Arash Pourhabibi-Zarandi

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RESEARCH INTERESTS

Distributed Systems, Cloud Computing & Software Engineering
My research interest relies on cloud computing and its abstraction levels from top to bottom; how to efficiently build a Software as a Service (SaaS) and deploy it on a cloud provided platform (PaaS) which is running on virtualized hardware (IaaS). The usage of new multi-core CPUs and modern GPUs as the infrastructure of cloud and distributed computing; and NoSQL systems as the backbone of its big data computations.

EDUCATION

M.Sc. in Software Engineering
Shiraz University, Shiraz, Iran *2013 - 2015 (Expected)*

- Accepted in the M.Sc. program without university entrance exam, as the exceptional student in the department.
- **Ranked First:** Achieving the highest GPA **(19.84/20)** among all M.Sc. students.
- **Related Courses:** Advanced OS, Advanced Computer Architecture, Multicore Programming, Parallel Algorithms, Grid Computing, Software Architecture, Text Mining

B.Sc. in Computer Engineering (Software Engineering)
Shiraz University, Shiraz, Iran *2009 - 2013*

- **Ranked First in CS related Courses:** Achieved the highest GPA in **CS courses (18.88/20)** among all B.Sc. students.
- **Ranked Third:** Achieved the third highest **overall GPA (17.56/20)** among all B.Sc. students.

Diploma in Mathematics and Physics
National Organization for Development of Exceptional Talents(NODET), Kerman, Iran *2005-2009*

AWARDS & ACCOMPLISHMENTS

Accomplishment in U of Illinois's Online **Cloud Computing Concepts** course with score of **97.6%** and achieved the **Course and Programming Mastery Badge**
Taught by Indranil Gupta at Coursera *February - March 2015*

Ranked **second** in the **Java** section of the First Iran Programming Skill Challenge, held by Sharif University of Technology and Tehran University's Faculty of Entrepreneurship. *Summer 2014*

Accomplishment with **Distinction** in University of Maryland's online **Developing Innovative Ideas for New Companies**: The First Step in Entrepreneurship course with score of **100%**
Taught by Dr. James V. Green at Coursera *January 2015*

Accomplishment in IIT Delhi's online **Web Intelligence and Big Data** course
Taught by Gautam Shroff at Coursera *December 2013*

Accomplishment in UC Berkeley's Online **SaaS I** and **SaaS II** courses with scores of **94%** and **92%**
Taught by David Patterson, Armando Fox at EdX *Summer 2013*

Awarded as the **Best Undergraduate Student** in Computer Engineering
Shiraz University *June 2013*

Nominated for the **Best Mobile Application** for SAHA (iPhone Application for Phone Bill Management) at the First Iran Mobile Innovation Awards, held by Sharif University of Technology, Tehran, Iran. *February 2012*

Accomplishment in Stanford's Online **Introduction to Databases** course with score of **294/323**
Taught by Jennifer Widom *October - December 2011*

LANGUAGES

Persian *(Maternal)*
English *(Advanced)* - TOEFL iBT score: 100(R:29, L:27, S:23, W:21) *October 2013*

EXPERIENCE

Shiraz University *2010 - 2013*
Member of CSE Department Network Administration Team, proposed and implemented new services for the department such as CMS (Content Management System).

Internship at Shiraz University CERT Center (ShirazAPA) *2010 - 2011*
Programmer and Researcher on "Update Manager" project.

Freelance Java and iOS Programmer and founder of Mobile Programming group in Shiraz University under the supervision of Dr. Farshad Khunjush

SELECTED PROJECTS

More information on these and my other projects is available on my homepage.

- **BigKernel (M.Sc. Thesis)** **Present**
  It's a joint research project with Reza Mokhtari under supervision of Prof. Michael Stumm at the University of Toronto. It's based on a scheme, named BigKernel, that provides pseudo-virtual memory to GPU applications and is implemented using a 4-stage pipeline with automated prefetching to optimize CPU-GPU communication and optimize GPU memory accesses. It's based on a proposed compile-time system that takes a BigData application as input and modifies it to automate the CPU-GPU data communications and improve the overall performance of the application. We are developing the compiler tool using the LLVM infrastructure.

- **Software Transactional Memory on GPUs** **Present**
  A research project with my colleague Ali Faraji regarding the parallelism problems dealing with data access on Graphics Processing Units. We are trying to implement and analyse pure Software Transaction Memory environment on GPUs in order to evaluate the efficiency from both performance and cost views. The projects output will be a library which helps GPU programmers to take the abstraction to a higher level. All common problems like lock handling, race conditions and deadlock will be handled automatically using the ideas which originally came from Database Management Systems and lead to a Hardware Transactional Memory on Intel Haswell CPUs.

