Résumé
Utkarsh Aashu Mishra

EDUCATION

INDIAN INSTITUTE OF TECHNOLOGY (IIT) ROORKEE
BTech in Mechanical Engineering
Expected May 2021 | Roorkee, India
Cum. GPA: 9.059/10
Transcripts

LINKS

Email: umishra@me.iitr.ac.in
Portfolio:// www.umishra.live
Mobile: +91-8240976847
Cell: +91-8394852072
Github:// utkarshmishra04
LinkedIn:// utkarshamishra

COURSEWORK

UNDERGRADUATE
Optimization
Mechatronics
Robotics and Control
Dynamics of Mechanical Systems
Automatic Control
Machine Design
Numerical Methods
Electromagnetic Theory
C++ Data Structures

INTERESTS

Robotics
Perception and Planning
Autonomous Vehicles
Optimal Control
Reinforcement Learning

SKILLS

PROGRAMMING
Languages:
C++ • Python • Matlab • LaTeX
Softwares:
MuJoCo • ROS • Gazebo • Matlab-Simulink • OpenSim • SCONE • Bullet • Solidworks • Ansys
Frameworks:
Tensorflow • Pytorch
OS:
Linux(Ubuntu) • Windows

BACHELOR THESIS

EPFL BIOROBOTICS LABORATORY | Thesis Collaboration
Sept 2020 – Present | Switzerland, Remote (Covid'19)
Primary Supervisor: Prof. Dr. Pushparaj M. Pathak, MIED, IIT Roorkee
Co-Supervisor: Prof. Dr. Auke Ijspeert, Biorobotics Laboratory, EPFL
- Collaborating with Dr. Dimitar Stanev and simulating Healthy Movements using Predictive Simulation
- Developing Robust Control Policies using Deep Reinforcement Learning to effectively control a full body skeletal model and achieve the desired gait.
- Intro Video

INTERNSHIPS

SWAAYATT ROBOTS | Reinforcement Learning Intern
April 2020 – July 2020 | India, Remote (Covid'19) | More Information
- Constructed Observation, States and Environment for Behavioral Planning DRL framework using the Perception Stack (Lidar, Camera)
- Conducted experiments with DDPG and PPO algorithms for velocity prediction agent on CARLA Simulator with ROS Bridge

SPARK FELLOWSHIP | Undergraduate Research Intern
May 2019 – July 2019 | IIT Roorkee, India | Conference Article
Supervisor: Prof. Dr. Ankit Bansal, MIED, IIT Roorkee
- Implemented Quasi Photon Monte Carlo with Importance Sampling and further reduced computation time with pseudo random sequences

RESEARCH | UNPUBLISHED

INDIAN INSTITUTE OF SCIENCE | Collaborator
Nov 2020 – Present | India
Supervisor: Prof. Dr. Shishir Kolathaya, EECS, IISC
- Working on bipedal RABBIT Locomotion in MuJoCo on Non-flat terrain with Policy optimization based on Augmented Random Search (ARS).
- Generalizing methodology to DIGIT (by Agility Robotics) in collaboration with Prof. Dr. Ayonga Hereid, MAE, OSU.

NANTES LABORATORY OF DIGITAL SCIENCES | Collaborator
July 2020 – Nov 2020 | France, Remote (Covid'19)
Supervisor: Dr. Stéphane Caro, ROMAS, LS2N
- Worked with path planning of a Cable Driven Parallel Robot in complex obstacle-cluttered environments under objectives of Maximizing Stability and Manipulability. **Publication Accepted at ICRA 2021.** Video
- Unsupervised Forward Kinematics for Under-constrained suspended Cable Driven Parallel Robot

MATHEMATICS DEPARTMENT | Robotics Project Student
Jan 2020 – Nov 2020 | IIT Roorkee
Supervisor: Prof Dr. N. Sukavanam, Mathematics Department, IIT Roorkee
- Working on a 9-DOF Toe-Foot Bipedal Robot Model.
- Developed Unsupervised Inverse Kinematics, Novel Trajectory planning strategies and an Optimal Tracking controller.
- Extending to Reinforcement Learning based tracking control for disturbance rejection and push recoveries

RESPONSIBILITIES

PRESENT

Aerodynamics Head
Autonomous Team member
@IITR Motorsports

2018

Teaching Assistant,
Academic Reinforcement Program
(MAN-004 Numerical Methods)

