

Erfan Fathi

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EDUCATION

Qazvin Islamic Azad University, Qazvin, Iran

▪ **B.S. in Software Engineering**

2015 – 2021

- Thesis: Learning go-to-ball skill for small size robots
- Thesis Score: 4.00 / 4.00

Hekmat High School, Tehran, Iran

▪ **Diploma in Mathematics and Physics**

2011 – 2015

RESEARCH EXPERIENCE

Mechatronics Research Laboratory, Small Size League

▪ **Artificial Intelligence Researcher**

Feb 2019 – Present

- Supervisor: Dr Aras Adhami Mirhosseini
- Focus: Robotics, Reinforcement Learning, Machine Learning.

Mechatronics Research Laboratory, Humanoid Soccer League

▪ **Head Of Software Development**

Nov 2018 – Feb 2019

- Supervisor: Dr Mohammad Norouzi
- Focus: Computer Vision, Robotics, Management.

▪ **Computer Vision Researcher**

Sep 2016 – Nov 2018

- Supervisor: Dr Mohammad Norouzi
- Focus: Computer Vision, Machine Learning, Robotics.

PUBLICATIONS

PREPRINT

Tafazzol, S., Fathi, E., Rezaei, M., & Asali, E. (2021). **Curious Exploration and Return-based Memory Restoration for Deep Reinforcement Learning.** arXiv preprint arXiv:2105.00499.

CONFERENCES

Kasaeian Naeini, M., Ganjali Poudeh, A., Rashvand, A., Dalvand, A., Rabbani Doost, A., ... and Fathi, E., “**MRL Extended Team Description 2020,**” in *Mechatronics Research Lab, Electrical Engineering and Computer Science Department*, Qazvin Islamic Azad University, Qazvin, Iran, 2020.

Teimouri, M., Fatehi, A., Gholami, A., Moradi, M. Fathi, E. and etc., “**MRL Team Description Paper for Humanoid TeenSize League of RoboCup 2019,**” in *Mechatronics Research Lab, Department of Computer and Electrical Engineering*, Qazvin Islamic Azad University, Qazvin, Iran, 2019.

Teimouri, M., Fatehi, A., Mahmoudi, H., Ha, P. S., Gholami, A., Delavaran, M. H., ... and Fathi, E., “**MRL Team Description Paper for Humanoid KidSize League of RoboCup 2018,**” in *Mechatronics Research Lab, Department of Computer and Electrical Engineering*, Qazvin Islamic Azad University, Qazvin, Iran, 2018.

PROJECTS

▪ **Curriculum learning in parameterized action space**, MRL-SSL Laboratory

2021

The goal of this project was to learn how to score a goal for a mobile robot. In the first place, we learned simple skills like go-to-ball and go-to-point with the help of deep reinforcement learning. Next, we created a main network that would score using these small networks.

▪ **Learning go-to-ball skill for small size robots**, MRL-SSL Laboratory

2019

Go-to-ball is a skill where the robot learns to navigate to the ball and get the ball on its dribbler. In this project, we learn an agent in continuous action space with deep deterministic policy gradient (DDPG) Algorithm.

▪ **Goal Posts Detection in Humanoid Soccer Field**, MRL-HSL Laboratory

2018

This was a project for detecting goalposts in a soccer field. This project is implemented by machine learning approaches. We use the HAAR feature of goalposts and learn it with an Adaboost classifier.

▪ **Obstacle Avoidance Implementation On Humanoid Robot**, MRL-HSL Laboratory

2017

Obstacle Avoidance implemented on humanoid soccer robots. In this project, we detect objects in the soccer field with image processing and we pass them through path planning algorithms (A*).

- **Camera Calibration using PSO Algorithm**, MRL-HSL Laboratory 2017
To make an accurate world model a robot needs to estimate the distance of the objects relative to an egocentric coordinate system. We use kinematics and robot motors to get the robot distance to our objects. To get the exact distance, the motors must be calibrated. The robot then detects a chessboard using the camera and calibrates the motors with the PSO algorithm.
- **Recognize Boundary of Soccer Field**, MRL-HSL Laboratory 2016
The robot should not leave the playing field. For this reason, it must recognize the end of the soccer field. We used a convex hull algorithm for this project.

AWARDS

- **Research Scholarship in Qazvin Islamic Azad University**, Qazvin, Iran. 2016 – 2021
- **1st place of RoboCup World Competition**, Montreal, Canada. 2018
- **1st place of RoboCup Asia Pacific**, Kish, Iran. 2018
- **1st place of RoboCup Iran Open**, Tehran, Iran. 2018
- **Participant in Deep Learning Summer School**, University of Tehran, Iran. 2018
- **1st place in the Technical Challenge of RoboCup World Competition**, Nagoya, Japan. 2017
- **1st place of RoboCup Asia Pacific**, Bangkok Thailand. 2017
- **2nd place of RoboCup Iran Open**, Tehran Iran. 2017
- **Participant in Deep Learning Summer School**, University of Tehran, Iran. 2017

TALKS & PRESENTATION

Introduction To Deep Learning With Pytorch, MRL-SSL Laboratory

- **Instructor** 2020
 - It was a 4-hour workshop for my teammates interested in deep learning. The popular Pytorch framework was used to provide examples. In this workshop, we talk about theoretical and practical subjects in deep learning such as network architecture, regression, classification, gradient descent algorithm, learning cycle, loss functions, etc.

A Review On Metaheuristic Algorithms, Qazvin Islamic Azad University

- **Presentor** 2018
 - A presentation to show how meta-heuristic algorithms like particle swarm optimization (PSO), genetic algorithm (GA) work. This presentation was for one of my undergraduate courses and came with practical examples. I also got a complete score for the presentation.

LANGUAGES

- English: IELTS Test will be taken soon. (Upper-Intermediate)
- Persian: Native language.

SKILLS

Social Skills

Strong teamwork, Quick learner and highly self-motivated, Executive Planning

Methodologies

Machine Learning, Deep Learning, Computer Vision, Reinforcement Learning, Image Processing

Programming Languages

Python, C/C++, C#, Java, JavaScript, Lua

Familiar With

Shell Script, SQL, MongoDB, Git, REST APIs, Make, CMake, Linux, \LaTeX

Misc

PyTorch, TensorFlow, OpenCV, Matplotlib, Scikit-Learn, Numpy, Pandas

INTERESTS

Basketball, Classical Guitar, Meditation.

REFERENCES

- **Dr Mohammad Norouzi**
Assistant Professor and Director at MRL(Mechatronics Research Laboratory)
Qazvin Islamic Azad University, Qazvin
norouzi@qiau.ac.ir
- **Dr Aras Adhami Mirhosseini**
Lecturer
University of Tehran, Tehran
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