Vahid Salmani

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Summary

Highly motivated Ph.D. with strong research, analytical and hands-on skills in design, development, evaluation and optimization of software systems, cyber-physical systems, and datacenter technologies, with a focus on operating systems, network protocols, and parallel processing.

Education

2008–2013 **Ph.D. in Electrical and Computer Engineering**
University of California, Irvine (UCI), USA

2004–2007 **M.Sc. in Computer Engineering**
Ferdowsi University of Mashhad (FUM), Iran

2000–2004 **B.Sc. in Computer Engineering**
Ferdowsi University of Mashhad, Iran

Professional Experience

2021–Present **High Performance Data Storage & Processing (HPDS), Tehran**
Project Manager
- Leading a team of 10 engineers, developing the web UI and CLI components of the High Availability SAN product to be launched in 2023.
- Worked towards commercializing the HCI prototype developed at Sharif ICT Innovation Center.

2019–2021 **Sharif ICT Innovation Center, Iran**
HCI Team Leader, Information and Communication Technology Innovation Center (ICTIC)
- Evaluated open source options for software defined storage and virtualization management.
- Implemented a proof of concept Hyper-Converged Infrastructure (HCI) platform.

2017–2019 **Amirkabir University of Technology (AUT), Iran**
Post-doctoral researcher, Department of Computer Engineering & Information Technology
- Designed more efficient collision resolution schemes for wireless sensor networks using a dynamic contention tree.
- Conducted more realistic simulations by incorporating channel inaccuracies and ambient interference.

2014–2015 **SK Hynix Memory Solutions, San Jose, CA**
Staff Engineer, Storage Research Team
- Integrated SCST and EnhanceIO in a zero-copy scheme to directly place cache data to NIC buffers.
- Contributed to the storage networking of an NVM-based proof of concept prototype for datacenters.
- Built a custom kernel to support a device driver for TCP/iSCSI protocol offloading in a newer Linux.

- Investigated performance tradeoffs for software and hardware-accelerated iSCSI implementations.

2013–2014 **MSC Software, Newport Beach, CA**

- Contributed to the design of MSC Nastran's high performance common result database based on open source Big Data processing frameworks such as HDF5 and PyTables.

2013 **MeridianLink Inc., Costa Mesa, CA**

- Contributed to the design of the company's next generation transaction logging database based on ElasticSearch.

2011–2012 **STEC, Inc. (acquired by Western Digital), Santa Ana, CA**

R&D Software Engineer Intern, Office of the CTO

- Designed and implemented a scalable NoSQL prototype optimized for Flash memory.
- Achieved persistence, data sharing, and high throughput as well as the support for additional DB services than what Redis provides such as locking and transactions.
- Contributed to the EnhanceIO SSD cache software in terms of performance analysis and optimization.
- Performed micro-benchmarking to analyze file system call execution times for different eviction policies.

Summer 2011 **Interuniversity MicroElectronics Center (IMEC), Belgium**

Visiting Scholar, Bioelectronic Systems Group

- Investigated the support of GPU-based multi-threaded parallel image processing in Java.
- Implemented parallel versions of morphological operations and spatial convolution in CUDA.
- Optimized the parallelized algorithms to achieve the highest speedup. Achieved a speedup of at least 18x compared to the optimized OpenMP based solution.
- Integrated CUDA programs and the NIH ImageJ framework through the JCuda library bindings.

2010–2011 **Versadial Solutions Inc., Irvine, CA**

- Developed a stand-alone screen monitoring client application for capturing scheduled or on-demand snapshots or video.
- Implemented a fast, memory-efficient mechanism for generating FLV files base on the Adobe "Screen Video" compression format which stores only the changes from one frame to the next.
- Contributed in development of the company's e-commerce website.

2009 **Javaground Inc., Irvine, CA**

- Transcoded CLDC and MIDP class libraries of J2ME into ActionScript by wrapping AS3 APIs, as part of the Java to Flash converter project, to generate ActionScript code from abstract syntax tree (AST) of Java programs.
- Integrated the converter with the Porting Engine, a component of Javaground's Xpress Suite that allows developers to create unique packages for various distributors from a single source code.

