

Mohammad Mahdi Rahimi

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Research Interests

Theory Artificial Intelligence, Reinforcement Learning, Game Theory, Ethics and Sociology

Practice Robotics, Multi-Agent Systems, Big-Data and Distributed Processing, Web and Information retrieval

Research Experience

Amirkabir University of Technology

4-Years

UNDERGRADUATE RESEARCH ASSISTANT

Feb. 2015 – Feb. 2019

- Implementation of the AI and the Optimization algorithms for **real-time vision-guided multi-agent** soccer robotic A.K.A. **ROBOCUP SSL**.
- Implementation of a **Reinforcement Learning** for kick-off plan positioning.
- Implementation of a user-friendly **Graphical Plan Designer** and **Plan Execution Engine** that anyone can design a strategy **without any code**.
- More than 2 years of **Leadership Experience** in a team larger than 20 members.
- Developer and Maintainer of **Grsim** the official open-source simulator of Robocup-SSL (+21 contributors, +68 forks).
- Re-basing the **Robocup SSL** base code from monolithic to a **multi-agent distributed** architecture on **ROS** framework.

Education

PhD. Candidate in Electrical Engineering

KAIST

ARTIFICIAL INTELLIGENCE

Sep. 2020 - Exp. Jul. 2025

- **Advisor:** Prof. JeaKyun Moon

B.Sc. in Computer Engineering

Amirkabir University of Technology

SOFTWARE

Sep. 2017 - Exp. Jul. 2020

- **Advisor:** Prof. Mohammad Mahdi Ebadzadeh
- **Thesis Title:** Multi-Agent Deep Reinforcement Learning on Soccer Robot
- **Description:** The goal of this project is to accomplish a simple task of a soccer match by using **DeepRL** on a **multi-agent robots**, to reach this goal; I implemented a 3D soccer simulator, a distributed multi-agent software architecture and a MARL method on the ROS framework.

B.Sc. in Electrical Engineering

Amirkabir University of Technology

TELECOMMUNICATION

Mar. 2015 - Exp. Jul. 2017

- **Advisor:** Prof. MohammadAzam Khosravi
- Entering Top Technical University of Iran as a **Talented Student** without taking national exam when I was **16**.
- **Withdrawal** at the end of the second year to focus on Software Engineering

Publication

ROS-based Architecture for Multi-agent Soccer Robots

FIRA World Cup and Summit

FIRA ROBOWORLDCUP AND CONGRESS 2019

2019

- Extended Abstract: Multi-Agent Architecture for Soccer Robots based on ROS, **M.M. Rahimi et al.** [Link](#)
- 3-Min Oral Presentation, **M.M. Rahimi** [Link](#)

Parsian Extended Team Description Paper

RoboCup Competitions

THE ANNUAL ROBOCUP INTERNATIONAL SYMPOSIUM

2015 - 2019

- PARSIAN 2019 Extended Team Description Paper, K. Behzad et al. [Link](#)
- PARSIAN 2018 Extended Team Description Paper, **M.M. Rahimi et al.** [Link](#)
- PARSIAN 2017 Extended Team Description Paper, **M.M. Rahimi et al.** [Link](#)
- PARSIAN 2016 Extended Team Description Paper, **M.M. Rahimi et al.** [Link](#)
- PARSIAN 2015 Extended Team Description Paper, A. Zolanvari et al. [Link](#)

OPEM: Open Source PEM Cell Simulation Tool

JOSS

THE JOURNAL OF OPEN SOURCE SOFTWARE

2018

- Report about Implementation and Usage of the OPEM package.
- Published On The Journal of Open Source Software. [Link](#)

QPage: Free Project For Creating Academic Homepage Without Any Code

Zenodo

DEVELOPER AND AUTHOR

2017

- Report about Implementation and Usage of the QPage package.
- Published On Zenodo. [Link](#)

Program Committees

2019	Advisory Board , AI WorldCup	S. Korea, KAIST
2019	League Co-Chair , Fira RoboWorld Cup	S. Korea, Changwon
2019	League Chair , FIRACup IranOpen	Iran, AUT
2018	Technical Committee , Fira RoboWorld Cup	Taiwan, NTNU
2018	Technical Committee , AI WorldCup	S. Korea, KAIST
2018	Technical Committee , Robocup IranOpen	Iran, QAIU
2018	Technical Committee , FIRACup IranOpen	Iran, AUT
2017	Technical Committee , FIRACup IranOpen	Iran, AUT
2017	Organization Committee , Robocup IranOpen	Iran, QAIU
2016	Organization Committee , FIRACup IranOpen	Iran, AUT

