Amir Yazdani

PhD candidate in Mechanical Engineering-Robotics

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Education

2016–current **Ph.D.**, ***Mechanical Eng.-Robotics***, **University of Utah**, Salt Lake City, UT.
Advisors: Andrew Merryweather, Tucker Hermans
Committe: Jake Abbott, John Hollerbach

2013–2015 **M.Sc.**, ***Mechanical Eng.***, **AmirKabir University of Technology**, Tehran, Iran.
Advisors: MohammadBagher Menhaj, Mehdi Tale Masouleh
Thesis: *Optimal Trajectory Planning and Fault Tolerant Control of Redundant Planar Serial Manipulators*

2005–2010 **B.Sc.**, ***Mechanical Eng.***, **Khajeh Nasir Toosi University of Technology**, Tehran, Iran.
Advisor: Ali Nahvi
Thesis: *Design and Development of VirSense: A Novel Haptic Device With Fixed-Base Actuators and Gravity Compensation*

Research Skills

AI Prtobabilistic Modeling, Reinforcement learning, Inverse reinforcement learning, POMDP, HMM

Estimation Kalman filters, Particle filters, Smoothing, Prediction, SLAM

Planning Optimal motion planning, MPC, Collision avoidance, MILP optimization

HRI human safety in HRI, human collision avoidance, Ergonimics in physical HRI, Human biomechanics, Human factors

Computer Skills

Languages Python, C/C++, MATLAB

Robotics ROS(rviz, opencv, openslam, gmapping, moveit, gazeebo, openni, rtabmap, kdl, tracIK, GTSAM), Tensorflow

Engineering SolidWorks, Catia, ADAMS, MATLAB Simulink, Gurobi Optimization

Teamwork & documenting Office, LaTeX, Slack, Git, Wrike

Awards and Honors

2018 Graduate Student Travel Assistance award, Graduate School, The University of Utah

2018 Dr. Paul Richards Safe Workplace Scholarship

2018 American Society of Safety Engineers Foundation Scholarship

2017 Dr. Paul Richards Safe Workplace Scholarship

2016 Pilot Project Research Training (PPRT) Award from National Institute of Occupational Safety and Health (NIOSH), Award number: T420H008414-10

2014 1st place in Senior Demo league in RoboCup IranOpen

Professional Experiences

May 2018 - current **Research Assistant**, *Utah Learning Lab for Manipulation Autonomy, The University of Utah*, Salt Lake City, UT.
Research on ergonomics-based inference in telemanipulation

Jan 2016 - current **Research Assistant**, *Laboratory of Ergonomics and Safety, The University of Utah*, Salt Lake City, UT.
Research on safety in human-robot collaboration

Dec 2011 - Dec 2015 **Research Assistant**, *Human and Robot Interaction Laboratory, The University of Tehran*, Tehran, Iran.
Research on parallel robots, motion planning and failure-tolerant robots

Apr-Jun 2011 **Robotics Engineer Intern**, *Kavosh Mechanized Inspection*, Tehran, Iran.
Design and development of sewer inspection robots

Jul 2008 - Sep 2011 **Lab Manager, Research Assistant**, *Virtual Reality Laboratory, Khajeh Nasir Toosi University of Technology*, Tehran, Iran.
Design and develop haptic devices and driving simulators

Research Projects

2018 Automatic repositioning of teleoperation robots considering human motion and posture as a POMDP problem

2018 Posture estimation of the human upper body in telemanipulation tasks from a haptic-input device using particle filters and incremental smoothing and mapping

2017 Spam users detection on Twitter using machine learning techniques

2017 Mobile robot visual localization and 3D map generation using RGB-D and monocular cameras in ROS

2016-current Improve human safety and productivity in human and robot collaboration in shared autonomy using a novel optimal fault-tolerant motion planning algorithm

2016 Manipulation planning of objects with mobile robots using a mixture of A* and RRT algorithms

2016 Develop and optimal control of a 2-DOF inverted pendulum

2016-17 Control a wearable rehabilitation robot and study on its performance in correcting arm swing for patients

2013-15 Collision-free optimal path planning and fault-tolerant control of serial manipulators using MPC

2014-2015 Motion planning and model predictive control of a group of mobile robots using MPC

2014 Developing Progressive Growing Neural Gas Network (PGNGN), a novel algorithm for workspace determination of parallel robots

