

Rishi Khajuriwala

1 Mount Hope Terrace, Worcester, MA, 01602

(508)-762-2803; rdkhajuriwala@wpi.edu

<https://rkhajuriwala.github.io/>; LinkedIn: rishi-khajuriwala; GitHub: rkhajuriwala

Education

Worcester Polytechnic Institute (WPI), Worcester, MA

Master of Science in Robotics Engineering, GPA 3.94/4.00, May 2019

Gujarat Technological University (GTU), Ahmedabad, India

Bachelor of Engineering in Mechatronics Engineering, CGPA 7.28/10.00, June 2016

Technical skills

Python, MATLAB, Simulink, ROS, GNU Octave, Cygwin, Batch Programming, Vicon Motion Capture System (Mocap), SolidWorks, PLC logic Programming, Arduino, PSPICE, MULTISIM, FANUC CNC Trainer, PLC, PROTEUS, LATEX, Git, Bitbucket, JAMA, JIRA, Microsoft (Word, Excel, PowerPoint, Outlook).

Experience

Algorithms Intern, Philips- Connected Sensing Venture, Cambridge, MA, May - December 2018

- Worked on a cross-collaborative team to design and develop a wearable device to monitor heart rate, respiration rate, activity type and level and ECG signals.
- Contributed in the development process of the signal processing algorithms in MATLAB and then passed on to supervisor for final production quality code integration in C.
- Worked with large physiological data-sets from Physionet in Cygwin and MATLAB.
- Used software like Bitbucket, JIRA, JAMA, Wiki for version control, bug control & internal documentation.
- Developed the protocols for the final validation and verification of the algorithms for internal testing.
- Collaborated with the quality and regulatory team to develop the final reports for the internal testing.
- Designed experimental test setups for the validation of the signal processing algorithms.
- Worked with cross platform teams for the final integration of the algorithms into the firmware.

Trainee Engineer, Chokshi Graphics, Ahmedabad, India, May 2016 – June 2017

- Designed hydraulic platform for easy loading and unloading of paper reels using SolidWorks.
- Integrated the hydraulic system for the platform to lift weights up to 3 tons.
- Supervised the prototyping of the platform.
- Integrated the platform with the already available machines in the factory.

Projects

Directed Research, WPI, September 2017-April 2018

- Designed and prototyped a low-cost robotic system to aid in the rehabilitation of stroke patients in a team of 7 students.
- Developed the control system for the robotic arms in MATLAB, integrated an adaptive controller in the system to help the patients in various stages of rehabilitation.
- Designed an upper body template for the vicon system and using different subjects to get final patterns for all the exercises needed for stroke rehabilitation.
- Applied dynamic motion primitives to the patterns from the vicon system to get trajectories of the exercises transform into the robot space.
- Debugged the hardware and software of both the robot arms.
- Developed new interactive games for the patients to make the rehabilitation interactive.

Artificial Intelligence, WPI, January- April 2018

- Implemented genetic and hill climbing algorithm to determine the optimum locations of industrial,

residential and commercial buildings in a city and implemented A* and hill climbing algorithm to solve N-Queens puzzle.

- Implemented gibbs sampling algorithm to compute conditional probabilities for a bayesian network, devised kalman filter to keep track of a country's GDP and implemented kalman filter to detect and eliminate anomalous lidar data.
- Implemented expectation maximization Algorithm with random restarts that takes in N-dimensional data and finds the best number of clusters using bayesian information criterion (Unsupervised Learning).
- Used reinforcement learning (SARSA algorithm) to solve a grid world, where the agent has no model of environment.

Robot Controls, WPI, January – April 2018

- Worked with one other member to overcome dynamic friction changes and avoid obstacles in autonomous cars.
- Formulated the dynamic model, devised an optimal cost function with constraints and performed online optimization.
- Simulated the results using gain-scheduled model predictive control design in MATLAB toolbox.
- Evaluated the real-life feasibility to use online MPC in complex rapidly changing environments.

Robot Dynamics, WPI, September- December 2017

- Developed a dynamic virtual world using RVIS and Gazebo in ROS, which can be used for simulating a real-world situation for robot navigation.
- Applied A star algorithm in python and applied it to stimulate the turtle bot in the Gazebo virtual world.

Soft Robotics, WPI, March – April 2018

- Developed soft gripper based on Pneu-nets using 3D printing and Lost wax technique.
- Conducted literature review of all soft manipulators and soft grippers.
- Tested the gripper by grasping different daily used objects.

Final Year Project, GTU, June 2015- April 2016

- Designed and prototyped semi-automated humanoid robotic limbs using SolidWorks.
- Used inverse pendulum and zero moment point (ZMP) to overcome locomotion issue in biped robots.
- Designed and prototyped the lower limb exoskeleton of the humanoid by using artificial air muscles and developed in-house pneumatic air muscles, by lowering the production cost by 70%.

Combat Robots, GTU, June 2015- May 2016

- Led a college team of 10 members to compete in “Robowars” events in national and international tournaments and won 12 awards total for the college.
- Engineered robots of various weights: (60, 45, 30, 25 and 15) kg using Solid Works for designing, Arduino and Solid-state relays.
- Designed a first-of-its-kind single piece single extrusion snail disk and snail drum to be used as weapon.

Leadership

Organizer, Robotics Project Club, GTU, April 2014- May 2016

- Organized and delivered various workshops for high school and college students on robotics.
- Advised and mentored students on their technical projects and aided with debugging problems.

Team Lead, Food Committee, Annual Function, GTU, February-April 2016

- Led a team of 25 to manage the catering of the university annual function attended by 3000 students.
- Partnered with Security committee to systematize the entire security of the event.

Organizing Committee Head, ICIAME, GTU, February 2016

- Led a team of 40 students to host an international conclave attended by professors from international universities.