Honors & Awards

INTERNATIONAL

2019	EurAI Full-Travel Grant , The 2019 ACAI Summer School: AI for Multi-Agent Worlds	Chania, Greece
2018	Finalist, Top 14 Among 3,224 Teams , Alibaba (Tianchi) BigData Competition: Zero Shot Image Recognition	China
2018	Finalist, Top 40 Among 780 Teams , Russian AI Challenge : Code Ball (3D multi-agent soccer simulation)	Russia
2018	3rd Place , FIRA Robo World Cup: 2D Soccer Simulation	Taichung, Taiwan
2018	3rd Place , FIRA Robo World Cup: Robot Challenge Simulation	Taichung, Taiwan
2017	4th Place , RoboCup: Small Size League	Nagoya, Japan
2016	6th Place , RoboCup: Small Size League	Leipzig, Germany
2015	8th Place , RoboCup: Small Size League	Hefei, China
2014	1st Place , RoboCup: Junior Soccer League	Joao Pessoa, Brasil
2014	Spirit of RoboCup Award , RoboCup: Junior Soccer League	Joao Pessoa, Brasil
2014	Best Poster and Presentation Award , RoboCup: Junior Soccer League	Joao Pessoa, Brasil

DOMESTIC

2017	Technical Challenge Championship , IranOpen RoboCup: Small Size League	Tehran, Iran
2017	3rd Place , IranOpen RoboCup: Small Size League	Tehran, Iran
2017	4th Place Among 964 Teams , Sharif AI Challenge 2017	Tehran, Iran
2016	1st Place , IranOpen Fira RoboWorldCup: Soccer Robots (MirosoT)	Tehran, Iran
2016	1st Place , Amirkabir AI Competition : Othello Player	Tehran, Iran
2014	2nd Round Qualified , The Iranian Mathematical Olympiad	Tehran, Iran
2014	2nd Round Qualified , The Iranian Informatics Olympiad	Tehran, Iran

Teaching

Artificial Intelligence Course - TA

AMIRKABIR UNIVERSITY OF TECHNOLOGY - PROF. AHMAD NIKABADI

2 - Semester

Sep. 2018 - Jun. 2019

- Teaching Evolutionary Search and Optimization Algorithm
- Prepare the **Final Project** and **Grading** of home-works

Advance Programming Course - TA

AMIRKABIR UNIVERSITY OF TECHNOLOGY - PROF. AMIR JAHANSHAHI

1 - Semester

Jan. 2018 - Jun. 2018

- Teaching **Bash**, **Git**, **Web Front-End** and **Databases** as side workshops
- Grade Home-works and review solutions in Class.

Basic Programming Course - TA

AMIRKABIR UNIVERSITY OF TECHNOLOGY - PROF. AMIR JAHANSHAHI

1 - Semester

Sep. 2017 - Jan. 2018

- Teaching **C** and **C++**
- Review solutions of home-works in class

Workshop Robotic Instructor

AMIRKABIR UNIVERSITY OF TECHNOLOGY - ROBOTIC SUMMER SCHOOL

4 - Summer

2015 - 2018

- Being the Teacher of the event for four continuous year.
- Teaching **Linux**, **Git**, **C++**, **Python**, **Qt Frameworks**, **ROS Framework** and **Gazebo** in Basic and Advance level in eighteen 6-hour sessions.

Work Experience

Data Engineer

MCI TELECOMMUNICATIONS (THE LARGEST TELECOM COMPANY IN MIDDLE-EAST)

Ongoing

Jun. 2019 - PRESENT

- Work on **Hadoop Ecosystem** and tools like **Hive**, **Yarn**
- Work with distributed queues **Zookeeper**, **Kafka** and **Avro**
- Work with **Elasticsearch**, **Logstash**, **Kibana** and **Beats** for collecting data specially logs and metrics
- Analyse and process data with **Spark** and **Flink**
- Visualise the result with **Grafana**
- distributed deployment and configuration management with **Redhat Ansible**
- Core **R&D** member for **Bigdata** solutions in MCI
- **Individually** developed and deployed the first distributed full stack ELK platform for **Real-Time Monitoring** of MCI DWBI Project.