2014 Design, development and dynamic simulation of a 4-DOF delta-based parallel robot

2013 Design and dynamic simulation of a 3-DOF spherical parallel robot

2013 Design, development and dynamic simulation of a 2-DOF spherical parallel robot

2012-13 Design, development and dynamic simulation of a fully-decoupled 3-DOF parallel robot with 3-PRRR limb structure

2012-13 Design and development of a pneumatic 6-DOF Gough-Stewart robot

2012 Design, development and kinematic analysis of a novel 4-DOF serial-parallel robot for urban bus driving simulator

2012 Design a quadruped walking robot

2008-10 Design and development of VirSense, a haptic device with fixed-base actuators and gravity compensation

2007 Design an autonomous and a teleoperated search and rescue robot for RoboCup competition

Journal Publications

2016 Roya Sabbagh Novin, Mehdi Tale Masouleh, and **Mojtaba Yazdani**. "A new neural gas network approach for obtaining the singularity-free workspace of 3-DOF planar parallel manipulators.", *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science* (2016).

2016 Roya Sabbagh Novin, Amirhossein Karimi, **Mojtaba Yazdani**, and Mehdi Tale Masouleh. "Optimal motion planning for parallel robots via convex optimization and receding horizon." *Advanced Robotics*, 30, no. 17-18 (2016): 1145-1163.

2016 Roya Sabbagh Novin, Mehdi Tale Masouleh, and **Mojtaba Yazdani**. "Optimal motion planning of redundant planar serial robots using a synergy-based approach of convex optimization, disjunctive programming and receding horizon." *Proceedings of the Institution of Mechanical Engineers, Part I: Journal of Systems and Control Engineering* 230, no. 3 (2016): 211-221.

2016 Mehdi Zamani Fekri, Mojtaba Zareei, Mehdi Tale Masouleh, and **Mojtaba Yazdani**. "Optimal design and fabrication of a 4-DOF quattrotaar parallel robot with singularity-free workspace by ABC and PSO algorithms.", *Modares Mechanical Engineering*, (2016): Vol 16 No 6, 149-158.

2015 **Mojtaba Yazdani**, Mehdi Tale Masouleh, Milad Hasanvand, Iman Yahyapour, and Mahmoud Ghafouri Tabrizi. "Inverse dynamic problem of two parallel manipulators with identical limbs structures.", *Modares Mechanical Engineering*, Vol 15 No 13, 281-290 (2015).

2015 Amir Jaberi, Ali Nahvi, Milad Hasanvand, Mehdi Tale-Masouleh, Mohammadreza Arbabtafti, and **Mojtaba Yazdani**. "Design and kinematic analysis of a 4-DOF serial-parallel manipulator for a driving simulator." *International Journal of Robotics (Theory and Applications)* Vol.4, No. 3, 29-37 (2015).

2015 Roya Sabbagh Novin, Mehdi Tale-Masouleh, **Mojtaba Yazdani** and Behzad Danaei. "Optimal motion planning of a 3-DOF decoupled parallel robot using convex optimization and receding horizon concept." *Modares Mechanical Engineering* Vol.15, No. 8, (2015).

2014 Ahmad Mashayekhi, Ali Nahvi, **Mojtaba Yazdani**, Majid Mohammadi Moghadam, Mohammadreza Arbabtafti, and Mohsen Norouzi. "VirSense: a novel haptic device with fixed-base motors and a gravity compensation system." *Industrial Robot: An International Journal* 41, no. 1 (2014): 37-49.

Conference Proceedings and Abstracts

2017 Roya Sabbagh Novin, **Amir Yazdani** , Tucker Hermans, and Andrew S. Merryweather. "Dynamics model learning and manipulation planning for objects in hospitals using a patient assistant mobile (PAM) robot." *2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Madrid, Spain, 2018

2017 **Mojtaba Yazdani**, and Andrew S. Merryweather. "Changing Perceptions of Robotics in Industry: Recent Accomplishment in Safety and Injury Risk Reduction." *National Occupational Research Symposium (NOIRS) 2018, Morgantown, WV*

2017 **Mojtaba Yazdani**, Roya Sabbagh Novin, and Andrew S. Merryweather. "Improvement of human safety in fault-tolerant human and robot collaboration using convex optimization and receding horizon control." *Expanding Research Partnership: State of The Science Conference*, June 2017, Aurora, CO

2017 Andrew Merryweather, Roya Sabbagh Novin, **Mojtaba Yazdani**, "Optimal motion and mobility aid manipulation planning to enable personal activity monitoring and facilitate safer sit-to-walk transitions", *5th International Conference on Ambulatory Monitoring of Physical Activity and Movement (ICAMPAM)*, June 2017, Bethesda, MD

