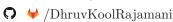
Dhruv K Rajamani

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in /dkr



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() +91-880-064-6969

2015 - 2019

BTech. in Mechatronics Engineering, Manipal Institute of Technology, KA

2012 - 2014 AISSCE from Vasant Valley School, Delhi

 $8.83^{/10}$ 95.00%

Interests

Rehabilitative and Assistive Devices, Nonlinear Control, Legged Locomotion, Mobile Robots, Robot Dynamics

ACHIEVEMENTS

- Best Rover team from Asia; 8th out of 82 teams at the University Rover Challenge, Utah, 2017. (link)
- Offered INSIPIRE scholarship by DST, Government of India for top 1% score in AISSCE 2014 Declined
- Best paper presentation at the iACT-2017 conference, ISA Bangalore.

Internships

BioRob (link)

École polytechnique fédérale de Lausanne

Prof. Auke Jan Ijspeert, Dr.Hamed Razavi

January 2018 - Present

Development of a Simulation Platform for the COMAN Robot(COmpliant HuMANoid robot) 1:

Simulate systemic integrations of human-robot interactions amongst humans and compliant robots

- * Developed simulators for OROCOS-RTT and ROS along with the appropriate analysis tools. (Simulation Packages)
- * Tested continuum of gaits (stepping, active balance, and walking) with a single controller. (Video)

Outcome: Worked with various robotics frameworks (ROS, OROCOS, YARP), performed gait analysis.

Development of a Neuromechanical framework to study animal locomotion ²:

Develop a simulator featuring appropriate analysis tools to conduct gait analysis of modular tetrapoda models

* Developed a simulator and controller using Central Pattern Generators (CPGs) to conduct lesion studies on tetrapods.

Outcome: Implemented a novel closed loop controller for modular tetrapods (single controller for varying body parts).

Autonomous Robotics Lab (link)

Indian Institute of Technology, Delhi

Dr.Sudipto Mukherjee

2017 - 2018

Development of an Underactuated Flexible Manipulator using Differential Flatness:

Design a flexible manipulator on MATLAB with just 2 non-colinear forces acting as input.

* Implemented a flat controller for a planar manipulator with trajectory tracking. (video)

Outcome: Conducted extensive research on differentially flat orthotic and prosthetic devices.

EXPERIENCE

BioRobotics Group (link)

Manipal Institute of Technology, KA

 $Co ext{-}Founder$

2018 - Present

The group is a community of scholars from EPFL and Manipal, collaborating on projects on bioinspired robotics.

Neuromechanical model of a Humanoid:

Leading a team of 8 researchers in developing a neuromechanical controller for the COMAN using CPGs.

ROS Package for the Pleurobot:

Leading a team of 6 researchers in developing a ROS Package for the Pluerobot (BioRob, EPFL) with CPGs.

Tutorials for ROS and Robotics:

Created tutorials to teach ROS, Gazebo, and Robot Dynamics and Control using a linear inverted pendulum model.

This work is supported by the Horizon 2020 Work Programme. (https://cogimon.eu/)

²This work is supported by the Human Frontier Science Program (HFSP). (Gain access to this repo)

Teaching Assistant

MTE-3003, MTE-2211

Manipal Institute of Technology, KA

2018 - Present

Robot Dynamics and Control (MTE-3003):

Teaching Junior and Senior Underraduates Robot Dynamics through ROS and evaluating final research project.

* Modified the course plan to teach robot dynamics through simulations. (Lab repo with completed projects)

CAD & Kinematics Lab (MTE-2211):

Teaching and evaluating 3D kinematic models on CATIA V6.

Mars Rover Manipal (link)

Manipal Institute of Technology, KA

Robotic Arm Lead, Research Lead, Mechanical Member

2015 - 2017

Development of a Mars Rover Prototype:

Developed a Mars Rover prototype that can traverse harsh Martian like terrain and steep gradients.

- * Participated in the University Rover Challenge, UT 2017 and stood 8th. (URC-2017)
- * Presented the Rover at various conferences. (Critical Design Review) [2]

Robotic Arm Lead:

Superevised a team of 6 interdisciplinary researchers to develop an detachable 6DOF Manipulator module for the Rover.

- * The arm has a 6kg payload and a 1.5m reach.
- * Self adapting gripper to perform screwing, grasping, retreiving, etc tasks, published. [1, 3-4]

PROJECTS

- Obstacle detection and Path planning for an autonomous robot using computer vision and fuzzy logic. ³
- Traffic Detection using a Kalman Filter and Feature detection. ⁴
- LQR based control of a 3-link Linear Inverted Pendulum on a cart (LIP). ⁵

TECHNICAL SKILLS

Programming C/C++, Python, C#, MATLAB, Simulink, Embedded C, Arduino, AVR, HTML, CSS, JS, I♣TEX

Robotics Software ROS, OROCOS, GazeboSim, MOVEit

CAD & CAM

ANSYS Mechanical Workbench, ADAMS, Soliworks, CATIA V6, AutoCAD, Blender

Publications & Presentations

- 1. Rajamani, D. K., et al. Design and development of a linear jawed gripper for unstructured environments. Manipal Journal of Science and Technology 3, no. 1 (June 2018). [link]
- 2. Rajamani, D. K., et al. Design Overview of a Planetary Exploration Rover for Unstructured Terrain. 3rd International and 18th National Conference on Machines & Mechanisms.
- 3. Rajamani, D. K., et. all. Design and Development of a Linear Jawed Gripper for Unstructured Environments. International Conference on Applied Sciences, Engineering & Technology.(ISBN: 978-93-5279-058-6)
- 4. Rajamani, D. K., et. all. A comparative Analysis ofIndustrial Grade Parallel Gripper and Linear Grippers. ISAB Industrial Automation and Control TechEvent Day, ISA Bangalore. (Best Paper Award)

Relevant Courses Covered

Please refer to this course curriculum for reference. (Mechatronics Course Plan)

Robot Dynamics and Control (MTE-4007), Robotic Path Planning (MTE-4008), Artificial Intelligence (MTE-4027), Machine Vision and Image Processing (MTE-4006), Machine Learning (MTE-4025), Robotics Lab (MTE-3212)

³C++, Python, MATLAB

⁴MATLAB

⁵ROS (C++, Python), MATLAB