

AMAN TIWARY

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🌐 <https://github.com/Heavy0strich>

SUMMARY

I specialize in motion planning and controls, adept at researching, developing, and optimizing software solutions for robotic systems. With strong focus on performance and efficiency, I have extensive experience in collaboration and innovation. I am eager to contribute to cutting-edge projects and advance the field of autonomous UAVs.

EDUCATION

MS in Mechanical Engineering | University of Washington

Sep. 2021 - Aug 2024(expected)

Coursework: Controls, Convex Optimization, Reinforcement Learning

GPA: 3.80/4.0

Specializing in **Motion Planning and Controls**, advised by Dr. Behçet Açikmeşe

BE in Mechanical Engineering | Birla Institute of Technology

Aug 2013 - May 2017

Coursework: Vehicle Dynamics, Finite Element Method, Data Structures & Algorithms

GPA: 7.91/10.0

Graduated with distinction

EXPERIENCE

Graduate Student Researcher | Autonomous Controls Lab | UW Seattle

Mar 2022 - present

- Perception aware trajectory planning for coverage: Developed and implemented **6DOF quad-rotor trajectory planning** using **Sequential Convex Programming** with **pointing constraints**
- Formulated **minimum viewpoint problem** as a **Mixed Integer Optimization problem** and created a **view planning package**(C++, Python) for **3D object reconstruction** using **Point Cloud Library(PCL)** with object-oriented design
- Researching robust **6DOF controller** for quad-rotor in complex scenarios
- Maintaining **Trajectory Optimization** software library for live flight demonstrations with quad-rotor(C++)
- Developing next generation of drone hardware and software stack to support perception and onboard trajectory computing tasks

Controls Engineering Intern | MONARCH TRACTOR | California, US

Jun 2022 - Sep 2022

- Conducted **system identification** of an **Electro-Hydraulic Steering Actuator** and designed a **feedforward steering controller**, improving the steering response by **100 ms**
- Developed a **steering simulator** to design and test various control strategies

Cost Engineering | TATA Motors Ltd | Maharashtra, IND

Jul 2018 - Jul 2021

- Led Cross-Functional Team for **Gearbox** and **Engine Cooling System** of Euro 6 vehicles and identified cost reduction opportunities through **DFMA**, **cost-driver analysis**, **Linear Performance Pricing**, and **VAVE** resulting in potential savings of **\$2 million** for commercial and passenger vehicles

PROJECTS

Reinforcement Learning for Flying Insect Robots 📄 | UW

Sep 2022 - Dec 2022

- Implemented the **Proximal Policy optimization** method in **AirSim** (Microsoft Simulator) to train a quad-rotor equipped with cameras to autonomously navigate the corridor without colliding

Manipulating Images Using Autoencoders 📄 | UW

Sep 2022 - Dec 2022

- Developed and trained a **Convolutional Autoencoder** to denoise an image for classification(MNIST Dataset) using Pytorch achieving a minimum classification accuracy of **76.5%** at a noise factor of **0.9**(Gaussian noise)

MPC for Autonomous Car 📄 | UW Formula Motorsports-Driverless

Jan 2022 - May 2022

- Implemented dynamic **vehicle-bicycle-model** in Python with MPC to find an optimal set of control inputs

Design Optimisation of a Car Underbody Diffuser | Undergraduate Thesis

Aug. 2016 - May. 2017

- Conceptualized and simulated the undertray design with the car in optimum lap, demonstrating an improvement of **2.5%** in a lap time of the car without undertray

Design of a formula student chassis | Team Srijan(Formula Student)

May. 2014 - May. 2016

- Optimized chassis weight by **8 kg** using FEM simulations in **ANSYS APDL** by identifying and relocating key members for torsional stiffness. Published in **IJRET** 📄

TECHNICAL SKILLS

Programming	C/C++, Python, Matlab, Simulink
Tools	Linux, ROS2, L ^A T _E X, GitHub
Libraries	Eigen, PCL, Open3D, CVXPY, OpenCV
Simulation/Design	AirSim, Rerun, Solidworks, AutoCAD, ANSYS