Zeeshan Basar Sheikh

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Education

Indian Institute of Technology Madras — Chennai, India
MS(R) in Aerospace Engineering (Guidance, Navigation and Control); ***CGPA: 8.74/10*** — *Aug 2021 – Present*

Manipal Institute of Technology — Manipal, India
B. Tech in Electrical and Electronics Engineering; ***CGPA: 8.49/10*** — *Aug 2016 – July 2020*

Research Experience

Fuel-Optimal Powered Descent Guidance for Hazardous Terrain — IIT Madras, Chennai
Graduate Research Scholar — *Jun 2022 – Present*

- Developed fuel-optimal **soft landing guidance** laws for spacecrafts in **hazardous terrain**.
- A novel augmentation to performance index is used, dependent on the known terrain model.
- Improved robustness of the guidance using **Sliding Model Control**.
- Validated terrain avoidance and efficacy in terms of fuel optimality in simulations in **MATLAB**.
- Extending the guidance law to **map the terrain online and avoid it on-the-go**.

PUBLICATIONS

Sheikh Zeeshan Basar, Satadal Ghosh. **Fuel-Optimal Powered Descent Guidance for Hazardous Terrain**. IFAC-PapersOnLine, vol. 56, no. 2, 2023, pp. 6018–23.

Work Experience

Early Bird Enginnering Internship — Airbus India Group Pvt. Ltd.
Simulation and Modelling Intern — *Jun 2023 – Aug 2023*

- Developed mathematical model for **pressure reduction valve** to accurately represent its behaviour.
- Simulated the mathematical model in **Python** to observe the **open-loop characteristics** of the PRV.
- Performed **sizing and selection** of appropriate COTS PRV for **PEM Fuel Cell in aerospace** applications.

Coordinated in BILT PM-1 Upgrade Job — ABB India Limited, Main Works - Peenya, Bangalore
Student Intern — *Jan 2020 – Apr 2020*

- Worked with ABB's ACS880 multi-motor drives for tissue manufacturing machines using **PMC880 standards**.
- Development of HMI for **PPI800 touch panel** using **Panel Builder 800** software.
- Development of control logic and communication systems using the **Compact Control Builder** software.

On Some Aspects of Load Frequency Control for Isolated Power System — IIT Kharagpur
Summer Intern — *May 2019 – Jun 2019*

- Used **MATLAB** to find integral controller gain (K_i) using location of **dominant poles of the system**, and minimising a **function of steady-state frequency deviation as performance index**.
- Used **Simulink to model the power system** and validate the findings.

High Voltage Subsystems — SolarMobil Manipal
Team Member — *May 2017 – Aug 2018*

- Developed, in part, the **e-differentials** for a **solar-powered electric car**.
- Worked with **motor and motor controllers** and assisted in testing them.
- Gained experience in **workshop safety and handling high-voltage equipment** like batteries and PV arrays.

Skills

Programming Languages: MATLAB, Python, LaTeX
Tools: Simulink, Numpy, Matplotlib, Yalmip, TensorFlow, Proteus, Arduino

Relevant Coursework

Major courseworks: Principles of Guidance of Autonomous Vehicles | Optimal Control | Nonlinear Systems Analysis | Linear Dynamical Systems | Flight Mechanics

Online Certifications: Python for Everybody Specialization | Introduction to Power Electronics | Introduction to Battery Management Systems | Neural Networks and Deep Learning

Projects

Real-time object detection using YOLOv3 Jun 2021 – Jul 2021

- Developed **near-realtime** object detection system using YOLOv3 architecture, trained on **MS COCO dataset**.
- Video feed is taken from a GoPro, and the system has **detection latency of** 20 **ms**.

Devanagari script detection using CNNs Jun 2021 – Jul 2021

- Built simple CNNs using **TensorFlow** to recognise characters from **Devanagari script**.
- Trained on **Devanagari Handwritten Character Dataset Data Set** available at **UCI ML Repository**.
- Achieved 97% **training and** 95% **validation accuracy**.

Load Frequency Control of Two-area Power System Mar 2021 – Apr 2021

- Extended the previous work done at IIT KGP, to control the steady-state frequency deviations due to **load changes in interconnected power system**.
- Used **MATLAB** to find the value of K_i using **dominant pole method**.
- Used **Simulink** to validate the findings and fine tune the desired response.

Switched Reluctance Machines and Drives for High-Performance EV - A Review Aug 2019 – Nov 2019

- Undertook literature survey of emerging technologies relevant to **Switched Reluctance Motors**.
- Learnt about **power electronic drives and control strategies** for **electric vehicles** applications.

Arduino-based Waveform Generator Feb 2019

- Developed a **variable frequency, variable amplitude** function generator using Arduino Nano.
- Used Arduino's **Tone** library generated square wave, used open-source **Mozzi** library to generate sinusoidal function.

Heart-rate Monitor Sept 2018

- Developed a heart-rate monitor using **IR sensors** and **8051 microcontroller.**
- Used **OPAMP amplifiers and filters** for signal conditioning.
- Developed the circuit in **Proteus** and used **Keil uVision** for embedded programming.

Positions of Responsibility

Teaching Assistant Principles of Guidance of Autonomous Vehicles

- Moderated a class strength of about 40 students, and assisted in **grading tests** and **conducting viva**.
- Took tutorials sessions and held doubt classes.

General Secretary The Photography Club, Manipal

- Key responsibilities included **writing and ratifying MOUs** between The Photography Club and various clubs across Manipal Institute of Technology.
- Worked with Registrar of MAHE for **expansion of club to university level**.

Hobbies

Gaming | Weightlifting | Music | Movies | Manga