithms

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**INDUSTRIAL EXPERIENCE**


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- **Graduate Intern** 2013  
 SAP, Waterloo, Canada
  - Investigated the impact of employing solid state drives (SSDs) in query processing and optimization
  - Proposed and Implemented a new dynamic and general I/O cost model which is able to capture the specific characteristics of SSDs for more accurate I/O cost estimation in query optimizer
  - Improved the runtime performance of some database operators significantly by exploiting the characteristics of SSDs
  - Filed a U.S. patent and published a research paper in SIGMOD 2014 conference
- **Graduate Intern** 2012  
 SAP, Waterloo, Canada
  - Studied the possibility of utilizing new hardware (multi/many-core processors, large memory, SIMD instructions, solid state drives) to improve the performance of the database engine.
  - Studied the impact of utilizing solid state drives in SAP SQL Anywhere database management system. Performed a comprehensive experimental study over a variety of database configurations and published the results as an internal white paper.
  - Proposed and implemented a novel approach for exploiting SSD as a persistent second level buffer pool for database engine in order to boost the performance of transaction processing. Modified several modules of the DBMS engine including cache management, I/O management, checkpoint process and recovery. Filed a U.S. patent for the proposed approach and prepared a research paper from the results of this project.
- **Technical Consultant** 2010  
 Career Development and Employment Centre, Ryerson University, Toronto
  - Proposed an innovative solution for crawling and automatic information extraction in a modern career search engine
- **IT Consultant** 2007-2008  
 University of Shahid Beheshti, Tebran, Iran, <http://en.sbu.ac.ir>
  - Reviewed and evaluated the feature set, architecture, performance and other technical aspects of more than forty Iranian ERP products, and prepared a comprehensive report in order to facilitate accurate decisions on how to invest in an affordable solution according to the University's requirements and constraints

- **CEO/Chairman/CTO** 2002-2008  
*Zero and One Information Technology, Tehran, Iran, <http://0and1.com>*
  - Co-Founded the company, designed and developed its IT infrastructure, hired, trained, and organized employees
  - Developed the technical aspects of the business strategies and built the long-term roadmap for the products and services
  - Successfully managed several enterprise software development projects for large governmental organizations
  - Monitored, controlled and improved constantly all stages of the software development lifecycle in the company's projects
  - Effectively communicated with client companies and prepared the technical details of project proposals according to their needs
  - Designed the software architecture of several software projects
  - Supervised R&D teams and utilized the result of R&D activities in providing innovative solutions for customers' needs
- **Freelance Developer** 2001-2002
  - Designed and developed an integrated shopping and inventory management system incorporating CRM facilities, for Sport Channel, a large shopping athletic equipment store in Tehran, Iran
  - Designed and developed an artistic full-flash website for presenting the products and services of Abnous Negar Co., an advertising company in Tehran, Iran
  - Designed and developed several interactive flash-based applications for animating the algorithmic concepts of the "Algorithms Design" course, part of an eLearning project at the University of Tehran

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## TEACHING EXPERIENCE

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- **Teaching Assistant** 2009-Present  
*University of Waterloo, Canada, <http://cs.uwaterloo.ca>*

Provided individual assistance for the students to help them understand course materials, produced sample solutions for assignments, wrote auto-testing scripts, marked assignments and exams for variety of undergraduate computer science courses including:

  - CS448 – Database Systems Implementation (Winter 2011)
  - CS116 - Introduction to Computer Science 2 (Winter 2009, Winter 2010)
  - CS348 - Introduction to Database Management (Spring 2009, Fall 2010, Spring 2011, Fall 2012, Winter 2013, Winter 2014, Spring 2014, Fall 2014)
  - CS338 - Computer Applications In Business: Databases (Spring 2009, Spring 2010, Fall 2011, Winter 2015)
  - CS240 - Data Structures and Data Management (Fall 2009)
- **Lecturer** 2005-2006  
*University of Applied Science and Technology, <http://www.uast.ac.ir/>*

Gave all lectures and wrote syllabus, homework assignments, and all exams for the following Computer Science undergraduate courses:

  - Introductory programming in Pascal
  - Advanced programming in C++
  - Data Structures
  - Operating Systems

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## COMPUTER SKILLS

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- **Languages/Tools/Frameworks/Open Source Projects:** C/C++, CUDA C, Java, C#, Delphi/Pascal, Scheme, Python, Asp.net, PHP, Shell Script, MPI, Action Script, HTML5, CSS, Bootstrap, Java Script/AJAX, Solr/Lucene, YII, JQuery, AngularJS, Selenium, Wordpress, Joomla, DotNetNuke
- **Operating Systems:** Windows, Unix/Linux
- **Database Systems:** MS SQL Server, MySQL, PostgreSQL, Oracle, SAP SQL Anywhere, DB2, FoxPro, Access, MonetDB, SQLite

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## AWARDS

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- Top student in aggregated average among all of the Computer Science students (B.Sc.)
- Ranked 34th in Iranian nationwide Computer Science M.Sc. Entrance Exam among more than 7,000 participants (one in five people admitted to the program).
- Second Place in American Open 2004 2D Robocup Soccer Simulation competitions, New Orleans, USA, 2004
- Third Place in 8th RoboCup International 3D Soccer Simulation competitions, Lisbon, Portugal, 2004
- Fourth Place in German Open 2002 2D Robocup Soccer Simulation competitions, Paderborn, Germany, 2002
- Honorable Mention in 6th RoboCup International 2D Soccer Simulation competitions, Fukuoka, Japan, 2002
- Honorable Mention in 7th RoboCup International 2D Soccer Simulation competitions, Padova, Italy, 2003
- Exempted from compulsory military service because of being designated as a gifted student
- University of Waterloo International Doctoral Student Award (2009-Present)
- University of Waterloo Mathematics Graduate Experience Award (2009-Present)
- University of Waterloo Special Graduate Scholarship (Spring 2011)
- Best student paper award, 18th International Symposium on String Processing and Information Retrieval, 2011
- SIGMOD conference student travel award, Snowbird, Utah, USA, 2014