2008–2013 **Center for Embedded Computer Systems (CECS) of UCI**

Graduate Student Researcher

- Designed two novel MAC schemes for Eco, an ultra-compact distributed wireless sensing platform for predicting Cerebral Palsy in premature infants.
- Introduced the "pre-pulling" technique that allows interleaved wireless transmissions by pipelining the sensor node operations. Improved bandwidth utilization 2.7 times.

- Proposed one of the most lightweight adaptive MAC protocols, which requires no carrier sensing capability on nodes and can resiliently scale with variable network sizes.
- Implemented a proof of concept prototype with a footprint as low as 4KB.

2005–2007 **Information Technology Services Center of FUM**
Software Engineer
- Maintained and enhanced FUM's online e-learning system based on ATutor, an open source web-based learning content management system.
- Integrated the e-learning system with the education services system through XML RPC web services.
- Built ATutor's Farsi language package.

2004–2007 **Communication and Computer Research Center (C&C) of FUM**
Graduate Student Researcher
- Designed multi-criteria algorithms and heuristics for scheduling real-time tasks on multi-core and multiprocessor platforms.
- Proposed a novel approach using processor affinity to reduce process migration overhead by a factor of 6.
- Modified the Maximum Urgency First (MUF) scheduling algorithm to prevent failure of critical tasks on uni-processors.

2002–2007 **Software Simulation and Modeling Lab. of FUM**
Co-founder and Team Leader, Nexus Soccer Simulation Team
- Designed and implemented the Nexus soccer simulation team.
- Devised several heuristics for intelligent decision making of autonomous software agents in multi-agent environments.

Teaching Experience

2020–2021 **Sharif University of Technology**
Lecturer
- Object Oriented Programming.

2019 **Amirkabir University of Technology**
Lecturer
- Advanced Programming.

2009–2010 **University of California, Irvine**
Teaching Assistant
- Engineering Data Structures and Algorithms, Object Oriented Systems and Programming.

2005–2008 **Khorasan Industrial and Scientific Advanced Training Center, Mashhad**
Lecturer
- Object Oriented Programming, Data Structures and Algorithms, Technical English Language, Fundamentals of Computer and Programming.

2007 **Jahad Daneshgahi, Mashhad**
Lecturer
- Data Structures and Algorithms, Technical English Language.

2006 **Saramad IT Educational Center, Mashhad**
Lecturer (Saramad was an accredited partner of NCC Education, UK)
- Object Oriented Programming Using C++ (in English).

2006 **Khorasan Institute of Higher Education, Mashhad**
Lecturer
- Algorithms Analysis & Design, Data Structures and Algorithms, Technical English Language, Advanced Programming.

2005–2006 **Emam Hossein University, Mashhad**
Lecturer
- Systems Analysis and Design, Operating Systems, Technical English Language.

2005 **Ferdowsi University of Mashhad**
Instructor
- E-Learning System (for Faculties).

Awards and Honors

- Non-resident Research Grant, Institute for Research in Fundamental Sciences (IPM), Iran, March 2021 & March 2022.
- Venture Capital Fund, for making the HCI product, Iran's National Elites Foundation, July 2019.
- Postdoctoral Fellowship, Iran's National Elites Foundation, October 2017.
- Travel Grant Awards for DCOSS'12 and MACOM'12, UCI.
- Visiting Scholarship, Katholieke Universiteit Leuven (KUL), Belgium. €3,700, April 2011.
- PhD admission with ORS award and UoB Postgraduate Research Scholarship, Department of Computer Science, University of Bristol, UK. £25,340/year for 3 years, April 2008.
- PhD admission with tuition grant, Department of Computer Science, University of North Carolina at Chapel Hill, NC. $26,020 plus Tuition Grant, April 2007.
- PhD admission with fellowship, Department of Electrical Engineering and Computer Science, University of California, Irvine, CA. $40,702 for one year, February 2007.
- 1st Rank in cumulative GPA among M.Sc. students graduated in 2007, Computer Engineering Department, FUM.
- 9th - 12th place of the RoboCup 2005 3D Soccer Simulation Championship among 33 teams, Osaka, Japan, July 2005.
- Ranked 110th, among about 10,000 graduates participating in the nationwide M.Sc. program entrance exam, Iran, April 2004.
- Awarded Outstanding B.Sc. Student, (awarded to only 7 out of 70 students), Computer Engineering Department, FUM, June 2004.
- 1st place of the City Soccer Simulation League, Islamic Azad University, Mashhad, Iran, June 2004.
- Winner of the ACM Programming Contest, (the selective competition for ACM Regional Collegiate Programming Contest, Western Asia, Tehran), FUM, 2002 & 2004.
- 1st place of the National Soccer Simulation Competition, held in conjunction with the 5th Conference on Intelligent Systems, Mashhad, Iran, October 2003.

