Roya Sabbagh Novin

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EDUCATION

The University of Utah, UT *PhD in Mechanical Engineering (Robotics Track), GPA: 3.9/4* *Sep. 2015 - Present*
Thesis title: Patient fall prevention through risk-Aware robotic assistance and room reconfiguration
The University of Tehran, Iran *MSc in Mechatronics Engineering, GPA: 19.2/20* *Sep. 2012 - Feb. 2015*
Thesis title: Collision free path planning and fault tolerant control of serial robots via convex optimization
Sharif University of Technology, Iran *BSc in Mechanical Engineering, GPA: 16.6/20* *Sep. 2006 - Jun. 2011*

EXPERIENCES

Probabilistic Modeling, Risk-aware Planning and Robot Control
LL4MA Lab, University of Utah
Research Assistant, Mentors: **Prof. Tucker Hermans**, **Prof. Andrew Merryweather** *2015 - present*

- Developed an optimal mobile manipulation planning framework to manipulate legged objects.
- Designed and developed an under-actuated robotic hand for grasping legged objects with various leg diameters.
- Generated predictive models of (1) object dynamics using Bayesian regression model, (2) patient motion using optimization, (3) patient fall risk probability in hospital rooms.
- Exploring probabilistic risk-aware planning that leverages the predictive models and manipulation planning to minimize the risk of patient fall in hospital room by providing supporting objects during ambulation.
- Collaborating in a project on human posture estimation and providing online guidance to improve ergonomics in physical human-robot interaction.

Motion Generation and Planning
TAAR Lab, University of Tehran
Research Assistant, Mentor: **Prof. Mehdi Tale Masouleh** *2012 - 2015*

- Developed an optimal collision-free motion generation algorithm based on convex optimization and model predictive control and implemented it on various mobile, serial and parallel robots with minor modifications.
- Created a neural gas network algorithm for finding the singularity-free workspace of parallel robots.
- Collaborated on a project focusing on fault tolerant trajectory tracking for serial manipulators.

Medical Robots
Research Center of Science and Technology in Medicine
Robotics Research Intern, Mentor: **Dr. Alireza Mirbagheri** *2010*

- Improved the design of a robotic hand rehabilitation System (Wrist RoboHab) used for post strock patients.
- Collaborated on development of a surgery assistant robot for camera handling during laparoscopic surgery.

Industrial Pneumatic Robot
Camozzi
R&D Research Intern, Mentor: **Dr. Fereidoon Babaie** *2009*

- Worked with a team of engineers focused on design, development and control of a pneumatic pick-and-place robot for demonstration as an industrial pneumatic robot.

Rehabilitation Devices
Biomechanics Lab, Sharif University of Technology
Research Assistant, Mentors: **Prof. Farzam Farahmand**, **Prof. Roya Narimani** *2006 - 2011*

- Developed a finger rehabilitation robotic device for post stroke patients with a novel design.
- Supervised a senior design team working on development of an adjustable head holder for Cerebral Palsy patients.

SKILLS (Python, C/C++, MATLAB)

AI	Probabilistic modeling, HMM, MDP, CNN, Deep learning, Particle filters, SLAM
Robotics	ROS (Rviz, Gazebo, MoveIt), OpenCV, Tensorflow, sklearn, pymc, KDL
Planning	MPC, A*, RRT, PRM, LQR, Collision avoidance, MIQP optimization
Engineering	Motive, Solidworks, Adams, MATLAB Simulink, Gurobi Optimization, CVX
Teamwork/Documentation	Office, LaTeX, Slack, Git