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

Bachelor Thesis

Ongoing — Learning Control Policies for Imitating Human Gaits
Sep 2020 — Collaboration: EPFL Biorobotics Laboratory

Primary Supervisor: Prof. Dr. Pushparaj M. Pathak, MIED, IITR

Co - Supervisor: Prof. Dr. Auke J. Ijspeert, Biorobotics Laboratory, EPFL

Simulating Healthy Movements using Predictive Simulation and developing Robust Control Policies using Deep Reinforcement Learning to effectively control a full body skeletal model and achieve the desired gait. Intro Video

Internships

Ongoing
Jul 2020 — Structural Stability based Motion Planning for Cable Driven Parallel Robots
Supervisor: Dr. Stéphane Caro, ROMAS-LS2N, France

Motion Planning of Suspended cable Robots in Clutterd Enviornments

Implemented modified RRT* with an Artificial Field Guide and GJK collision detection

Publication Submitted.

Jul 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

Conducted experiments with DQN, DDPG, TRPO and PPO algorithms on Carla Self-Driving Simulator with ROS Bridge. More Information

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

Published: ASME Summer Heat Transfer Conference (SHTC 2020)

Research Experience (Unpublished)

Ongoing
Jan 2020

Trajectory Planning and Tracking for Toe-Foot Bipedal Robot Model Paper
Computer Science and Engineering Department, IIT Roorkee, India
Accepted: ROBOTICS AND ARTIFICIAL INTELLIGENCE (ROAI) 2020

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

Research Publications [C] - Conference [J] - Journal

[C] Sep 2020 Paper — 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.

[C] Sep 2020 Paper — 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, Volume 2: Fluid Mechanics; Multiphase Flows. Virtual, Online. July 13–15, 2020. V002T03A025. ASME. https://doi.org/10.1115/FEDSM2020-20097.

[C] Sep 2020 Paper — Mishra, UA, & Bansal, A. "Quasi-Photon Monte Carlo on Radiative Heat Transfer: An Importance Sampling Approach." Proceedings of the ASME 2020 Heat Transfer Summer Conference. Virtual, Online. July 13–15, 2020. V001T02A012. ASME. https://doi.org/10.1115/HT2020-8950.

Team Projects

Oct 2020
Sep 2020

Analyse the mental health of India during COVID
Group Project for Spotle AIthon 2020

Classified Mood based on grayscale facial expression images by using VGG-like architecture

Performed Exploratory Data Analysis on Twitter data from Sep 18-22

Multinomial NB model was used along with Tfidf Vectorizer to train the model with a stratified Cross-validation Strategy

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 More Information

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

Key Courses

2020	Robotics and Control (Cur.)		Vibration and Noise (9/10)
	Dynamics of Mechanical Systems (Cur.)		Machine Drawing (10/10)
	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)		Numerical Methods (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. N. Sukavanam
Professor, Head of Department
Mathematics Department
Indian Institute of Technology Roorkee
India
n.sukavanam@ma.iitr.ac.in

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

TRANSCRIPT VALID ONLY IF IT BEARS INSTITUTE HOLOGRAM

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

OFFICIAL TRANSCRIPT

(Statement of Earned Credits & Grades)

ENROLLMENT NO. OF THE STUDENT: 17117093 **NAME:** UTKARSH AASHU MISHRA

PROGRAMME: BACHELOR OF TECHNOLOGY (MECHANICAL)

SESSION 2017-18	SEMESTER Autumn	GRADE LETTER	GRADE POINT	CREDIT
SUBJECT CODE	SUBJECT TITLE			
CEN-105	INTRODUCTION TO ENVIRONMENTAL STUDIES	B+	9	3
HSN-001A	COMMUNICATION SKILLS (BASIC)	B+	9	2
HSN-002	ETHICS AND SELF AWARENESS	A	10	2
MAN-001	MATHEMATICS-I	B+	9	4
MIN-101A	INTRODUCTION TO MECHANICAL ENGINEERING	A	10	2
MIN-103	PROGRAMMING AND DATA STRUCTURES	A	10	4
PHN-001	MECHANICS	B+	9	4
EARNED CREDITS 21	TOTAL EARNED CREDITS 21	SGPA 9.381		
REG. CREDITS 21		CGPA 9.381		

