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"I do not fear computers. I fear the lack of them." - Isaac Asimov

Education

Ph.D.

2018–present **Ph.D.**, *University of Rochester*, NY, USA.
Department of Computer Science
– Computer Systems Group

Advisor Prof. Yuhao Zhu

Course Works

- Operating Systems
- Mobile Systems Architecture
- Introduction to Artificial Intelligence
- Parallel and Distributed Computing
- Computer's Models and Limitations

M.Sc.

2014–2016 **Master of Science**, *Sharif University of Technology*, Tehran, Iran.
Department of Computer Engineering
– Computer Architecture Group
– Embedded Systems Research Laboratory (ESRLab)

Master's Thesis

Title **"Energy Management in Fault-Tolerant Mixed-Criticality Systems"**

Advisor Prof. Alireza Ejlali

Abstract Mixed-criticality systems are introduced due to industrial interest to integrate different types of functionalities with varying importance into a common and shared computing platform. Low-energy consumption is vital in mixed-criticality systems due to their ever-increasing computation requirements and the fact that they are mostly supplied with batteries. In this thesis, we propose a novel reliability-aware energy management approach and three methods, Monotonous-DVFS, Stretch, and Combined Monotonous-DVFS/Stretch in which energy management targets non-safety-critical functionalities. The Monotonous-DVFS method lowers energy consumption by evenly distributing slack times between low-criticality tasks while the Stretch method lowers the energy consumption of mixed-criticality systems with the cost of degraded service in low-criticality tasks. Our Stretch method extends both execution time and period of tasks while preserving their utilization. This leads to degrading the tasks' service level due to a period extension that is exploited by Stretch for energy management. Experiments show that Combined Monotonous-DVFS/Stretch provides ~30% energy savings compared to the state-of-the-art with only 5% service level degradation in low-criticality tasks in a heavily utilized system. The energy savings can be increased to ~66% with the cost of 100% service level degradation in low-criticality tasks. Furthermore, the original reliability of the system is preserved in our approach.

Course Works

- Advanced Computer Architecture
- Advanced VLSI Design
- Embedded Systems Design
- Low Power Digital Systems Design
- System on Chip Design
- Fault-Tolerant Systems Design

- Advanced Design of Dependable Systems

B.Sc.

2006–2011 **Bachelor of Science**, *K. N. Toosi University of Technology*, Tehran, Iran.
Department of Computer Engineering
– Computer Hardware Group

Final Project

Title **"Survey on VoIP Vulnerabilities, Threats and Countermeasures in order to Optimize Countermeasures Against a Well Known Threat"**

Advisor Prof. Sadan Zokaei

Abstract Voice over IP (VoIP) technology can significantly reduce the cost of establishing call centers, since computer networks are readily available, and individuals have access to computer networks through Local Area Networks (LANs) or the Internet. VoIP, however, can suffer from different threats and vulnerabilities considering its real-time nature. In this project, we categorized different VoIP vulnerabilities and threats; We realized that unintentional Denial of Service (DoS), and unintentional Distributed Denial of Service (DDoS) are the strongest threats for VoIP technology. Moreover, we conducted extensive simulations, using NS2 (i.e., the Network Simulator 2), on some randomly generated topologies of VoIP networks, and we realized that the weakness lies in the Transport-Layer Protocols (i.e., TCP, and UDP) for carrying real-time data. To diminish the threat, we proposed an idea to use Stream Control Transmission Protocol (i.e., SCTP) instead of TCP and UDP in VoIP networks. Our experimental results indicated that SCTP is much less vulnerable in case of unintentional DoS or DDoS for real-time data.

Selected Course Works

- Computer Architecture
- Digital Design
- Linear Control Systems
- Data Transmission
- Microprocessor
- Operating Systems
- Internet Engineering
- Multimedia
- VLSI Design
- Digital Electronics
- Signals and Systems
- Data Structure and Algorithm
- Computer Networks
- Voice over Internet Protocol
- Artificial Intelligence
- Project Management

Research Interests

- Computer Architecture
- Mobile Systems Architecture
- System on Chip (SoC) Architecture
- Cyber-Physical Systems
- Mixed-Criticality Systems
- Cloud Computing
- Computer Networks and Data Centers
- Real-Time Systems
- Low Power and Energy Efficient Digital Systems
- Fault Tolerance and Design-for-Reliability
- Dependability Evaluation and Reliability Assessment
- Hardware Design and Synthesis
- VLSI and Electronic Circuits

Publications

Journal Papers:

TSUSC-2018 **"Reliability-Aware Energy Management in Mixed-Criticality Systems"**, *Amir Taherin, Mohammad Salehi, Alireza Ejlali, IEEE Transactions on Sustainable Computing*, vol. 3, no. 3, pp. 195-208, 2018.

Conference Papers:

RTEST-2015 **"Stretch: Exploiting Service Level Degradation for Energy Management in Mixed-Criticality Systems"**, *Amir Taherin, Mohammad Salehi, Alireza Ejlali*, The CSI Symposium on Real-Time and Embedded Systems and Technologies (RTEST), Tehran, Iran.