DW/BI Engineer

MCI TELECOMMUNICATIONS

6-month

Jan. 2019 - Jun. 2019

- Working with Oracle RDBMS and Tools like: **ODI** - **OBIEE** - **Oracle Cloud**
- Built and deployed **ETL packages**, focusing on high-availability, **Fault Tolerance**, and **Auto-Scaling**.
- Developed **KPI Dashboards** to control system and product health.
- Development of **Telecom Interconnect** analysis area from scratch to **FACT & DIM** level

Software Developer

BRTEL(BLUE-RAY TELECOMMUNICATIONS)

1-Year

Sep. 2015 - Sep. 2016

- Work with **Rabbit-MQ** and **MySQL** for fast and reliable message passing.
- implementation pf **Value-Added Services** based on SMS.
- Develop **Android** and **IOS** application for fan-service of Iranian soccer teams.
- Worked in a **Agile** team with **JIRA** management.

Robotic Teacher

SALAM HIGH SCHOOL

1 - Year

Sep. 2014 - Sep. 2015

- Teach embedded system programming on **Micro-Controllers** with C
- Teach basic algorithm, data structure and **C** Programming Language

RoboCup Junior

HIGH SCHOOL RESEARCH

3-Years

Sep. 2011 - Sep. 2014

- A team of two omni-directional **autonomous soccer robots**.
- Work with Atmega16 micro-controller and **XBee**, **Gyroscope** and **Ultra-Sonic distance meter** modules.
- **Filtering IR sensors** on 38khz.
- Implement **Two-way communication** and collaboration between two soccer robots.
- Implement **PID-Controller** to fix robot direction and **DC-Motor velocity control**.

Skills

Mathematics	<ul style="list-style-type: none">• Calculus, Linear Algebra, and Discrete Mathematics since university• Geometry, Number Theory and Combinatorics since high school
Programming Languages	<ul style="list-style-type: none">• System: C/C++(10 Years), Bash/Zsh(5 Years), Python(5 Years), JAVA(4 Years), Rust(2 Years), Go(2 Years)• Web: JavaScript(6 Years), NodeJS(2 Years), HTML/CSS(6 Years)• Functional: Lisp(1 Year), Racket(1 Year)• Hardware: VHDL(3 Years), Verilog(1 Year)
Frameworks	Qt (6 Years), ROS (3 Years), OpenCV (3 Years), Tensorflow (2 Years), Pytorch (1 Year), OpenAI GYM (1 Year)
Simulations Platform	Gazebo (3 Year), Webots (2 Years), Mujoco (1 Year), V-Rep (1 Year)
Version Control	Git (6 Years), Subversion (3 Years)
Continuous Integration	Gitlab CI/CD (6 Years), Travis (4 Years), Circle CI (2 Years), Github Workflow (1 Year)
Operating Systems	MacOs (8 Years), Ubuntu (6 Years), Redhat (2 Years), SunOs (1 Year)
BigData Stack	Hadoop Ecosystem (1 Year), ELK Stack (1 Year), Kafka (1 Year), Spark (1 Year), Redis (1 Year)
Databases	Oracle (2 Years), Postgres (1 Year), MySQL (1 Year), Sqlite (6 Years)
Languages	Persian (native), English (10 Years), Arabic (4 Years), Korean (1 Year)

Open-Source Contribution

GENERAL

OH-MY-ZSH – Community-Driven Framework for Managing your ZSH Configuration.

Contributer

ROBBYRUSSELL/OH-MY-ZSH

- Add Spotify CLI support.
- Improve MacOS features

PYCM – Multi-class Confusion Matrix Library in Python

Contributer

SEPANDHAGHIGHI/PYCM

- Fine-tune Models and fix bug.
- Add OSX Support.
- Add test and CI on Travis.

QPAGE – Free Project For Creating Academic Homepage Without Any Code In 3min

Co-Owner

SEPANDHAGHIGHI/QPAGE

- Implementation of styles and templates.
- Add UNIX/MacOs Support.