SESSION 2017-18	SEMESTER Spring	GRADE LETTER	GRADE POINT	CREDIT
SUBJECT CODE	SUBJECT TITLE			
MAN-004	NUMERICAL METHODS	A	10	4
MIN-104	MANUFACTURING TECHNOLOGY-I	B	8	4
MIN-106	ENGINEERING THERMODYNAMICS	B+	9	4
MIN-108	MECHANICAL ENGINEERING DRAWING	A	10	4
MTN-106	MATERIAL SCIENCE	C+	7	4
PHN-008	ELECTROMAGNETIC THEORY	B+	9	4
PR-501	N.C.C.	B+	9	2
EARNED CREDITS 26	TOTAL EARNED CREDITS 47	SGPA 8.846		
REG. CREDITS 26		CGPA 9.085		

SESSION 2018-19	SEMESTER Autumn	GRADE LETTER	GRADE POINT	CREDIT
SUBJECT CODE	SUBJECT TITLE			
CEN-102	SOLID MECHANICS	B+	9	4
MIN-201	KINEMATICS OF MACHINES	B+	9	4
MIN-203	MANUFACTURING TECHNOLOGY-II	A	10	4
MIN-205	FLUID MECHANICS	B	8	4
MIN-291	ENGINEERING ANALYSIS AND DESIGN	B	8	4
EARNED CREDITS 20	TOTAL EARNED CREDITS 67	SGPA 8.800		
REG. CREDITS 20		CGPA 9.000		

SESSION 2018-19	SEMESTER Spring	GRADE LETTER	GRADE POINT	CREDIT
SUBJECT CODE	SUBJECT TITLE			
EEN-112	ELECTRICAL SCIENCE	B+	9	4
HSS-01	ECONOMICS	B+	9	3
MIN-204	MACHINE DRAWING	A	10	4
MIN-206	MECHANICS OF MATERIALS	B+	9	4
MIN-208	THEORY OF PRODUCTION PROCESSES	B+	9	4
MIN-210	ENERGY CONVERSION	B+	9	4
EARNED CREDITS 23	TOTAL EARNED CREDITS 90	SGPA 9.174		
REG. CREDITS 23		CGPA 9.044		

SESSION 2019-20	SEMESTER Autumn	GRADE LETTER	GRADE POINT	CREDIT
SUBJECT CODE	SUBJECT TITLE			
IBM-306	MARKETING RESEARCH	B+	9	3
MIN-301	DYNAMICS OF MACHINES	A	10	4
MIN-303	PRINCIPLES OF INDUSTRIAL ENIGNEERING	B+	9	4
MIN-305	HEAT AND MASS TRANSFER	B+	9	4
MIN-321	VIBRATION AND NOISE	B+	9	4

भारतीय प्रौद्योगिकी संस्थान Indian Institute of Technology भारत India

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(Statement of Earned Credits & Grades)

ENROLLMENT NO. OF THE STUDENT: 17117093 **NAME:** UTKARSH AASHU MISHRA

PROGRAMME: BACHELOR OF TECHNOLOGY (MECHANICAL)

MIN-391	TECHNICAL COMMUNICATION			C+	7	2
EARNED CREDITS	21	**TOTAL EARNED CREDITS**	111	**SGPA**	9.000	
REG. CREDITS	21			**CGPA**	9.036	

SESSION 2019-20 **SEMESTER** Spring (Covid-19)

SUBJECT CODE	SUBJECT TITLE	GRADE LETTER	GRADE POINT	CREDIT
IPH-305	QUANTUM COMPUTING	S	-	3
MIN-300	LAB BASED PROJECT	A	10	4
MIN-302	MACHINE DESIGN	B+	9	6
MIN-304	FLUID MACHINERY	B+	9	4
MIN-354	AUTOMATIC CONTROL	B	8	4

EARNED CREDITS	21	**TOTAL EARNED CREDITS**	132	**SGPA**	9.000	
REG. CREDITS	21			**CGPA**	9.031	

STUDENT HAS NOT YET COMPLETED THE PROGRAMME

Note:-

1) The medium of Instruction at this Institute is English.

2) Academic Performance is graded on a 10-Point Scale.

3) "S"-Grade: Satisfactory performance during Covid-19 pandemic.

Place: Roorkee

Dated: 10/13/2020

Assistant Registrar (Evaluation)