Teaching Experience

Spring 2016 **Embedded Systems Design**, *Teacher Assistant*, Sharif University of Technology, Tehran, Iran.
Under Supervision of Prof. Alireza Ejlali

Spring 2016 **Logic Design**, *Teacher Assistant*, Sharif University of Technology, Tehran, Iran.
Under Supervision of Prof. Shaahin Hessabi

Spring 2015 **Advanced Logic Design**, *Teacher Assistant*, Sharif University of Technology, Tehran, Iran.
Under Supervision of Prof. Alireza Ejlali

Honors and Awards

2015 – 2016 **National Elites Foundation Scholarship** from Presidency of Islamic Republic of Iran. Tehran, Iran.

2016 **Ranked 3rd** in cumulative GPA among all students of computer architecture (41 students), Sharif University of Technology, Tehran, Iran.

2014 **Rank Obtained 21** in the Nation-wide University Entrance Exam of Graduate Studies in Computer Science and Engineering among 8,998 Participants. Tehran, Iran.

2006 **Rank Obtained 1525** in the Nation-wide University Entrance Exam in Undergraduate Studies, Physics and Mathematics Track, among 1,345,000 Participants. Tehran, Iran.

Academic Services

TETC-2018 **Reviewer**, *IEEE Transactions on Emerging Topics in Computing*.

RTEST-2017 **Reviewer**, *The CSI Symposium on Real-Time and Embedded Systems and Technologies (RTEST)*.

RTEST-2015 **Reviewer**, *The CSI Symposium on Real-Time and Embedded Systems and Technologies (RTEST)*.

Standard Test Scores

TOEFL **115/120**: Reading: 28/30, Listening: 29/30, Speaking: 29/30, Writing: 29/30

Computer & Technical Skills

Operating Systems: Windows, Linux, Android

Programming Languages: C/C++, Python, TCL/OTcl, StateFlow, MATLAB, Assembly languages of X86, and ARM

HDLs: Verilog

CAD Tools: Synopsys (Design Compiler, HSPICE, PrimePower), Cadence (Virtuoso, SoC Encounter), Mentor Graphics (ModelSim), Xilinx (ISE Design Suite, Vivado HLS, SDSoC), MATLAB, Simulink

CMSs: Joomla, Drupal, Plone, OwnCloud

Typesetting: LaTeX, TeX, Microsoft Office

Information Technology Skills

- Search Engine Optimization and Marketing (SEO & SEM)
- Information Technology Infrastructure Library (ITIL)
- Information Technology Service Management (ITSM)
- Information Technology Project Management

Selected Projects

2016 **Design and Implementation of Low-Power On-Chip Interconnect in 90nm CMOS Technology**, *Based on Bus-Inverting and Reduced Voltage Swing Techniques, Developed in HSPICE*, Sharif University of Technology, Tehran, Iran.
Low Power Digital Systems Design Course Project

2016 **Layout Design of Basic Gates in 90nm CMOS Technology**, *Families: Static CMOS, Pseudo-nMOS, DCVSL, Dual-Rail Domino, Developed in Virtuoso Layout Editor*, Sharif University of Technology, Tehran, Iran.
Advanced VLSI Course Project

2015 **Reliability Model of TMR Configured Multicore Processors Based on DVFS and AVF**, *Developed in MATLAB*, Sharif University of Technology, Tehran, Iran.
Advanced Design of Dependable Systems

2015 **Designing and Implementing Incubator Temperature Control**, *Designed and implemented in two different MoC's, (1) Differential Equations (PI and PID Controllers) with MATLAB/Simulink, and (2) Automata-Based Programming (CFSM) with MATLAB/Simulink StateFlow*, Sharif University of Technology, Tehran, Iran.
Embedded Systems Design Course Project

2015 **Implementing ER-EDF and EDF-VD Mixed-Criticality Scheduling Algorithms**, *ER-EDF (DATE 2013) and EDF-VD (ECRTS 2012), Developed in MATLAB*, Sharif University of Technology, Tehran, Iran.
Embedded Systems Design Course Project

2015 **Designing and Implementing a Complex Multiplication ASIC (Hard) IP-Core in 0.18μm CMOS Technology**, *A complete ASIC design flow written in Verilog, synthesized in Synopsys Design Vision, placed, routed and RC-extracted in SoC Encounter, and verified by post layout simulation in HSIM*, Sharif University of Technology, Tehran, Iran.
System on Chip Design Course Project

2015 **Designing and Implementing a Complex Multiplication IP-Core on FPGA**, *Developed in Xilinx ISE Design Suite for Spartan-6, Spartan-4 and Virtex-4, Virtex-5, Virtex-6, Virtex-7 families*, Sharif University of Technology, Tehran, Iran.
System on Chip Design Course Project

2014 **Survey on Limitations and Challenges of Using Multicore Processors in Safety-Critical Systems**, *In Context of Mixed-Criticality Systems*, Sharif University of Technology, Tehran, Iran.
Fault Tolerant Systems Design Course Project

