Tushar Sial

https://tusharsial.github.io/ | sialtushar@gmail.com | linkedin.com/in/tushar-sial-726001195/ | github.com/tusharsial

Education

Birla Institute of Technology and Science - Pilani, Pilani Campus — India
Bachelor of Engineering in Electrical and Electronics, CGPA - 7.95/10 — *Aug. 2019 – May 2023*

Army Public School Dhaula Kuan, New Delhi — India
12th grade, Percentage - 93.2% — *July 2017 – March 2019*

Technical Skills

Frameworks: Robotic Operating Software (ROS) 1 Melodic, Linux
Design: Fusion 360, LT Spice
Programming Languages: Java, Python, C++, Go, MATLAB
Libraries: Numpy, Pandas, OpenCV
Others: Arduino, Git, Docker, Kubernetes, Terraform, MS Excel

Fields of Interest

Space Systems, Control Theory, Mathematical Modelling, Astrodynamics, Electric Vehicles

Experience

HDFC Bank: Junior DevSecOps Engineer — July 2023 – July 2024

- Designed, maintained & secured CI/CD pipelines using Jenkins, Git, Kubernetes, and Docker.
- Integrated distributed tracing system in the CI pipeline using Google Cloud Trace and OpenTelemetry, for health monitoring of Dockerised web applications.
- Implemented infrastructure-as-code principles using tools like Terraform and Ansible to ensure secure and compliant cloud environments.

Guidance, Control & Decision Systems Lab (GCDSL): Research Intern — June 2022 – June 2023

- Developed algorithms for spacecraft rendezvous with non-cooperative satellites under the guidance of Dr. Debasish Ghose, a professor of the Department of Aerospace Engineering at the Indian Institute of Science, Bengaluru.
- Implemented a Koopman operator-based approach for the computation of control sequences that minimizes the fuel consumption for far-field rendezvous of a thrust-vectoring spacecraft.

Intelligent Systems Group, CSIR-CEERI Pilani: Research Intern — July 2021 – Nov 2021

- Developed the drive system of a small 4-wheeled prototype for autonomous traversal in indoor mapped and outdoor unmapped environments, under the guidance of Dr. Kaushal Kishore.
- Modelled the drive system of the prototype based on the electronic differential principles and implemented PID-based speed and direction control by employing MATLAB & Simulink and Raspberry Pi4.

Projects

Mars Rover Team | *MATLAB, Simulink, ROS, Gazebo, Eagle-CAD, Fusion 360* — Jan 2021 – Jan 2022

- Co-founded CRISS Robotics (Consortium for Research in Space Systems), a student research technical team at BITS Pilani consisting of 60+ members for designing and manufacturing an all-terrain 6-wheeled Mars Rover.
- Designed the high-level Electrical Architecture of the Mars rover capable of Autonomous traversal, Equipment servicing using a 6-DOF Robotic Manipulator, and life detection using a Science module.
- CRISS qualified for the International Rover Challenge in 2022 finals at Chennai among 16 international teams; followed by winning the International Rover Design Challenge in 2023. (IRC Report) (IRDC Report)

Powertrain of a Formula Styled Electric Vehicle | *Fusion 360, MATLAB, Simulink* Aug 2019 – March 2022

- Member of formula student team Inspired Karters Electric at BITS Pilani consisting of 40+ members for designing and manufacturing an electric formula car for competing in National and International Formula Student events.
- Worked on the assembly and packaging of the Electrical components such as motor, motor controller, accumulator, low Voltage electronics, and tractive system wiring of our car's CAD model using Fusion 360.
- Modelled the Electric Powertrain package using Simulink and Simscape to calculate the torque and current requirements to select the motor and battery capacity requirements and simulate various motor control algorithms for selecting the optimum motor control technique. (CAD Video) (Design Report)

Flight Stabilizing Controllers for Agile Fixed-Wing Aircrafts | *MATLAB, Simulink* Aug 2021 – March 2022

- Designed flight stabilizing controllers for an agile fixed-wing aircraft under the guidance of Dr. Bijoy Krishna Mukherjee, a professor of the Department of EEE at BITS Pilani.
- Designed and modeled the Longitudinal and Lateral-Directional stability movement controllers of the aircraft using the Backstepping Control technique using MATLAB and Simulink.
- Designed a wind observer to incorporate environmental disturbances(like wind shears, wind gusts, and atmospheric disturbances) to make the controllers robust and thus, improve flight capability. (Video) (Github Link)

Autonomous Cleaning Bot | *WeBots, Python, ROS, Gazebo* Oct 2021 – Dec 2021

- Developed autonomous navigation algorithms for a differential drive mobile robot in unknown environments for cleaning purposes under Dr. Avinash Gautam, a professor at the Department of CSE at BITS Pilani.
- Working on sensor fusion and wheel odometry for localization and state estimation.
- Employed Bugs 0 algorithm for path planning and obstacle avoidance of the mobile robot. (Design Report)

Awards and Honours

AUGSD Project Funds Sept 2021

- Awarded Rs 25,000 for developing an adaptive drive control system for a Mars Rover prototype at BITS Pilani.

3rd Edition of National Engineering Olympiad (NEO) July 2020

- Achieved an All India Rank 19 in the 1st Year Engineering Category.

4th Annual FSEV Concept Challenge | *Formula Bharat* April 2020

- Achieved overall first position across India in the event.
- Worked on the design and assembly of the electrical powertrain package of an electric vehicle.

JEE Advanced May 2019

- Achieved an All India Rank of 7054 of 1,300,000 in Joint Entrance Examination (JEE) Advanced.

Position of Responsibility

Powertrain Head | *Inspired Karters Formula Student, BITS Pilani* March, 2021 – March 2022

- Responsible for designing and integrating the Electric Powertrain of a formula student electric vehicle.
- Particularly, dealt with Motor, Motor controller, & Regenerative Braking.

Demonstration Head | *Department of Physics, BITS Pilani* May 2020 – April 2021

- Responsible for designing functional demonstrations in APOGEE i.e. the college's annual technical fest.

Courses

- Control of Mobile Robotics by Georgia Tech University
- Spacecraft Dynamics and Control Specialization by University of Colorado Boulder
- Fundamentals of Astrodynamics Using Python by Spartficial Innovations Pvt. Ltd

Languages

English (*Bilingual Proficiency*), Hindi (*Bilingual Proficiency*)