OPEM – Open Source PEM Fuel Cell Simulation Tool

Co-Owner

ECSIM/OPEM

- MacOS Support and maintenance.
- Implement Static Simulation Analysis.
- Implement Test and CI on Travis.

GOPEM – GUI for OPEM Simulation

Creator

ECSIM/GOPEM

- Written in Python by **pyQt** and **matplotlib**
- Implement test and CI on Travis.
- Easy Install package deployed by **PyInstaller**.

Spotify-AdBlocker – Listen to Spotify - W/O Ads!

Creator

MAHI97/SPOTIFY-ADBLOCKER

- Written with **AppleScript**
- Mute, Replace and Remove ads from Spotify.

SpotifyControl – Search and Play Music from Spotify in Terminal

Creator

MAHI97/SPOTIFYCONTROL

- Written with **AppleScript**
- Manage all Spotify functionality including search.

ROBOCUP & FIRACUP

GrSim – RoboCup Small Size Robot Soccer Simulator

Maintainer

ROBOCUP-SSL/GRSIM

- Add OSX Support.
- Implement test and CI on Travis.
- Improve performance, fix bugs and add new rules and requirements.

FIRASim – FiraCup 2D Soccer Simulation Platform

Maintainer

FIRA-SIMUROSOT/FIRASIM

- Implementation of Robot models.
- Add Win/Linux/OSX Support.
- Implement test and CI on Travis.
- Improve performance, fix bugs and add new rules and requirements.

SimPlus – The RoboCup Rescue Simulation environment for Robocup Junior Rescue

Contributer

ROBOCUP-SIMPLUS/SIMPLUS-VREP

- Implementation of communication messages.
- Implementation of game server.
- Implementation of python client.
- Implementation of GRPC async protocol.

SSL-VISION – Shared Vision System For The RoboCup Small Size League

Contributer

ROBOCUP-SSL/SSL-VISION

- Add OSX Support.
- Implementation of new rules and requirements.

Remarkable Projects

SSL Visual Planner – A User Friendly software to arrange plans for SSL league

PARSIANROBOTICLAB/SSL-VISUAL-PLANNER

- Add OSX Support.
- Implementation in **C++ and Qt**

Parsian Robotic Lab.

Prof. Mohammad Azam Khosravi

SSL FEdit – Formation Editor For SSL

PARSIANROBOTICLAB/SSL-FEDIT

- Migrated from RoboCup Soccer Simulation 2D
- Implemented in **C++ and Qt**.

Parsian Robotic Lab.

Prof. Mohammad Azam Khosravi

RAIC2019 – RussianAICup, Soccer Platform using Long Term Prediction

PARSIANROBOTICLAB/RAIC2019

- Implemented in **Rust**
- Prediction of Ball and Agents in 3D Soccer Environment
- Multi-agent AI with Cooperation for Pass and Receive

Parsian Robotic Lab.

Prof. Mohammad Azam Khosravi

Simurosot-Middle – Simurosot Base Code MiroSot

PARSIANROBOTICLAB/SIMUROSOT-MIDDLE

- Implemented in **C++ and VisualStudio**.
- Strong debug tools with network tools.

Parsian Robotic Lab.

Prof. Mohammad Azam Khosravi

ZeroShot Learning for ZJU AI Competition (GAN Approach)

PARSIANROBOTICLAB/ZERO-SHOT-LEARNING

- GAN approach implementation
- Manifold implementation for classification

Parsian Robotic Lab.

Prof. Mohammad Azam Khosravi

ImageSegmentation – Image Segmentation by Hidden Markov Models

MAHI97/IMAGESEGMENTATION

- Written in **Python / Jupyter Notebook**
- Implement Naive Bayes and HMM for pixel labeling.
- Improve quality of segmentation by simulated annealing.

Probability Graphical Models Course.

Prof. Ahmand Nikabadi

PersianNews-Retrieval – All sort of Retrieval Process on already fetched Persian News

MAHI97/PERSIANNEWS-RETRIEVAL

- Written in **Python / Jupyter Notebook**
- Implement normalization, stemming, tokenizer and detect stop-words
- Improve quality search by invert indexing and **tf-idf** rankings

Information Retrieval course.

Prof. Ahmand Nikabadi

ClassicSearch – Implementation of Classic Search Algorithms for some Classic Problems

MAHI97/CLASSICSEARCH

- Written in **C++**
- Implement Bidirectional, BFS, A*, DFS and UCS Searches.
- Model and Solve 2D Navigation, Puzzle 15 and Water Buckets Problems.