Technical Skills

- Operating Systems: Windows, Linux (kernel- and user-level), Mac OS
- Parallel/Distributed Systems: CUDA, POSIX Threads
- Big Data frameworks: HDF5, PyTables, Apache Lucene, Elasticsearch
- Storage Systems: Redis, DRBD, Ceph
- Programming: C, C++, Java, Assembly, Python, SQL, Bash scripting
- Protocols: TCP/IP, iSCSI, IEEE 802.15.4
- Version Control: Git, SVN, CVS
- Project Management: Jira, Microsoft Project

Professional Services

Associate Editor

- Communications in Computer and Information Science, Springer, Vol. 101 & 102, 2010

Reviewer

- International Journal of Electrical and Computer Engineering (IJECE), 2019
- ACM Transactions on Sensor Networks (TOSN), 2017 & 2018
- ACM Transactions on Design Automation of Electronic Systems (TODAES), 2017
- Inderscience International Journal of Sensor Networks (IJSNET), 2013 & 2016
- IEEE Transactions on Mobile Computing (TMC), 2014
- IEEE Transactions on Industrial Informatics (TII) , 2013
- Springer Design Automation for Embedded Systems (DAEM), 2013
- Journal of Zhejiang University Science C (Computers & Electronics), 2013
- ACM/EDAC/IEEE Design Automation Conference (DAC), 2011 & 2012
- ACM/IEEE Asia and South Pacific Design Automation Conference (ASPDAC), 2011
- ACM/IEEE Intl. Conference on Information Processing in Sensor Networks (IPSN), 2011
- Symposium on Integrated Circuits and Systems Design (SBCCI), 2011
- IEEE Advances in Computing, Control, & Telecommunication Technologies (ACT) 2009
- Conference on Information and Knowledge Technology (IKT), 2007
- IEEE Conf. on Computer, Information, Systems Sciences, and Engineering (CISSE), 2006

Program Committee

- Conference on Healthcare Computing Systems and Technologies (CHEST), 2019
- National Conf. on Management & E-business with Resistance Economics Approach, 2018
- Intl. Conf. on Control, Communication and Power Engineering (CCPE), 2010 $\sim$ 2017
- Intl. Conf. on Emerging Trends in Engineering & Technology (IPETET), 2015 & 2016
- Conf. on Advances in Information Technology and Mobile Communication (AIM), 2013
- Conf. on Computational Intelligence & Information Technology (CIIT), 2011, 2013 & 2016
- International Conference on Signal Processing and Information Technology, (SPIT) 2012
- International Conference on Advances in Recent Technologies in Communication and Computing (ARTCom), 2009 & 2010

