Mohammad Mahdi **Rahimi**

No. 45, Noor 4th, Noor St., S. Mahallati town, Minicity, Tehran, IR. Iran

(+98) 912-110-9109 | mahi@kaist.ac.kr | mahi97.github.io | mahi97 | mohammadmahdi76 | Mahi | mahi97

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

Research Assistant

Sep. 2020 – Sep. 2025

Moon Lab - EE Department @ KAIST — *Prof. JeaKyun Moon*

- Exploring role of **Memory Augmentation** on **Deep Learning**
- Focusing of **Multi-Agent Reinforcement Learning** methods and **Distributed/Federated** learning.

Research Assistant

Dec. 2017 – Dec. 2019

Cognitive Robotics Lab - CS Department @ Amirkabir University of Technology — *Prof. Saeed Shiry Gheydari*

- Implementation of **AI** and **Control** algorithms for 2D Soccer Simulation.
- Implementation of **Vision** and **Control** for Rescue Simulation on **Gazebo** and **ROS**.

Research Assistant

Feb. 2015 – Feb. 2019

Parsian Robotics Lab - EE Department @ Amirkabir University of Technology — *Prof. Mohammad Azam Kosravi*

- Implementation of the AI and the Optimization algorithms for **real-time vision-guided multi-agent** soccer robotic, extbfROBOCUP 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.

High School Research

Sep. 2011 - Sep. 2014

EMJA Robotics Lab - EmamJavad High School

- 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**.

Work Experience

Data Engineer

1-Year

MCI Telecommunications (**The Largest TeleCom Company in Middle-East**) — *Dec. 2019 - Dec. 2020*

- 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

1-Year

MCI Telecommunications — *Jan. 2019 - Dec. 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

1-Year

BRTel(Blue-Ray Telecommunications) — *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.

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 without taking national exam when I was **16** as a **Talented Student**.
- **Withdrawal** at the end of the second year to focus on Software Engineering

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*

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**

Teaching

Artificial Intelligence - TA
Fall 2019

CE Department @ Amirkabir University of Technology — *Prof. Ahmad Nickabadi*

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

Artificial Intelligence - TA
Fall 2018

CE Department @ Amirkabir University of Technology — *Prof. Ahmad Nickabadi*

- **Grading** of home-works

Advance Programming - TA
Fall 2018

EE Department @ Amirkabir University of Technology — *Prof. Amir Jahanshahi*

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

Basic Programming - TA
Fall 2017

EE Department @ Amirkabir University of Technology — *Prof. Amir Jahanshahi*

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

Robotic Summer School - Workshop Instructor
2015 - 2018

CE @ Amirkabir University of Technology — *Prof. Soursh SadeghNejad*

- 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.

Skills

Programming Languages	• **System: C/C++**(10 Years), **Bash/Zsh**(5 Years), **Python**(5 Years), **JAVA**(4 Years), **Rust**(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), **Pytorch**(2 Year), **Tensorflow**(1 Years), **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)
Databases	**Oracle**(2 Years), **Postgres**(1 Year), **MySql**(1 Year), **Sqllite**(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

NTM – Neural Turing Machine, a Robust Implementation

Moon Lab.

Mahi97/NTM

Prof. JeaKyun Moon

- Implementation in **Pytorch**
- Find and applied tricks to make NTM robust

SUMO – Reinforcement Learning on Crossroad Traffic Lights.

Game Theory and MARL course

Mahi97/SUMO

Prof. Jinkyoo Park

- Implementation in **Pytorch**
- Implemented both **DQN** and **DDPG** for discete and continous cases

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

Parsian Robotic Lab.

ParsianRoboticLab/SSL-Visual-Planner

Prof. Mohammad Azam Khosravi

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

SSL FEdit – Formation Editor For SSL

Parsian Robotic Lab.

ParsianRoboticLab/ssl-fedit

Prof. Mohammad Azam Khosravi

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

RAIC2019 – RussianAICup, Soccer Platform using Long Term Prediction

Parsian Robotic Lab.

ParsianRoboticLab/RAIC2019

Prof. Mohammad Azam Khosravi

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

Simurosot-Middle – Simurosot Base Code MiroSot

Parsian Robotic Lab.

ParsianRoboticLab/Simurosot-Middle

Prof. Mohammad Azam Khosravi

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

ZeroShot Learning for ZJU AI Competition (GAN Approach)

Parsian Robotic Lab.

ParsianRoboticLab/Zero-Shot-Learning

Prof. Mohammad Azam Khosravi

- GAN approach implementation
- Manifold implementation for classification

ImageSegmentation – Image Segmentation by Hidden Markov Models

PGM Course.

Mahi97/ImageSegmentation

Prof. Ahmand Nikabadi

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

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

Information Retrieval course.

Mahi97/PersianNews-Retrieval

Prof. Ahmand Nikabadi

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

ClassicSearch – Implementation of Classic Search Algorithms for some Classic Problems

Artificial Intelligence Course.

Mahi97/ClassicSearch

Prof. Ahmand Nikabadi

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

Non-Classic-Search – Beyond Search Algorithems

Artificial Intelligence Course.

Mahi97/Non-Classic-Search

Prof. Ahmand Nikabadi

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

OthelloPlayer – AI & Learning for Othello Game

Artificial Intelligence Course.

Mahi97/OthelloPlayer

Prof. Ahmand Nikabadi

- 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.

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

Data Structure Course.

Mahi97/InvertSearch

Prof. Mahdi Dehghan Takhtefoladi

- 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.

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

Data Structure Course.

Mahi97/FSM

Prof. Mahdi Dehghan Takhtefoladi

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

Persian-Compiler – Just Another Persian Compiler

Compiler Course.

Mahi97/Persian-Compiler

Prof. Mohammad Reza Razzazi

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

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

Programming Languages Course.

Mahi97/NUMEX-Lang

Prof. Mehran Soleyman Fallah

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

LSTM_FPGA – Implementation of LSTM in FPGA with VHDL

FPGA Course.

Mahi97/LSTM_FPGA

Prof. Morteza Saheb Zamani

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

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

Computer Architecture Course.

Mahi97/SAYEH

Prof. Saeed Shiry Gheydari

- 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.

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

Computer Architecture Course.

Mahi97/C-Compiler

Prof. Saeed Shiry Gheydari

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

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

Micro-Controller Course.

Mahi97/USART_GUI

Prof. Mohammad Mahdi Homayounpour

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

MircroProject – Receiving Morse Code from PC and Translate to Beep with any Frequency

Micro-Controller Course.

Mahi97/MircroProject

Prof. Mohammad Mahdi Homayounpour

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

P2PFileTransfer – (Torrent) Sending File Peer-to-Peer over from multiple source and receiver

Network Course.

Mahi97/P2PFileTransfer

Prof. Masoud Sabaei

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

CalcNet – Distribute Calculation over Network

Network Course.

Mahi97/CalcNet

Prof. Masoud Sabaei

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