Utkarsh Aashu Mishra

Personal Information

Adrress:	BG-03, Jawahar Bhawan, Indian Institute of Technology, Roorkee Uttarakhand, India - 247667
home:	CE-10/1 Arjunpur (East) Kolkata, West Bengal, India 700059
Mobile:	+91-8240976847, +91-8394852072
email:	umishra@me.iitr.ac.in , utkarsh75477@gmail.com
website:	www.umishra.live
github:	UtkarshMishra04

Education

2017 - Present Bachelors of Technology in Mechanical Engineering
Indian Institute of Technology(IIT), Roorkee, India
CGPA: 9.031/10.0 | Transcripts

Interests

Robotics, Autonomous Vehicles, Optimal Control, Reinforcement Learning

Internships

Aug 2020 – Apr 2020 | Behavioral Planning for Autonomous Vehicles using Reinforcement Learning
Reinforcement Learning Intern at Swaayatt Robots, India

Worked on constructing observation, states and action space for Behavioral Planning DRL framework coupled with a probabilistc local planner and PD controller

Conducting experiments with DQN, DDPG, TRPO and PPO algorithms on Carla Self-Driving Simulator with ROS Bridge based on offline collecetd data

May 2019 – Jul 2019 | Quasi Photon-Monte Carlo: An Importance Sampling Approach
SPARK Research Fellowship 2019 at IIT Roorkee, India

Accepted: ASME Summer Heat Transfer Conference (SHTC 2020)

Worked on Quasi Photon Monte Carlo Method along with Importance Sampling technique and its application to radiative heat transfer.

Research Experience

Ongoing – Jan 2020 | Trajectory Planning and Tracking for Toe-Foot Bipedal Robot Model
Computer Science and Engineering Department, IIT Roorkee, India

Working on a 9-DOF Toe-Foot Robot Model, devloped Unsupervised Inverse Kinematics and Dynamic Equations for modelling.

Novel Trajectory planning strategies are explored and Optimal Tracking controller is developed

Nov 2019 – Aug 2019 | Path Planning and Optimization of Cable-Driven Parallel Robots
Mechanical and Industrial Department, IIT Roorkee, India

Accepted:28th Mediterranean Conference on Control and Automation (MED'2020)

Worked on path planning through genetic algorithm and workspace analysis of Cable Driven Parallel Robots

Dynamic optimization considering cable tensions and non-negligible cable mass. Cable sagging and Collision constraints are also considered

Feb 2019 – Oct 2018 | Optimal Flow Planning in Water Distribution Networks
Mathematics Department, IIT Roorkee, India

Accepted:ASME Fluids Engineering Division Summer Meeting (FEDSM 2020)

Worked on optimal flow planning based on Electrical analogy using least impedance path and maintaining flow pressure

Developed Dynamic Series-Parallel Cost function based Least Cost Algorithm

Publications

Sept 2020 U. A. Mishra, I. Chawla and P. M. Pathak, "On Determining Shortest Path in Joint Space of a Cable-Driven Parallel Robot for Point-to-Point Motion," 2020 28th Mediterranean Conference on Control and Automation (MED), Saint -Raphaël, France, 2020, pp. 984-989, doi: 10.1109/MED48518.2020.9183198.

Team Projects

Aug 2020 – Jul 2020 | Design, Simulation and Motion Planning for Quadrotor
Group Project for Flipkart GRID 4.0

Designing and Structural Analysis, followed by proper URDF modelling

Integrated sensors and stereo-camera based localization and mapping using RTabMap

Dynamic Modelling is done and appropriate probablistic conformal lattice based planner is formulated

Present – Jan 2018 | IIT Roorkee Motorsports Electric 2019 (RMSE'19) FS Prototype
IIT Roorkee Motorsports , Formula Student Team of IIT Roorkee

Experience of Designing and Fabricating an Electric Vehicle from scratch. Manufactured RMSE'19 Formula Electric Prototype

As a member of the Autonomous Algorithms Subsystem, dedicated to vision-based Localization, Mapping and motion planning for our upcoming proposed vehicle

MPC based trajectory optimization for a race track on the basis of longitudinal, lateral and cornering stability

Key Courses

2020	Robotics and Control (Cur.)		Electrical Science (9/10)
	Dynamics of Mechanical Systems (Cur.)		Economics (9/10)
	Automatic Control (8/10)	2018	Engineering Analysis and Design (8/10)
	Machine Design (9/10)		Kinematics of Machines (9/10)
2019	Dynamics of Machines (10/10)		Mechanical Engineering Drawing (10/10)
	Vibration and Noise (9/10)		Numerical Methods (10/10)
	Marketing Research (9/10)		Electromagnetic Theory (9/10)
	Machine Drawing (10/10)	2017	Programming and Data Structures (10/10)

Skills

Programming:	C++, Python, Tensorflow,
Softwares:	ROS, Gazebo, MATLAB, Simulink, OpenSim, Visual Studio, Solidworks, Ansys (Design, Meshing, Structural, Fluent)
Others:	Linux(Ubuntu), LaTeX

Awards and Achievements

Jan 2020	Secured Second Runners Up position in Formula Green 2020 with IIT Roorkee Motorsports
May 2019	Selected for the SPARK Research Internship Program by IIT Roorkee (Certificate)
May 2017	Joint Entrance Examination, Advanced (Indian Institute of Technology) All India Rank **2223, 98.99 percentile**
May 2017	Awarded the prestigious KVPY Scholarship (Kishore Vaigyanik Protsahan Yojana) in-stream SX (2016) (Certificate)
May 2017	Achieved Merit Certificate in Physical Education in the CBSE AISSCE 2017 (Standard 12) **(top 0.1%of examinees)**(Certificate)

Position of Responsibilities

Current	Aerodynamic SubSystem head at IIT Roorkee Motorsports
Jan 2019	Undergraduate Teaching Assistant, Academic Reinforcement Program, Teaching Assistant for the course MAN-004 Numerical Methods.
Dec 2018	Developer and WoC Mentor at Mobile Development Group, IIT Roorkee
Aug 2017	National Cadet Corps, 3UK NCC IIT Roorkee, India Successfully gave the Guard of Honour to our Institute's Director on the occasion of Independence Day

References

Dr. Pushparaj Mani Pathak
Professor
Mechanical Engineering Department
Indian Institute of Technology Roorkee
India
pushpfme@iitr.ac.in

Dr. Ankit Bansal
Associate Professor
Mechanical Engineering Department
Indian Institute of Technology Roorkee
India
abansfme@iitr.ac.in