Android Developer
Winter of Code Mentor
@ Mobile Development Group
IIT Roorkee

REFERENCES

DR. STÉPHANE CARO

CNRS Research Director
Team Leader: ROMAS
Nantes Laboratory of Digital Sciences
France
Stephane.Caro@ls2n.fr

DR. N. SUKAVANAM

Professor, Head of Department
Mathematics Department
Indian Institute of Technology Roorkee
India
n.sukavanam@ma.iitr.ac.in

DR. PUSHPARAJ M. PATHAK

Professor
Mechanical Engineering Department
Indian Institute of Technology Roorkee
India
pushparaj.pathak@me.iitr.ac.in

DR. DIMITAR STANEV

Post-Doctoral Researcher
BioRobotics Laboratory
School of Engineering
Swiss Federal Institute of Technology
Lausanne - EPFL
Switzerland
dimitar.stanev@epfl.ch

ARTICLES | [C] - CONFERENCE [J] - JOURNAL [P] - PREPRINT

[P] Krishna, L., **Mishra, U.A.**, Castillo, G.A., Hereid, A., & Kolathaya, S. (2021). Learning Linear Policies for Robust Bipedal Locomotion on Terrains with Varying Slopes. https://arxiv.org/abs/2104.01662

[P] **Utkarsh A. Mishra**, Marceau Métillon, Stéphane Caro. Kinematic Stability based AFG-RRT* Path Planning for Cable-Driven Parallel Robots. The 2021 IEEE International Conference on Robotics and Automation (ICRA 2021), May 2021, Xi'an, China. hal-03182298

[P] Bhardwaj, G.*,†, **Mishra, U. A.**†, Sukavanam, N., & Balasubramanian, R. (2020). Cycloidal Trajectory Realization on Staircase with Optimal Trajectory Tracking Control based on Neural Network Temporal Quantized Lagrange Dynamics (NNTQLD). http://arxiv.org/abs/2012.01417 († Equal Contribution)

[C] G. Bhardwaj, **U. A. Mishra**, N. Sukavanam, and R. Balasubramanian, "Planning Adaptive Brachistochrone and Circular Arc Hip Trajectory for a Toe-Foot Bipedal Robot going Downstairs," J. Phys. Conf. Ser., vol. 1831, no. 1, p. 012032, Mar. 2021, doi: 10.1088/1742-6596/1831/1/012032.

[C] **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. Article

[C] Soni, B, **Mishra, UA**, & Nayak, AK. "Optimal Control Strategy to Distribute Water Through Loop-Like Planar Networks." Proceedings of the ASME 2020 Fluids Engineering Division Summer Meeting. July, 2020. ASME. doi: 10.1115/FEDSM2020-20097. Article

TEAM PROJECTS

IIT ROORKEE MOTORSPORTS | FORMULA STUDENT ELECTRIC

IITR Motorsports Electric 2019 (RMSE'19) FS Prototype | Jan. 2018 – Present

- Experience of Designing and Fabricating an Electric Vehicle from scratch. Manufactured RMSE'19 Formula Electric Prototype
- Member of Autonomous Algorithms Subsystem, formulating SLAM base for autonomous endeavors in future

SPOTLE AI-THON 2020 | SPOTLE.AI DATA SCIENCE PROJECT

Analyse the mental health of India during COVID | Sept. 2020 – Oct. 2020

- Classified Mood based on grayscale facial expression images by using VGG-like architecture
- Multinomial NB model was used along with Tfidf Vectorizer to train the model with a stratified Cross-validation Strategy Certificate

FLIPKART GRID 4.0 2020 | ROBOTICS PROJECT

Design, Simulation and Motion Planning for Quadrotor | Jul. 2020 – Sept. 2020

- Designing and Structural Analysis, followed by proper URDF modelling Integrated sensors and stereo-camera based SLAM
- Implemented Dynamic Modelling and probablistic conformal lattice based planner Presentation Video

AWARDS

2020 Secured 3rd position in 5th Formula Green 2020 with IIT Roorkee Motorsports
2019 Selected for the SPARK Research Fellowship Program by IIT Roorkee
2017 All India Rank **2223**, **99.72 %ile** in Joint Entrance Examination Advanced(IITJEE)
2017 Awarded the prestigious KVPY Scholarship (Kishore Vaigyanik Protsahan Yojana) in-stream SX (2016) (All India Rank **780**, **99.48 %ile**)