Artificial Intelligence Course.

Prof. Ahmand Nikabadi

Non-Classic-Search – Beyond Search Algorithms

MAHI97/NON-CLASSIC-SEARCH

- Written in **Python**
- Implement All sort of Hill Climbing, Genetic and Simulated Annealing
- Model and Solve 8 Queen, Math Equations and Graph Partitioning Problems.

Artificial Intelligence Course.

Prof. Ahmand Nikabadi

OthelloPlayer – AI & Learning for Othello Game

MAHI97/OTHELLOPLAYER

- Written in **Java**
- Implement All MinMax Tree with **alpha-beta** pruning.
- Implementation of Opening Book and Ending Scenarios.
- Implementation of Genetic Optimizer to find weight through self-playing.

Artificial Intelligence Course.

Prof. Ahmand Nikabadi

InvertSearch – Positional Index and searching on Huge text data files with B-Trees

MAHI97/INVERTSEARCH

- Written in **C++ and Qt**
- All data structures like List and Vector implemented from Scratch.
- Using Balance trees for indexing and search.
- Multi-thread Processing.

Data Structure Course.

Prof. Mahdi Dehghan Takhtefoladi

FSM – Finite-State Machine, Automata, and Graph Computing

MAHI97/FSM

- Written in **C++ and Qt**
- Solve FSM language with backtracking.
- Remove Loop and improve the FSM.

Data Structure Course.

Prof. Mahdi Dehghan Takhtefoladi

Persian-Compiler – Just Another Persian Compiler

MAHI97/PERSIAN-COMPILER

- Written in pure **C** with help of **Yacc** and **Flex**
- Support Recursive function, array and pointers

Compiler Course.

Prof. Mohammad Reza Razzazi

NUMEX-Lang – A Pure Functional Interpreter for A Pure Functional Language

MAHI97/NUMEX-LANG

- Written in **Racket** (a functional PL driven from Lisp)

Programming Languages Course.

Prof. Mehran Soleyman Fallah

LSTM_FPGA – Implementation of LSTM in FPGA with VHDL

MAHI97/LSTM_FPGA

- Written in **VHDL**
- Deployed of the **Xilinx Spartan 3** FPGA Hardware
- Train and Test for simple **Translation** from Greek to English

FPGA Course.

Prof. Morteza Saheb Zamani

SAYEH – Basic Computer (Simple Architecture Yet Enough Hardware!)

MAHI97/SAYEH

- Written in **VHDL**
- Implementation of **Memory** and **16-bit CPU** (ALU, Controller and Data Path)
- Implementation of **Pipeline** with **Branch Prediction**.
- Implementation of **Cache** with multiple strategy for SAYEH.

Computer Architecture Course.

Prof. Saeed Shiry Gheydari

C-Compiler – A Compiler to Generate SAYEH Assembly Instruction from C Source Code

MAHI97/C-COMPILER

- Written in **C++**
- Implementation of **Lexical** and **Syntax** Analysis
- Implementation of **Assembler**.

Computer Architecture Course.

Prof. Saeed Shiry Gheydari

USART_GUI – GUI Application that connect to any device for Read and Write via USART

MAHI97/USART_GUI

- Written in **C++ and Qt**
- Support every OS and Platform for execution
- Support all sort of device that use USART with any Frequency

Micro-Controller Course.

Prof. Mohammad Mahdi Homayounpour

MircroProject – Receiving Text from PC and Translate to Morse Code Beep!

MAHI97/MIRCROPROJECT

- Design Electronic PCB with Altium Designer
- Assemble and Program the PCB
- Direct Connect to PC with USART

Micro-Controller Course.

Prof. Mohammad Mahdi Homayounpour

P2PFileTransfer – (Torrent) Sending File Peer-to-Peer from many source to many destination

MAHI97/P2PFILETRANSFER

- Written in **JAVA**
- Distributed file transfer from multiple source to multiple destination

Network Course.

Prof. Masoud Sabaei

CalcNet – Distribute Calculation over Network

MAHI97/CALCNET

- Written in **JAVA**
- Use Master-Slave Architecture for task handling.

Network Course.

Prof. Masoud Sabaei