Journal Publications

1. V. SALMANI and P. H. Chou. Resilient Round Robin: A Lightweight Deterministic MAC Primitive. *ACM Transactions on Sensor Networks (TOSN)*, 11(2):31:1–31:38, February 2015. New York, NY, USA
2. V. SALMANI and P. H. Chou. Intra-Cluster Contention Resolution in Wireless Sensor Networks. In *Lecture Notes in Computer Science (LNCS)*, volume 7642, pages 170–181. Maynooth, Ireland, November 19-20, 2012. 5th International Workshop on Multiple Access Communications (MACOM)
3. A. M. Fard, V. SALMANI, et al. Game Theory based Data Mining Technique for Strategy Making of a Soccer Simulation Coach Agent. In *Lecture Notes in Informatics (LNI)*, volume P-107, pages 54–65. Kharkiv, Ukraine, May 23-25, 2007. 6th International Conference on Information Systems Technology and its Applications (ISTA)
4. A. M. Fard, V. SALMANI, et al. Nexus Robosoccer Development Process from 2D Simulated agents to 3D Humanoid Soccerbots. *Journal of the National Technical University Kharkiv Polytechnical Institute*, 2007. Herald of the NTU KhPI Science Works
5. V. SALMANI et al. A Modified Maximum Urgency First Scheduling Algorithm for Real-Time Tasks. In *International Journal of Computer and Information Engineering*, volume 1, pages 19–23. World Academy of Science, Engineering and Technology, Istanbul, Turkey, November 2007. World Enformatika Conference (WEC'05)
6. V. SALMANI et al. A Two-Phase Mechanism for Agent's Action Selection in Soccer Simulation. In *International Journal of Computer, Electrical, Automation, Control and Information Engineering*, volume 1, pages 1198–1201. World Academy of Science, Engineering and Technology, Istanbul, Turkey, February 25-27, 2007. The Second World Enformatika Conference (WEC'05)
7. V. SALMANI et al. Efficiency Assessment of Job-level dynamic Scheduling Algorithms on Identical Multiprocessors. *WSEAS Transactions on Computers*, 5(12):2948–2955, December 2006

Conference Publications

8. F. Omidvar, V. SALMANI, and M. Rasti. A Contention Resolution Scheme for Energy Efficiency of M2M Traffic in LTE Networks. In *Proceedings of the 9th IEEE International Symposium on Telecommunications*, (IST), pages 281–285, Tehran, Iran, December 17-19, 2018
9. V. SALMANI et al. An Empirical Evaluation Methodology for iSCSI Storage Networking. In *Proceedings of the 14th IEEE International Symposium on Network Computing and Applications*, (NCA), pages 216–225, Cambridge, MA, USA, September 28-30, 2015
10. G. Kurczina, V. SALMANI, et al. Comparison of Parallelized Gray-scale Zonal Operations on CPU and GPU. In *Proceedings of the 6th Neuroinformatics Congress*, pages 172–173, Stockholm, Sweden, August 27-29, 2013. International Neuroinformatics Coordinating Facility (INCF)
11. V. SALMANI and P. H. Chou. Bin-MAC: A Hybrid MAC for Ultra-Compact Wireless Sensor Nodes. In *Proceedings of the 8th IEEE International Conference on Distributed Computing in Sensor Systems*, (DCOSS), pages 158–165, Hangzhou, China, May 16-18, 2012
12. V. SALMANI et al. CUDA-Based Massively Parallel Implementation of Gray-Scale Mathematical Morphology Operations in Java. In *Proceedings of the Bioimage Analysis Workshop*, page 61, Barcelona, Spain, April 30 - May 1, 2012. Euro-BioImaging
13. V. SALMANI and P. H. Chou. Pushing the Throughput Limit of Low-Complexity Wireless Embedded Sensing Systems. In *Proceedings of the 3rd IEEE International Conference on Sensor Networks, Ubiquitous, and Trustworthy Computing*, (SUTC), pages 181–188, Newport Beach, California, USA, June 7-9, 2010

14 N. Khatib-Astaneh, V. SALMANI, et al. Investigating the Effect of Processor Affinity on Uniform Parallel Machine Scheduling. In *Proceedings of the 3rd IEEE International Conference on Application of Information and Communication Technologies*, (AICT), pages 1–5, Baku, Azerbaijan, October 14-16, 2009

15 J. Mohammadzadeh, A. Ghazinezhad, A.R. Valaghozi, A. Nadi, E. Asgarian, V. SALMANI, et al. Observations on Using Probabilistic C-Means for Solving a Typical Bioinformatics Problem. In *Proceedings of the 2nd UKSIM European Symposium on Computer Modeling and Simulation*, (EMS), pages 236–239, Liverpool, UK, September 8-10, 2008. IEEE