2014 **Reliability Evaluation and Assessment**, *Systems: TMR, 5MR, TMR with Error Recovery, RAID5, RAID6, Standby-Sparing, by Relex tools*, Sharif University of Technology, Tehran, Iran.
Fault Tolerant Systems Design Course Project

2014 **Designing and Implementing a Cache Prefetcher**, *Algorithms: Next-Line Prefetcher, Stride Prefetcher, Temporal Streaming of Shared Memory (TMS) Prefetcher (ISCA 2005), Developed in C++*, Sharif University of Technology, Tehran, Iran.
Advanced Computer Architecture Course Project

2014 **Designing and Implementing a Cache Simulator**, *Replacement Policies: LRU, LFU, MRU, Pseudo LRU, Belady's optimal, and Shepherd Cache (MICRO 2007), Developed in C++*, Sharif University of Technology, Tehran, Iran.
Advanced Computer Architecture Course Project

2012 – 2013 **Reliability Assessment and Risk Management**, Behsazan Co., Core-Banking Solutions, Tehran, Iran.

2011 **Categorizing VoIP Threats in NGNs**, *Based on well-known threats taxonomies*, K. N. Toosi University of Technology, Tehran, Iran.
VoIP Course Project

2009 **Implementing a Multi-Threaded Web Server**, *Developed in C++*, K. N. Toosi University of Technology, Tehran, Iran.
Operating Systems Course Project

2008 **Implementing a Pipelined MIPS Processor**, *Developed in Quartus*, K. N. Toosi University of Technology, Tehran, Iran.
Computer Architecture Course Project

2007 **Designing and Implementing Chess Engine**, *A simple chess engine developed in C++*, K. N. Toosi University of Technology, Tehran, Iran.
Advanced Programming Course Project

Professional Positions

2014 – 2017 **Research Assistant**, *Embedded Systems Research Laboratory (ESRLab)*, Department of Computer Engineering, Sharif University of Technology, Tehran, Iran.
Under Supervision of Prof. Alireza Ejlali
Research Project Lead Scientist: Dr. Mohammad Salehi

Research Statement

Due to consideration of cost, energy efficiency, area, weight etc., there is an increasing trend in designing embedded systems to integrate different functionalities with varying criticalities (i.e. importance) into a shared computing platform. Therefore, mixed-criticality systems are typically safety-critical. Mixed-criticality systems are the next generation of complex embedded systems since mixed-criticality is known as a core foundational concept in fields such as Cyber-Physical Systems (CPS) and Internet of Things (IoT). Integrating vast amount of functionalities within mixed-criticality systems requires enormous power supplies and cause thermal problems. Therefore designing energy efficient mixed-criticality systems is vital considering often battery operated and fan-less nature of these systems. We intend to propose system-level methods for designing energy efficient fault-tolerant mixed-criticality embedded systems.

2012 – 2013 **Consultant**, *Department of Computer Engineering*, IRNA, Islamic Republic News Agency, Tehran, Iran.
Consultant in:
- Search Engine Optimization (SEO)
- Search Engine Marketing (SEM)
- Information Technology Infrastructure Library (ITIL)
- Information Technology Project Management

2012 – 2013 **Internship**, *Research and Develop Department (R&D)*, Behsazan Co., Core-Banking Solutions, Tehran, Iran.
involved in:
- Building and Testing a Virtualized Sandbox
- Performing Reliability Assessment and Risk Management on E-Banking Solutions
- Designing Audit Plan for Risk Management
- Conducting a Survey on ITIL
- Designing Guideline for Training Human Resources Based on ISO 10015

2011 – 2012 **Internship, Search Engine Optimization and Marketing Designer (SEO & SEM)**, *Department of Computer Engineering*, IRNA, Islamic Republic News Agency, Tehran, Iran.
Worked on:
- Capacity Management
- Availability Management
- Keyword Analysis
- Internal and External Link Analysis
- SEO Friendly Site Structure
- Google Analytics
- User Navigation
- Website Statistics
- In page Analytics
- HTML Validation

2010 – 2011 **Internship, Search Engine Optimization and Marketing Designer (SEO & SEM)**, *E-Commerce Laboratory*, Tarbiat Modares University, Tehran, Iran.
Worked on:
- Keyword Analysis
- Internal and External Link Analysis
- SEO Friendly Content Generation
- SEO Friendly Site Structure
- Alexa Analyzer
- Google Analytics
- In page Analytics
- SEO Plug-ins
- HTML Validation
- Optimization in Social Networks, Blogs and Forums

2009 – 2010 **Internship**, *IP-PBX Research and Develop Group*, ACECR, Academic Center for Education, Culture and Research, Tehran, Iran.
Worked on:
- Documentation
- VoIP Codecs
- ATCA
- Switching
- DNS
- Digital Trunks

2007 – 2009 **Teacher**, *Teaching English Language*, Moalem Elementary School, Tehran, Iran.

Languages

Farsi Mother tongue

English Full professional proficiency *TOEFL iBT: 115/120*

References

Available on request.