2017 **Mojtaba Yazdani**, Roya Sabbagh Novin, and Andrew S. Merryweather. "Towards Safe human and robot collaboration in industrial environments using fault-tolerant and optimal trajectory planning for robot manipulators." *15th Annual Regional National Occupational Research Agenda (NORA) Young/New Investigators Symposium*, Apr. 2017, Salt Lake City, UT

2015 **Mojtaba Yazdani**, Roya Sabbagh Novin, Mehdi Tale Masouleh, Mohammad Bagher Menhaj, and Hamid Abdi. "An experimental study on the failure tolerant control of a redundant planar serial manipulator via pseudo-inverse approach." *Proceedings of the 3rd IEEE RSI International Conference In Robotics and Mechatronics (ICRoM)*, 2015 , pp. 365-370.

2014 Esmaeil Rostami Jame Bozorgi, Iman Yahyapour, Amirhossein Karimi, Mehdi Tale Masouleh, and **Mojtaba Yazdani**. "Design, development, dynamic analysis and control of a 2-DOF spherical parallel mechanism." *Proceedings of the Second RSI/ISM International Conference on Robotics and Mechatronics (ICRoM)*, 2014 , pp. 445-450. IEEE, 2014.

2014 Iman Yahyapour, **Mojtaba Yazdani**, Mehdi Tale Masouleh, and Mahmoud Ghafouri Tabrizi. "Dynamic modeling and computed torque control of a 3-DOF spherical parallel manipulator." *Proceedings of the Second RSI/ISM International Conference on Robotics and Mechatronics (ICRoM)*, 2014, pp. 280-285. IEEE, 2014.

2014 Roya Sabbagh Novin, **Mojtaba Yazdani**, Mehdi Tale Masouleh, and Mohammad Bagher Menhaj. "Workspace determination of planar parallel robots via progressive growing neural gas network." *Proceedings of the Second RSI/ISM International Conference on Robotics and Mechatronics (ICRoM)*, 2014, pp. 322-327. IEEE, 2014.

2013 Amir Jaberi, Ali Nahvi, Milad Hasanvand, Mehdi Tale Masouleh, Mohammadreza Arbabtafti, **Mojtaba Yazdani**, Mehrdad Lagha, Mehdi Hemmatabadi, and Saeid Samiezadeh. "Design and kinematic analysis of a 4-DOF serial-parallel manipulator for urban bus driving simulator." *Proceedings of the First RSI/ISM International Conference on Robotics and Mechatronics (ICRoM)* , pp. 407-412. IEEE, 2013.

2013 Iman Yahyapour, Milad Hasanvand, Mehdi Tale Masouleh, **Mojtaba Yazdani**, and Siavash Tavakoli. "On the inverse dynamic problem of a 3-PRRR parallel manipulator, the Tripteron." *Proceedings of the First RSI/ISM International Conference on Robotics and Mechatronics (ICRoM)*, pp. 390-395. IEEE, 2013.

Patents

2016 4-degree of freedom industrial-researching parallel robot with free singularity workspace, No.146720 issued by Iranian Organization of Patents Registration

2015 Pneumatically Actuated 6-DoF Gough-Stewart Parallel Robot, No.446327 issued by Iranian Organization of Patents Registration

2013 VirSense, a novel haptic device with fixed-base actuators and gravity compensation, No.036421 issued by Iranian Organization of Patents Registration

2013 Two degrees of freedom parallel mechanism for the purpose of rapid object tracking, No.78963 issued by Iranian Organization of Patents Registration

Certified Experiences

American Society of Safety Engineers (ASSE) Student Leadership Conference, Apr 2017, Tucson, AZ

Development Management of Companies, Student Entrepreneurship and Talented Conduction, K.N.Toosi University of Tech.

Management Systems – Principles and Standards, NIS CERT.

Quality Management Systems(ISO 9001:2000) – Internal audit, TÜV-Academy Rheinland.

Personal Management, Management Association of Iran, Tehran, Iran.

Teamwork Techniques, Management Association of Iran, Tehran, Iran.

Membership

Student member of IEEE

Student member of Robotic & Automation Society (RAS)

Student member of American Society of Safety Engineering (ASSE)

Peer Reviews

Technologies, MDPI

Sensors, MDPI

Medicina, ELSEVIER

Applied Sciences, MDPI

Journal of Systems and Control Engineering, SAGE

IEEE International Conference on Robotics and Mechatronics (ICROM), IEEE, Iran

Hobbies

Fly fishing, mountain biking, and hiking