- **Building a Fault-Tolerant Key-Value Store** **Spring 2015**
  It's a Key-Value Store written in C++ which supports the four CRUD operations in addition to its load balancing and fault tolerance. It uses a ring-based DHT and keeps three replicas of each key-value pair and supports quorum consistency level for CRUD operations. Beneath the KV store, a distributed membership protocol is always running to keep track of the ring in the event of a new node joining or when a node fails. It was the programming project of the University of Illinois's online Cloud Computing Concepts course which I got the complete grade.

- **Pure P2P File Sharing Application Written in Java** **Fall 2011**
  In this application each peer can add other peers to its peer list and then asks its peer list for a file name. Each peer then replies whether he has the file or not. If the file is available the asking peer will receive the file from others. For writing this application, I first wrote a general purpose P2P Framework in Java then I wrote a file sharing application on top of it which uses an UDP flooding feature for finding peers.

- **Online Judge System with Code Similarity Written in Java** **Fall 2010**
  The goal was to create a system for online exams of C Programming course, so that the students can see the questions and submit their answers over the network and to self-check their answers. It uses the code similarity algorithms used in Plagiarism Detecting Applications to calculate how much the submitted code is similar to the one that the instructor had submitted.

- **Steganography Written in C** **Spring 2010**
  Its a text based menu-driven application written in C and it can hide a text file in a Bitmap image and extract it back from the image. It's based on the paper *Adaptive Data Hiding in Edge Areas of Images With Spatial LSB Domain Systems* and can hide up to 15 bits in each pixel of an image.

PUBLICATIONS

- Design and Implementation of a scheme for BigData Processing on GPU *In Preparation*
- Official Persian translation of "Engineering SaaS: An Agile Approach Using Cloud Computing" written by Armando Fox and David Patterson. It is going to be published soon by the help of Nima Towhidi and under supervision of Dr. Ahmad Towhidi.

TECHNICAL SKILLS

Programming Languages: Python, C, Java SE, SQL, Objective-C, Ruby
Programming Models, Platforms & Frameworks: LLVM, MPI, OpenMP, CUDA, PThreads, MapReduce, Ruby On Rails
Operating Systems: OS X, Linux, Windows
Miscellaneous: Git, LaTeX, Shell Scripting

TEACHING EXPERIENCE

Grid Computing
- *Teacher Assistant supervised by Dr. Gholamhossein Dastgheybifard* *Spring 2014*

Software Architecture
- *Teacher Assistant supervised by Dr. Mostafa Fakhrahmad* *Spring 2014*

GPU Programming
- *Teacher Assistant supervised by Dr. Farshad Khunjush* *Fall 2013*

Design & Implementation of Programming Languages
- *Teacher Assistant supervised by Dr. Mohammad-Reza Mousavi* *Spring 2013*

Database Laboratory
- *Teacher supervised by Dr. Ali Hamzeh* *Spring 2015, Spring 2014, Spring 2013*

Fundamentals of Computer and Programming Using Python
- *Teacher Assistant supervised by Dr. Ahmad Towhidi* *Fall 2012*
- *Teacher Assistant supervised by Dr. Farshad Khunjush* *Fall 2010*

Principles of Programming Using C
- *Teacher Assistant supervised by Dr. Ali Hamzeh* *Spring 2012, Spring 2011*

Advanced Programming Using Java
- *Teacher Assistant supervised by Dr. Ali Hamzeh* *Fall 2011*

EXTRA-CURRICULAR ACTIVITIES

BreakTime In University Summer 2010 - Summer 2014
BreakTime In University is a three-day conference consists of up to 50 different workshops which has been held by a group of university students from the summer of 2007 at Shiraz University. Around 300 talented high schoolers attend this event every summer and its goal is to help them know their skills and potentials, how they can be creative and innovative and how they can work better in teams . In addition to these, they become familiar with university, different study majors and how to become successful researchers. I had the chance to be a part of the organization team for five years and had different responsibilities in preparation and program committees.

Internet and Technical Services Assistant
16^{th} *CSI International Symposiums on Computer Architecture & Digital Systems and Artificial Intelligence & Signal Processing, Shiraz University, Shiraz, Iran* *May 2012*

REFERENCES

Dr. Farshad Khunjush, Assistant Professor, Shiraz University (khunjush@cse.shirazu.ac.ir)
Prof. Armando Fox, Professor, University of California, Berkeley (fox@cs.berkeley.edu)
Dr. Ali Hamzeh, Assistant Professor, Shiraz University (ali@cse.shirazu.ac.ir)

Last Update: April 2015