# MOHAMMAD ALI SHARPASAND

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## Research Interests
Internet, Peer to Peer Networks, Bayesian Estimators, Machine Learning and Artificial Intelligence

## Education
**Qazvin Azad University — B.Sc. in Software Engineering, class of 2017**
Thesis: A Cheap and Low Power Peer to Peer RF Network for Internet Of Things
GPA: 17.2/20  (as of August 1st)

**University of Texas at Austin — Machine Learning Summer School, 2015**

**National Organization for Development of Exceptional Talents (NODET) — Diploma in Mathematics, class of 2011**

## Projects
**A Cheap and Low Power Peer to Peer RF Network for Internet Of Things — Qazvin Azad University**
In the context of Internet Of Things, there has always been the challenge of price and ease of installation. Beside the size of networks as measured by number of nodes, these challenges lead to inefficiency of conventional networks. There is a need for a simple, cheap, low-range and low-power network for interconnecting hundreds of devices. I am building a simplified peer to peer network using cheap and low-power radio frequency transceivers and Arduino boards.

**Automatic Simultaneous Calibration of Joints and Camera for Humanoid Robots — Mechatronics Research Laboratory**
Most of joint position sensors and cameras need calibration in order to provide accurate data on humanoid robots. Calibrating theses sensors, however, needs external device which has to be manufactured very precisely. Otherwise, measurements of the calibration parameters are co-dependent for camera and joints. Simultaneous calibration requires solving an under-determined system of equations. This ambiguity has to be resolved. We are working on a technique to resolve this ambiguity and construct a determined system of equations.

**Particle Filter Self-Localization for NAO Biped Robots in RoboCup Standard Platform Field — Mechatronics Research Laboratory**
Self-Localization is one of the necessities of any mobile robot. Standard Platform League of RoboCup is not exempt of this need. A biped robot in order to play soccer, has to process the visual data of a standard field and its own odometry to

estimate its position in the field. I have been working on a Monte Carlo Localization, to overcome this challenge.

**Bipedal Walk (Zero Momentum Point Based) General for Biped Robots Developed on Aldebaran NAO— Mechatronics Research Laboratory**
I have been working among motion control team in Mechatronics Research Laboratory on kinematic and dynamic analysis and ZMP based approaches to stabilize biped robots. We are developing an open source biped walk library that can be used on almost any biped walker robot.

**Motion Planning in Dynamic Cluttered Environments, a Geometric Realtime Approach — Mechatronics Research Laboratory**
A realtime motion planning on NAO biped robot have been crafted in this project that will avoid obstacles that are dynamically moving and will follow a moving object in RoboCup field.

**Efficient Overt Top-Down Visual Attention for Humanoid Robots — Mechatronics Research Laboratory**
Vision takes the responsibility for providing most of the data needed for humanoid robots. Realtime constraints, however, impose very tight computational capacity. Visual attention, which is inspired from biology, can effectiveness reduce the amount of data to be processed by either choosing a part of image to be processed or controlling a moving camera with a limited field of view to capture required information. An efficient probabilistic method to the latter solution (Overt Visual Attention) is implemented on NAO biped robot.

**A Framework for Reactive Autonomous Agents on RoboCup Standard Platform League — Mechatronics Research Laboratory**
An autonomous agent in the game of soccer, has to be agile in deciding and react fast to the changes of environment. In such a scenario, it is also important to be consistent and deliberate. To overcome this paradox, we have designed and implemented a framework in which decisions are divided into two categories and those in higher-level are taken deliberately while letting lower-level decisions change very fast in a hierarchy.

**Shifting Organizational Culture and a Democratic Adaptation of Agile Software Engineering Paradigms for Research — Mechatronics Research Laboratory**
Organizational Culture stands as one of the most powerful factors making deep impact on performance and consistency of a team. It is especially more noticed in agile software development cycles. As the consultant of our team, I contributed to make shifts in the dominant culture of the team. Besides, among other members, we crafted a comprehensive procedure for recruiting, normal software development, and research in our team. The procedures are now running on their own and a new body of team members are following the same guidelines, and developing them.

## Experience

**Senior Researcher, Mechatronics Research Laboratory; Qazvin, Iran — Nov. 2011-Present**
I have been an active researcher in the Biped Division of Mechatronics Research Laboratory, the most well-known robotics laboratory in Iran, working on Visual Attention, Autonomous Agents, Self-Localization, Biped Walk, Motion Planning, and Software Engineering and Organization of the team.

**Executive Officer, Jahan Pardazesh Alborz (JPA) Inc.; Karaj, Iran — 2011-2013**
I was responsible for software development and web design department, leading several long term projects like advanced accounting software, and office and school automation system. I had also worked on recruiting program and development plans of the department and corporate.

## Awards and Honors

- Awarded research scholarship from Qazvin Azad University, 2011 – Present

- A number of International RoboCup awards. — GermanOpen, 3rd Place of Standard Platform League (SPL) 2014 — IranOpen, 1st place of SPL 2014 and 2012 and SPL Research Innovation 2016 and 2013, 2nd Place of SPL 2015 and 2013

- Ranked among top 20% in ACM Junior Programming Contest of Sharif University of Technology in 2009

- Admitted to National Organization for Development of Exceptional Talents (NODET) for middle school and high school, in 2004 and 2006.

## Publications

- **Efficient Overt Top-Down Visual Attention for Humanoid Robots** (In preparation, a short description is presented in projects section)

- **Automatic Simultaneous Calibration of Joints and Camera for Humanoid Robots** (In preparation for IEEE Conference on Robotic and Automation, a short description is presented in projects section)

- Mehr, A. M., **Sharpasand, M. A.**, Shahroudi, N., Beyglou, F. F., & Hasanzadeh, M. MRL-SPL Team Description for RoboCup 2016. In RoboCup 2016, Leipzig, Germany

- AmirGhiasvand, O., Shahroudi, N., **Sharpasand, M. A.**, Mehr, A. M., Ha, P. S., Ghazeli, M. R., ... & Harandi, M. A. Z. Team Description for RoboCup 2015. In RoboCup 2015, Hefei, China

## Skills

- Non-Parametric Bayesian Estimation, Kalman Filtering, Monte Carlo Localization, Motion Planning, Kinematic Analysis, Simulation, Biped Locomotion, Autonomous Agents

- Teamwork experience, Agile Software Development, Leadership and Organization skills (e.g.: Successful experience in JPA and MRL — see experience section)

- C++, MATLAB, Linux, Git, Python, Bash, Full Stack Web Programming

- Technical Writing and proficiency in several languages: **English** (TOEFL iBT 94/120; writing 28/30), **Persian** (native), **Spanish** (elementary)

## References

**Omid AmirGhiasvand**

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