Utkarsh Aashu Mishra

Personal Data

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Education

July 2017 - Present | Bachelors of Technology in Mechanical Engineering
Indian Institute of Technology(IIT), Roorkee, India
CGPA: 9.036/10 | Detailed List of Courses

Interests

Robotics, Autonomous Vehicles, Optimal Control, Reinforcement Learning

Internships

Ongoing / April 2020 | Behavioral Planning using Reinforcement Learning on Carla Simulator
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 based on offline collecetd data

Jul 2019 / May 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

March 2020 / Dec 2019 | Novel Dynamic Trajectory Planning and Optimization for Toe-Foot Bipedal Robot Model on Staircase
IIT Roorkee, India

Submitted to IEEE-Transactions in Robotics

Developed forward kinematic and ANN based inverse kinematic model for the 8-DOF Bipedal Robot

Extended to Dynamic planning and control as a learning agent based on Deep Deterministic Policy Gradient learning method.

Nov 2019 / Aug 2019 | Path Planning and Optimization of Cable-Driven Parallel Robots
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
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

Team Projects

Current Jan 2018	Mechanical and Driverless Subsystem Member *IIT Roorkee Motorsports , official Formula Student Team of IIT Roorkee* Experience of Designing and Fabricating an Electric Vehicle from scratch. As a member of the Autonomous Algorithms Subsystem, dedicated to vision-based Localization, Mapping and motion planning for our upcoming proposed vehicle Works include designing and programming models efficient enough to follow a vision and LIDAR based localization and path planning for unknown racing circuits. Driver Modelling based on driver characteristics prediction and validation using Data Acquisition (DAQ) system. MPC based trajectory optimization for a race track on the basis of longitudinal, lateral and cornering stability.

Skills

Programming Languages:	C++, Python (Tensorflow, PyTorch, Theano)
Softwares and Utilities:	ROS, MATLAB, Simulink, OpenSim, SimBody, Visual Studio, Solidworks, Ansys (Design, Meshing, Structural, Fluent)
Others:	ubuntu, LaTeX
Key Courses:	Programming and Data Structures, Kinematics and Dynamics of Machines, Vibrations and Noise, Automatic control
Coursera Courses:	State Estimation and Localization for Self-Driving Cars (Certificate), Visual Perception for Self-Driving Cars (Certificate), Control of Mobile Robots (Certificate)

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) (Instituted by the Department of Science and Technology, Government of India)
May 2017	Achieved Merit Certificate in Physical Education in the CBSE AISSCE 2017 (Standard 12)(top 0.1%of examinees) (Certificate)

Position of Responsibilities (and other Certificates)

Apr 2020 - Current	Aerodynamic SubSystem head at *IIT Roorkee Motorsports*
Jan-Jul 2019	Undergraduate Teaching Assistant, Academic Reinforcement Program, Teaching Assistant for the course MAN-004 Numerical Methods.
2018-19	Developer and WoC Mentor at Mobile Development Group, IIT Roorkee
August 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

Reference:

Dr. Pushparaj Mani Pathak
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