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## PUBLICATIONS

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- **Articles published in refereed journals**
  1. **Pedram Ghodsnia**, Kamran Tirdad., J. Iann Munro, and Alejandro López-Ortiz, “A Novel Approach for Leveraging Co-Occurrence to Improve the False Positive Error in Signature Files”, *Journal of Discrete Algorithms*, Volume 18, January 2013, pp. 63-74.
  2. Ali Mohammad Zare Bidoki, **Pedram Ghodsnia**, Nasser Yazdani, “A3CRank, an Adaptive Ranking Method Based on Connectivity, Content and Click-through Data”, *Information Processing and Management*, Volume 46, No. 2, March 2010, pp. 159-169.
  3. Ali Mohammad Zare Bidoki, Nasser Yazdani, **Pedram Ghodsnia**, “FICA: A Novel Crawling Algorithm Based on Reinforcement Learning”, *International Journal of Web Intelligence and Agent Systems*, Vol. 7, No. 4, December 2009, pp. 363-373.
  4. **Pedram Ghodsnia**, Ali Mohammad Zare Bidoki, Nasser Yazdani, “WPR: A Weighted Approach to PageRank”, *International review on Computers and Software (IRECOS)*, Vol. 3, No. 1, January 2008, pp. 99-109.

- *Articles published in refereed conferences*

5. **Pedram Ghodsnia**, Ivan T. Bowman, Anisoara Nica, “Parallel I/O Aware Query Optimization”, SIGMOD’14, Snowbird, Utah, USA, June 2014.
6. **Pedram Ghodsnia**, “An In-GPU-Memory Column-Oriented Database for Processing Analytical Workloads”, VLDB 2012 PhD Workshop, Istanbul, Turkey, August 2012.
7. Kamran Tirdad, **Pedram Ghodsnia**, Alex Lopez-Ortiz, Ian Munro, “COCA Filters: Co-occurrence Aware Bloom Filters”, SPIRE’11, Pisa, Italy, 2011 (**Best Student Paper Award**).
8. Shahin Kamali, **Pedram Ghodsnia**, Khuzaima Daudjee, “Fragment Allocation with Replication in Distributed Systems”, IPCCC’11, Orlando, Florida, 2011.
9. **Pedram Ghodsnia**, Ali Mohammad Zareh Bidoki, Naser Yazdani, “Statistical Evaluation of Effect of Some Persian Language Problems in Recall Factor of Search Engine Results”, In Proceedings of CSICC’08, Kish Island, Persian Gulf, Iran, 2008.
10. Ali Mohammad Zareh Bidoki, Nasser Yazdani, **Pedram Ghodsnia**, “FICA: A Fast Intelligent Crawling Algorithm”, In Proceedings of ACM/IEEE Web Intelligence’07, Silicon Valley, USA, 2007.
11. **Pedram Ghodsnia**, Ali Mohammad Zareh Bidoki, Nasser Yazdani, “A Punishment/Reward Based Approach to Ranking”, In Proceedings of ACM InfoScale’07, Suzhou, China, 2007.
12. Ashkan Bayati, **Pedram Ghodsnia**, Reza Basseda, Maseud Rahgozar, “A Novel Way of Determining the Optimal Location of a Fragment in a DDBS: BGBR”, In Proceedings of IEEE International Conference on Systems and Networks Communications, Tahiti, French Polynesia, 2006.

- *Selected non-refereed articles*

13. **Pedram Ghodsnia**, “A survey on TLA and TLA+”, technical report, David Cheriton School of Computer Science, University of Waterloo, July 2009.
14. **Pedram Ghodsnia**, “Parallel Gaussian Elimination”, project report, David Cheriton School of Computer Science, University of Waterloo, July 2009.
15. **Pedram Ghodsnia**, “Performance improvement of Search Engines using analytical techniques of web graph”, Master’s thesis, School of Electrical and Computer Engineering, University of Tehran, 2008.
16. **Pedram Ghodsnia**, “A survey on Spatial Methods”, Technical report, Database Research Group, School of Electrical and Computer Engineering, University of Tehran, 2006.
17. Mostafa Hadian Dehkordi, Peyman Zarrineh, **Pedram Ghodsnia**, Farid AmirGhiasvand, Hesamaddin Torabi Dashti, “UTUtd 2004 Team Description”, RoboCup 2004: The 8th RoboCup International Symposium, Lisbon, Portugal, 2004.

- *Patents*

18. **Pedram Ghodsnia**, Reza Sherkat, John C. Smirnios, Peter Bumbulis, and Anil K. Goel, “Solid State Drives As A Persistent Cache For Database Systems”, No. US20140019688, filed in US on July 13 2012, published on Jan 16 2014.
19. **Pedram Ghodsnia**, Ivan T. Bowman, “Estimation of Query I/O Cost in Databases”, No. 14301160, filed in US on November 27.

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## ACTIVITIES AND INTERESTS

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- Hiking with friends, table tennis, swimming, biking and travelling
- Reading technology and entrepreneurship news, digital arts, photography, graphics, and animation

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**REFERENCES**

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- **Dr. Ken Salem**  
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