

# Mehdi Mehdikhani

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## RESEARCH INTERESTS

- **Robotics, Image Processing, Artificial Intelligence, Machine Learning, Human-Robot Interaction, Mechatronics, Control Theory, Embedded Systems, Algorithms**
- As an individual with a great enthusiasm for robotics and computer vision, I am interested in designing and enhancing technologies to create a positive impact on solving real-world problems. Consequently, computer science methods (image processing, artificial intelligence, machine learning, algorithms), control theory and embedded systems are my tools to encounter with robotics and computer vision challenges.

## EDUCATION

- **Isfahan University of Technology (IUT)**, B.Sc. in Computer Engineering (Software), Isfahan, Iran. 2012 – 2017 (expected).  
**Overall GPA:** 16.86/20  
**Last two years GPA :** 18.2/20  
**Thesis:** Theoretical study and practical implementation of Simultaneous Localization and Mapping (SLAM) and map-based indoor navigation, **Score: 20/20**, 2016  
**Supervisors:** [Prof. Mehdi Keshmiri](#), [Dr. Nader Karimi](#)
- **Pre-University Diploma**, Physics and Mathematics, Isfahan, Iran, **GPA: 19.81/20**, 2011-2012
- **High School Diploma**, Physics and Mathematics, Isfahan, Iran, **GPA: 19.62/20**, 2008-2011

## PROFESSIONAL EXPERIENCES AND PROJECTS

- **Research Assistant** at Advanced Robotics and Mechatronics Laboratory ([ARMLab](#)), Department of Mechanical Engineering, Isfahan University of Technology, Iran, 2016.
- **Design and construction of a differential drive mobile robot** with the ability to do simultaneous localization and mapping and map-based indoor navigation. Department of Mechanical Engineering, Department of Electrical and Computer Engineering, Isfahan University of Technology, Isfahan, Iran, 2016. (**B.Sc. Thesis**) - ([More details](#))
- **Design and construction of a high-precision polishing tool** with the ability to control machining forces. The tool can connect to a milling machine and control the force applied by its end effector. Designing and construction of embedded system and control software of the tool, with an innovative approach for force feedback. Department of Mechanical Engineering, Isfahan University of Technology, Iran, 2015. (**Industrial Project**) – ([More details](#))
- **HMI design and PLC programming** for pipelines pressure control and automatic scheduling of working hours in a water pumping station. Organon Sanaat Sepahan Co. Isfahan, Iran, 2016. (**Summer Internship** - Industrial Automation) – ([More details](#))
- **Managing a rescue team** consisting of nine main members. Design and construction of a remote-control belt-type mobile robot with a compatible configuration for rescue operations and a quad-rotor with the ability to do semi-autonomous flight and 3D SLAM. Department of Mechanical Engineering, Isfahan University of Technology, Iran, 2014 - Present. (**Team Manager**) – ([More details](#))
- **A model learning approach for general video game playing (GVGP)**. Developing an approach for learning model of world in a video game, when the exact model of world is not available. Actor attempts to learn the model of the environment of a specific game, by repeating game and gaining experience. In each step, the player uses the updated model and after each game, the model will be updated. The final model is general and can be utilized in every model-based search algorithm. (**in preparation** for the journal of “IEEE Transactions on Computational Intelligence and AI in Games”) – ([More details](#))

- **Design and construction of a simple thermal camera** by TPA81 thermopile sensor. Department of Electrical and Computer Engineering, Isfahan University of Technology, Iran, 2014– ([More details](#))
- **Two axis gimbal prototype with Dynamixel servo motors and Xsens IMU**. Department of Mechanical Engineering, Isfahan University of Technology, Iran, 2013 – ([More details](#))
- **Design and implementation of an embedded time and date server**. Department of Electrical and Computer Engineering, Isfahan University of Technology, Iran, 2013 – ([More details](#))
- **Design and construction of a junior rescue robot** in high school and **ranked 1<sup>st</sup>** in thirteenth [Kharazmi young competition](#) in rescue robot junior league, 2011. – ([More details](#))
- **Design and construction of a Bowling Robot** at the age of fourteen that was able to detect and hit pins, 2007. – ([More details](#))

## PATENT

- **Expandable data acquisition and motor control device**. The device is an interface between a controller (PC, Microcontroller, PLC) and various types of rotary encoders, motor drivers and typical sensors. Most important feature of this device is the ability to connect to more peripherals by adding extension boards to the device. Patent acquired in Iran. 2016 – ([More details](#))

## HONORS AND AWARDS

- **Ranked 4<sup>th</sup>** (in the top 5%) among 73 electrical and computer engineering undergraduates, 2012 - 2016.
- Recognized as **gifted and talented Student** and granted **Gifted Student Award**, Isfahan University of Technology, Iran, 2012.
- Ranked among the first 0.07% of more than 260,000 participants in the national entrance exam of universities, 2012.
- **Ranked 1<sup>st</sup>** in the [Kharazmi young competition](#) (The highest ranked scientific competition in Iran hold by top Iranian scientific organizations including “Science & Research Ministry, Education Ministry, Industrial Research Organization, Nation Organization for Development of Exceptional Talents), Robotic branch – 2011.
- Recognized as **gifted and talented student** in the nationwide entry exam of National Organization for the Development of Exceptional Talents ([NODET](#)), 2003 and 2006.

