Mehran Shakerinava

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EDUCATION	◇ **B.Sc. in Computer Engineering**	2014 – Present

Department of Computer Engineering
Sharif University of Technology, Tehran, Iran
GPA: 17.47/20 (Last Two Years: 18.30/20)

RESEARCH INTERESTS

◇ **Machine Learning**: *Neural Networks & Reinforcement Learning*

◇ **Robotics**: *Intelligent Control & Autonomy*

RESEARCH EXPERIENCE

◇ **Machine Learning Laboratory (MLL)**
Undergraduate Research Assistant
Advisor: Prof. Mahdieh Soleymani Baghshah

- **Deep Reinforcement Learning**: Assisted senior M.Sc. student in thesis research. Implemented Deep Reinforcement Learning agents (DQN, A3C, etc.) and trained them on the Atari Learning Environment. Trained environment models using data gathered from trained agents by implementing the "Recurrent Environment Simulators" paper. Experimented with intrinsic rewards and exploration.

- **Geometric Deep Learning**: We introduced a novel definition of locality in graphs, equivalent to the commute distance of vertices. Such a measure of locality can be computed via spectral embedding of the graph. A notion of locality enables the construction of Convolutional Neural Networks that can process the graph. We had theoretically proved that this method would have certain appealing properties, but empirically the model could not outperform the state-of-the-art ("Graph Convolutional Networks") and thus, was not published.

◇ **High Performance Computing Architectures and Networks Laboratory (HPCAN) and IPM School of Computer Science**
Undergraduate Research Assistant
Advisors: Prof. Hamid Sarbazi-Azad & Prof. Pejman Lotfi-Kamran

- **Data Prefetching**: Developed and implemented novel architectures for spatial data prefetching. The work resulted in a *B.Sc. Thesis* and a conference paper in the highly prestigious *HPCA* symposium.

PUBLICATIONS

◇ M. Bakhshalipour, **M. Shakerinava**, P. Lotfi-Kamran, and H. Sarbazi-Azad, "Bingo Spatial Data Prefetcher," in *International Symposium on High-Performance Computer Architecture (HPCA)*, February 2019.

HONORS & AWARDS	◇ **Silver Medal** (Ranked ~15 among ~10,000)	Summer 2012
	21st *Iranian National Olympiad in Informatics*	
	◇ **1st Place**	Spring 2013
	Iranian Qualification Round at 1st *International Bayan Programming Contest*	
	◇ **1st Place**	Spring 2016
	Programming Contest at Iran's 3rd National Python Conference (*PyCon 2016*)	
	◇ **2nd Place** (Among ~20 teams)	Fall 2016
	1st *Gatuino Hardware Competition* at Sharif University of Technology	

TEACHING EXPERIENCE

◇ **Instructor**
Informatics Olympiad (2012 – 2015)
NODET High-School

Taught topics on Combinatorics, Graph Theory, Algorithms, and Programming.

◇ **Teaching Assistant**
Fall 2016 - Advanced Programming
Sharif University of Technology, Tehran, Iran

Held a recitation class on Regular Expressions. Designed and graded a Quiz on Object-Oriented Programming and Regular Expressions. Designed a programming assignment.

◇ **Teaching Assistant**
Spring 2018 - Artificial Intelligence
Sharif University of Technology, Tehran, Iran

Designed and graded assignments, covering Markov Decision Processes, Reinforcement Learning, Bayesian Networks, and Hidden Markov Models. Designed programming assignments on Reinforcement Learning and Perceptrons. Held recitation classes for clarifying and solving assignments. Answered newsgroup/email queries.

SELECTED COURSES

◇ **B.Sc., Sharif University of Technology**:

- Intro to Programming (20/20)
- Multivariate Calculus (20/20)
- Advanced Programming (19.5/20)
- Data Structures & Algorithms (20/20)
- Computer Architecture (19.7/20)
- Automata & Compilers (20/20)

- Artificial Intelligence (18.6/20)
- Computer Networks (18.7/20)
- Signals & Systems (19/20)
- Real-Time Systems (18.2/20)
- Foundations of Neuroscience (17.8/20)
- B.Sc. Thesis (20/20)

SELECTED PROJECTS

◇ **2048 AI**
Fall 2014 - Intro to Programming Open-ended Homework Problem

An AI for the game 2048, based on Monte-Carlo tree search and a custom evaluation function. It's able to reach the 4096 tile.

◇ **Flight Control Game**
Fall 2014 - Intro to Programming Project

A clone of Flight Control written in C with GTK.

◇ **Bare Metal Raspberry Pi Programming**
Fall 2015 - Computer Structure & Language Project

Programmed a Raspberry Pi in ARM assembly to draw the Sierpinski triangle with a Rule 90 cellular automaton. *(Best class project)*

◇ **15-Puzzle AI & GUI**
Fall 2015 - Advanced Programming Midterm Project

A GUI for a 15-Puzzle game, and an AI that can solve it. Written in C++ with Qt.

◇ **Pacman Game**
Fall 2015 - Advanced Programming Final Project

A clone of classic Pacman written in C++ with Cocos2d-x.

◇ **Pipelined Processor**
Spring 2016 - Computer Architecture Bonus Project

Verilog implementation of the 5-stage classic RISC pipeline.

◇ **Cython Compiler**
Fall 2016 - Automata & Compilers Project

Wrote a compiler for a made-up programming language called Cython. The compiler used LALR(1) parsing and was written in C++ with Flex, Bison, and LLVM.

◇ **FPGA Odometry**
Fall 2016 - Digital Systems Design Project

Implemented odometry in C on Arduino and afterward, in Verilog on FPGA. Constructed a differential drive robot with optical wheel encoders (consisting of encoder disks and photoelectric sensors), and tested the implementation on it successfully. *(Best Class Project)*

◇ **Network Protocols**
Spring 2017 - Computer Networks Programming Assignments

Implemented DHCP, TCP, and BGP in Java.

◇ **Local Search**
Spring 2017 - Artificial Intelligence Programming Assignment

Implemented Hill-climbing, Simulated Annealing, and Genetic Algorithm to solve a discrete optimization problem.

◇ **Video Streaming WiFi Robot**
Spring 2018 - Hardware Lab

Assembled and programmed a WiFi-controlled differential drive robot with a camera, based on the Arduino platform. The video is streamed to a responsive web-based UI from which the robot can be remotely controlled.

◇ **FSM to Ladder Logic**
Spring 2018 - Industrial Automation Lab

Designed a simple algorithm for transforming FSM controllers into Ladder Logic programs.

VOLUNTARY WORK

◇ **8th and 9th Sharif AI Challenge**
Sharif University of Technology, Tehran, Iran (2016 & 2017).
Technical Staff (C++ Client)

SKILLS	⋄ Assembly, C/C++, Java, Python, MATLAB, TensorFlow, Git, Verilog, HSpice, ModelSim, Quartus, FPGA, Microcontroller, Arduino, SQL, HTML, CSS, Javascript, Bash, Linux, LaTeX

LANGUAGES	⋄ Persian (Mother Tongue)
	⋄ English (Fluent)

- TOEFL (Reading: 30, Listening: 30, Speaking: 27, Writing: 26)
- GRE (Quantitative: 170, Verbal: 162, Writing: 3.5)

⋄ Swedish (Basic)