

# Seyed Sina Mirrazavi Salehian

CONTROL AND MACHINE LEARNING EXPERT

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## Education

### Ecole polytechnique fédérale de Lausanne

Lausanne, Switzerland

PHD IN ROBOTICS, CONTROL, AND INTELLIGENT SYSTEMS

Mar. 2014 - PRESENT

- Thesis title: Coordinated multi-arm motion planning for reaching and grabbing moving objects

### Amirkabir University of Technology

Tehran, Iran

MSC IN MECHATRONICS, ROBOTICS, AND AUTOMATION ENGINEERING

Sep. 2010 - Sep-2012

- Thesis title: Design and analysis of a nonlinear cooperative dual-master, dual-slave teleoperation system
- GPA: 18.68 out of 20

### Amirkabir University of Technology

Tehran, Iran

BSC IN MECHANICAL ENGINEERING

Sep. 2006 - Sep-2010

- Thesis title: Reliability in Micro Electro Mechanical Systems (MEMS)
- GPA: 17.95 out of 20

## Professional Experience

### Doctoral Researcher at Learning Algorithm and System Laboratory

EPFL, Lausanne

RESEARCH ON MOTION PLANNING AND CONTROLLING OF UNI- OR MULTI- ROBOTIC ARMS.

Mar. 2014 - PRESENT

- Research:
  - Development of a real-time controller which endows a multi-arm system with both synchronous and asynchronous behaviors .
  - Development of a real-time solver for solving the inverse kinematic problem of multiple robotic arms with respect to the kinematic and the self-collision avoidance constraints.
  - Development of a real-time controller for catching flying objects softly .
- Projects:
  - Horizon 2020, Cogimon EU project.
  - The 7th Framework Programme, AlterEgo project.
- Live demos:
  - KUKA innovation award, Team manager, Hannover messa, MANCHU team, April 2017.
  - KUKA innovation award, Team manager, Hannover messa, CATCH team, April 2015.
- Other activities:
  - Development of a real-time control interface for KUKA IIWA.
  - Logistic G402 Proteus Speed Validation.
  - Speed Validation of the blackboards at EPFL.
  - Teaching activities in Robotic Practical, MSc course at EPFL.
  - Supervision of four internships, four master thesis and three semester student projects.

### Internship at Learning Algorithm and System Laboratory

EPFL, Lausanne

RESEARCH ON SOFT CATCHING OBJECTS IN FLIGHT.

Sep. 2013 - Mar. 2014

- Development of a real-time controller for catching softly objects in flight.

### Hirgan energy engineering Co.

Tehran, Iran

MECHANICAL ROTATING EQUIPMENTS ENGINEER.

Sep. 2012 - Aug. 2013

- Being familiar with API 610.

## Honors & Awards

- April 2017 **Finalist**, KUKA innovation Award Hannover, Germany
- Jun 2016 **Received the Best Student Paper Award**, Robotics: Science and Systems Conference Ann Arbor, U.S.A
- Jun 2016 **Nominated for the Best Conference Paper Award**, Robotics: Science and Systems Conference Ann Arbor, U.S.A
- Jun 2016 **Nominated for the Best Systems Paper Award**, Robotics: Science and Systems Conference Ann Arbor, U.S.A
- April 2015 **Finalist**, KUKA innovation Award Hannover, Germany
- Sep. 2012 **Ranked 1<sup>st</sup>**, The master program in the mechanical engineering department Tehran, Iran
- Sep. 2010 **Honorary Admission**, The master program in Amirkabir university Tehran, Iran

Sep. 2010 **Ranked 5<sup>st</sup>**, The bachelor program in the mechanical engineering department

*Tehran, Iran*

Sep. 2006 **Entrance Elite**, Amirkabir university of technology

*Tehran, Iran*

## **Skills**

### **Automatic Control and Optimization Theory**

EXPERT WITH SEVERAL YEARS OF EXPERIENCE PRIMARILY WITH APPLICATIONS IN ROBOTICS

- Dynamical system based motion planning.
- Linear and Non-linear control algorithms (PID, feedback linearization, backstepping, adaptive, robust, etc).
- Optimal and model predictive Control.
- Data-Driven and Linear Parameter Varying Models.

### **Machine Learning**

EXPERT KNOWLEDGE WITH EXPERIENCE OF A WIDE RANGE OF ALGORITHMS FOR REGRESSION, CLUSTERING AND

CLASSIFICATION.

- Dimensionality reduction (PCA, Kernel PCA, LDA, etc).
- Linear and Non-linear regressions (GMR, GP, LWRP, LPV, SVR, etc).
- Linear and Non-linear clustering and classification (GMM, SVM, K-means, etc).
- Big-Data and Learning sparse Models.

### **Computer Skills**

- C/C++, Python, Matlab Simulink, Maple, Java.
- Distributed version control systems: bsr, git, Travis.
- Robotic interfaces: ROS, YARP, Gazebo, Orocos, Usarsim.
- Machine learning interfaces: Mlpack(c++), Scikit-learn (Python), ML\_toolbox (Matlab).
- CAD softwares: Solidworks, Catia.
- Miscellaneous:  $\text{\LaTeX}$ , UNIX/Linux, Windows, Adobe suite, Microsoft Office suite.

### **Robotic Platform**

- Robotic manipulators: KUKA LWR 4+ and IIWA, ABB YU-Mi, KATANA.
- Humanoids: iCub.
- Haptic devices: Phantom omni and Falcon.
- Grippers and hands: Allegro hand, QB hand, 2-Finger Robotiq hand and Barret hand .
- Vision systems: Motive and Arena from Optitrack.

### **Language**

- Farsi Native or bilingual proficiency.
- Azari Native or bilingual proficiency.
- English Fluent.
- French Elementary proficiency.

## **Academic Activities**

### **Reviewer experiences**

- IEEE Transactions on Aerospace and Electronic Systems.
- IEEE/RSJ International Conference on Intelligent Robots and Systems.
- IEEE International Conference on Robotics and Automation.
- IEEE-RAS International Conference on Humanoid Robots.
- IEEE/ASME International Conference on Advanced Intelligent Mechatronics.
- Journal of Mechanical Science and Technology.
- ASME's International Mechanical Engineering Congress and Exposition.

### **Selected publications**

- Mirrazavi Salehian, S. S., Figueroa, N. and Billard, A. (2016) Coordinated multi-arm motion planning: Reaching for moving objects in the face of uncertainty. In Proceedings of Robotics: Science and Systems XVI, Arbor, Michigan, USA.
- Mirrazavi Salehian, S. S., Khoramshahi, M. and Billard, A. (2016) A Dynamical System Approach for Catching Softly a Flying Object: Theory and Experiment. in IEEE Transactions on Robotics, vol. 32, no. 2, pp. 462-471, April 2016.
- Firouzeh, A., Mirrazavi Salehian, S. S., Billard, A. and Paik, J. (2015) An Underactuated Robotic Arm with Adjustable Stiffness Shape Memory Polymer Joints. Proceedings of ICRA 2015.

## **Volunteer Experience and Hobbies**

### **Treasurer at IRSA (Iranian Students Associations)**

*EPFL, Lausanne*

### **Member at the student community of Mechanical Department**

*May. 2015 - May. 2016  
Amirkabir university, Tehran*

### **Treasurer at the climbing community of Mechanical Department**

*Jan. 2012 - Jan. 2013  
Amirkabir university, Tehran*

### **Hobbies**

*Jan. 2011 - Jan. 2012*

- Volleyball, Biking, Hiking, Basketball