## TECHNICAL SKILLS

- **Programming Languages:** [Python](#), [C++](#), [C#](#), Java, SQL, Lisp, Prolog, AIML, Processing, JavaScript
- **Frameworks & Libraries:** [ROS](#), [OpenCV](#), PCL, OpenNI, Boost, Qt
- **Hardware:** [AVR](#), ARM, [Arduino](#), [Raspberry Pi](#), Siemens PLCs and HMIs, Various sensors and modules, FPGA, verilog
- **CAD Softwares:** [Altium Designer](#), LibreCAD, AutoCAD Electrical, [Proteus](#), Eagle, Axure RP
- **Development Tools & IDEs:** [Visual Studio](#), Qt Creator, Atmel Studio, Keil  $\mu$ Vision, Code Vision AVR, IntelliJ IDEA, PyCharm
- **Operation Systems:** [Ubuntu](#), Microsoft Windows
- **Simulators:** [Gazebo](#), V-rep
- **Other:** Microsoft Office ([Word](#), Excel, [PowerPoint](#)), [L<sup>A</sup>T<sub>E</sub>X](#), Multi-Threading, [MATLAB](#) and Simulink, Network Programming, Computer Networks, Unity game engine, [Microsoft SQL Server](#), Microsoft Project, Blender, MeshLab, Bizagi BPMS, Photoshop

## TEACHING EXPERIENCES

- **Teaching Assistant**, Advanced Programming, Isfahan University of Technology, Department of Electrical and Computer Engineering – Fall 2014, Spring 2014
- **Laboratory Instructor**, Advanced Programming (C++), Isfahan University of Technology, Department of Electrical and Computer Engineering - Spring 2014, Fall 2015
- **Workshop Instructor**, ROS & Gazebo workshop, Isfahan University of Technology, Department of Mechanical Engineering - 2015
- **Workshop Instructor**, PCB Design workshop, Isfahan University of Technology, Department of Electrical and Computer Engineering – 2015
- **Free Discussion Moderator**, Held and moderated Turkish free discussion sessions, Isfahan University of Technology, 2013
- **Robotic Tutor**, Robotics and electronics tutor in Professor Hessabi student research center, 2011. ([More details](#))

## COURSE-RELATED PROJECTS

- Designing and implementation of an attendance system using face recognition.
- Programming a chess player agent using minimax algorithm and alpha-beta pruning (C++).
- Developing and deploying an E-Voting webservice.
- Developing Chess, Super Mario and a simplified excel program using C++.
- Developing a purchase request workflow using Bizagi bussiness process management system.
- Solving the n-queens problem using genetic algorithms.
- Pattern recognition using neural networks in matlab.
- Design and implementation of an online bookstore database.
- Simulating ATM using Stateflow toolbox of matlab.
- Prototyping and analysis of user interface of an online store.
- Data analysis and business intelligent on a data warehouse.
- Designing a MIPS CPU with Verilog on FPGA.
- Designing a simplified model of CPU.
- Project management of a sport club automation project.

## LANGUAGE SKILLS

- **English:** Full Professional Proficiency
- **Persian:** Native
- **Azerbaijani:** Native (Bilingual Proficiency)
- **Turkish:** Minimum Professional Proficiency

## RELATED ACADEMIC COURSES

- |                                     |         |                                     |         |
|-------------------------------------|---------|-------------------------------------|---------|
| ○ Engineering Mathematics           | 20/20   | ○ Computer Networks                 | 17.5/20 |
| ○ Artificial Intelligence           | 17.5/20 | ○ Digital System Design             | 18.3/20 |
| ○ Design and Analysis of Algorithms | 18.8/20 | ○ IT Project Management             | 20/20   |
| ○ Human Computer Interaction        | 19.4/20 | ○ E-Commerce                        | 19.2/20 |
| ○ Embedded Systems Design           | 20/20   | ○ Industrial Management & Economics | 18.8/20 |
| ○ Microprocessors                   | 20/20   |                                     |         |

## UNOFFICIAL ATTENDANCE COURSES

- Signals and Systems
- Automatic Control
- Linear Algebra
- Fundamentals of Image Processing
- Mechanics of Robotic Systems

## **TECHNICAL PRESENTATIONS**

- **Real-time operation systems**, Isfahan University of Technology, Department of Electrical and Computer Engineering, 2015
- **Robot Gestures Make Difficult Tasks Easier**, (Human Computer Interaction), Isfahan University of Technology, Department of Electrical and Computer Engineering, 2015,
- **Software Engineering for embedded systems**, Isfahan University of Technology, Department of Electrical and Computer Engineering, 2015
- **Robotic Competitions, opportunities and challenges**, Isfahan University of Technology, Department of Mechanical Engineering, 2014
- **Introduction to Reinforcement learning**, (Special Topics in Computer), Isfahan University of Technology, Department of Electrical and Computer Engineering, 2015

## **HOBBIES**

- Travelling, Swimming, Hiking, Public Speaking, Music