16 S. K. Nejad, A. Najafl-Ardebili, A. Ghazinezhad, and V. SALMANI. Automated Ontological Web Service Management - A New Approach in Semantic Web. In *Proceedings of the 2nd Asia International Conference on Modeling & Simulation*, (AICMS), pages 150–153, Kuala Lumpur, Malaysia, May 13-15, 2008. IEEE

17 H. T. Yazdi, V. SALMANI, et al. Exploiting Laxity for Heterogeneous Multiprocessor Real-time Scheduling. In *Proceedings of the 3rd IEEE International Conference on Information and Communication Technologies: From Theory to Applications*, (ICTTA), pages 1–6, Damascus, Syria, April 7-11, 2008

18 V. SALMANI et al. A Fuzzy-based Multi-criteria Scheduler for Uniform Multiprocessor Real-time Systems. In *Proceedings of the 10th IEEE International Conference on Information Technology*, (ICIT), pages 179–184, Roukela, India, December 17-20, 2007

19 V. SALMANI et al. Deadline Scheduling with Processor Affinity and Feasibility Check on Uniform Parallel Machines. In *Proceedings of the 7th IEEE International Conference on Computer and Information Technology*, (CIT), pages 793–798, Fukushima, Japan, October 16-19, 2007

20 V. SALMANI et al. Multi-criteria Scheduling of Soft Real-time Tasks on Uniform Multiprocessors Using Fuzzy Inference. In *Proceedings of the IEEE International Joint Conferences on Computer, Information and Systems Sciences and Engineering*, (CISSE), pages 439–444, Bridgeport, Connecticut, USA, December 4 - 14, 2006. Springer

21 V. SALMANI et al. Quantitative Comparison of Job-level Dynamic Scheduling Policies in Parallel Real-time Systems. In *Proceedings of the IEEE Region 10 Conference*, (TENCON), pages 1–4, Hong Kong, China, November 14-17, 2006

22 M. Mozafari, A. M. Fard, V. SALMANI, et al. An Improved Fuzzy Mechanism for 3D Soccer Simulation Agent's Shoot Skill. In *Proceedings of the Annual IEEE India Conference*, (INDICON), pages 1–6, New Delhi, India, September 15-17, 2006

23 V. SALMANI et al. Performance Evaluation of Deadline-based and Laxity-based Scheduling Algorithms in Real-time Multiprocessor Environments. In *Proceedings of the 6th WSEAS International Conference on Systems Theory & Scientific Computation*, (ISTASC), pages 121–126, Elounda, Greece, August 21-23, 2006. World Scientific and Engineering Academy and Society (WSEAS)

24 S. T. Zargar, V. SALMANI, et al. MMUF: An Optimized Scheduling Algorithm for Dynamically Reconfigurable Real-Time. In *Proceedings of the 2nd IEEE International Conference on Information and Communication Technologies: From Theory to Applications*, (ICTTA), pages 3486–3491, Damascus, Syria, April 24-28, 2006

25 M. Sabeghi, H. Deldari, V. SALMANI, et al. A Fuzzy Algorithm for Real-time Scheduling of Soft periodic Tasks on Multiprocessor Systems. In *Proceedings of the IADIS International Conference on Applied Computing*, pages 467–471, San Sebastian, Spain, February 25-28, 2006. International Association for Development of the Information Society (IADIS)

26 V. SALMANI et al. A Fuzzy Two-Phase Decision Making Approach for Simulated Soccer Agent. In *Proceedings of the IEEE International Conference on Engineering of Intelligent Systems*, (ICEIS), pages 1–6, Islamabad, Pakistan, April 22-23, 2006

Theses

27 V. SALMANI. *Adaptive Multiple Access Communication for High Data Rate Wireless Sensing Applications*. PhD thesis, UCI, June 2013

28 V. SALMANI. Multi-criteria Scheduling of Real-time Tasks on Uniform Multiprocessors. Master's thesis, FUM, September 2007

Technical Reports

29 V. SALMANI et al. Nexus 2007–3D Soccer Simulation Team Description. Technical report, FUM, 2007

30 V. SALMANI et al. Nexus 2005-3D Team Description. Technical report, FUM, 2005