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, Deep Learning, Machine Learning.

Mechatronics Research Laboratory, Humanoid Soccer League

- Software Supervisor — Nov 2018 – Feb 2019
  - Supervisor: Dr Mohammad Norouzi
  - Focus: Computer Vision, Robotics, Deep Learning, Management.
- Computer Vision Researcher — Sep 2016 – Nov 2018
  - Dr Mohammad Norouzi
  - Focus: Computer Vision, Machine Learning, Deep 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.

AWARDS

- 1st place of RoboCup Asia Pacific, Kish, Iran. — 2018
- Participant in Deep Learning Summer School, University of Tehran, Iran. — 2018
- 1st place of RoboCup World Competition, Montreal, Canada. — 2018
- 1st place of RoboCup Iran Open, Tehran, Iran. — 2018
- Participant in Deep Learning Summer School, University of Tehran, Iran. — 2017
- 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
- Research Scholarship in Qazvin Islamic Azad University, Qazvin, Iran. — 2016 – 2021
  Half-tuition scholarship for undergraduate studies.

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 Implement 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.

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.

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: Intermediate (listening, reading); basic (speaking, writing).
- 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**
  PhD Candidate, Research Associate
  University of Technology, Sydney
  mohammad.norouzi@uts.edu.au
- **Dr Aras Adhami Mirhosseini**
  PhD Candidate, Research Associate
  University of Tehran, Tehran
  a.adhami@ece.ut.ac.ir