UTKARSH ANAND

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Robotics, AI & Rocketry enthusiast pursuing Electrical & Electronics Engineering

Education

7.29/10 **BTech in Electrical & Electronics Engineering**, *Manipal Institute of Technology* | Karnataka, India *2020-2024*

Courses: Advance Linear Algebra | Microcontrollers | Linear Control Systems | Machine Learning | Data Structures & Algorithms | Signal Processing | Advanced Python Programming | Algorithmic Thinking

Honors & Awards

2022 **IASc-INSA-NASI Summer Research Fellowship**, Indian Academy of Sciences *India*

2023 **Runner's Up product "Smart Scrub with Posture Correction"**, Design Dentaverse 1.0 Hackathon *India*

Experience

Boltzman Labs, *Deep Learning Research Intern* | Remote *Nov 2023 - Present*

- Working on developing reward based Large Language Models (**LLMs**) for peptide generation targeting a high protein - protein interaction binding affinity.

Indian Institute of Technology Roorkee, *Power Electronics Intern* | Remote *July 2023 - Nov 2023*

- Worked under Asst. Prof. Rahul Thakur in IoT Lab and responsible for design & development of custom solar powered sensing devices for installation on trees.
- Designed **PCBs** & power electronics circuits for **Solar Power Manager** and custom **I2C Converters**.

Indian Institute of Sciences (IISc), *Research Fellow* | Bangalore, India *Jan 2023 - June 2023*

- Worked under Prof. Govind S. Gupta on optimization of Multi Phase Flow mathematical computation using custom **Neural Networks**.
- Developed a **Python** based web application for Gas Cabaurizing Process Simulations.

Defence Research & Development Organization, *Computer Vision Intern* | Hyderabad, India *Dec 2022 - Jan 2023*

- Worked on Deep Learning Platform for Defence Applications (DLPDA) project.
- Developed in-house state of the art **Computer Vision** based Automated Image Annotation Tool Software for large and confidential image datasets for training of Deep Learning Models using **OpenCV**.
- Developed user friendly **GUI** in **Qt** & **Python** and **reduced time taken** for annotation process by **96%**.

thrustMIT Rocketry Team, *Head of Payload & Launch Operations Lead* | Manipal, India *Oct 2021 - Sep 2023*

- **Led the Payload Subsystem** of 6 members & acted as the **Launch Operations Lead** at thrustMIT, Asia's best student-led Rocketry Team.
- Participated in the **Spaceport America Cup 2023** against 200+ rocketry teams from most prestigious universities in world. Successfully **Launched** and **Recovered**, sounding rocket **Altair** to an apogee of 11568 ft at Spaceport America, New Mexico, USA.
- Design, Developed & Tested **Payloads** for sounding rockets with apogee of 10k feet.
- Successfully researched and developed a reliable replacement of **RK4** method based **airbake** control mechanism by **Deep Learning** models.
- Successfully developed and **patented** a novel radial **Payload Deployment** mechanism for sounding rocket.
- Developed the official website of the team.

Infyuva Tech Solutions : *Deep Learning Intern* | Manipal, India *Dec 2022 - June 2023*

- Developed **Mask-Red-CNN** based Deep Learning models on Fundus Images for early detection of **Glaucoma** in patients.
- Successfully tackled working on limited data through various **augmentation** & **generative** techniques.
- Focused on **reducing False Negatives** & achieved accuracy of almost **94%**.

Patents

SMART SCRUB WITH POSTURE CORRECTION *Aug 2023*

Indian Patent Office | Application No.: 202341056831

- Smart Wearable Tech fitted into scrubs for pain relief & posture correction for medical professionals.
- Developed complete hardware of technology including system design, PCB design & embedded programming of mechanism.

PAYLOAD DEPLOYMENT MECHANISM IN SOUNDING ROCKET *Nov 2023*

Indian Patent Office | Application No.: 202341075776

- Novel radial deployment mechanism for payloads in sounding rockets without use of pyrotechnics.
- Contributed to complete design, development & testing of mechanism.

Research Papers

[1] T. Agrawal and U. Anand, "Optimization of a Runge-Kutta 4th Order Method-based Airbrake Control System for High-Speed Vehicles Using Neural Networks," arXiv.org, Jul. 22, 2023. https://arxiv.org/abs/2307.12038.

[2] T. P. G. Singh, U. Anand, T. Agrawal, and S. G, "Design and Analysis of a Novel Radial Deployment Mechanism of Payloads in Sounding Rockets," arXiv.org, Oct. 30, 2023. https://arxiv.org/abs/2310.19673.

Skills

Programming	Python (Keras, Pandas, Sklearn, OpenCV, Qt, etc.), C/C++, embedded C, Matlab, Git, Scripting (Bash), LaTeX, HTML, CSS
Robotics	Arduino, Teensy, Sensor Interfacing, Sensor Fusion, Control Systems, Simulink
Software	Linux, Pytorch, OpenCV, KiCad, LTSpice
Certifications	Robotics Software Engineer, Udacity Nanodegree – (2023) | Self-Driving Cars, University of Toronto – (2023)

Projects

STEWIE - Parallel Manipulator Robot *2023*

thrustMIT Rocketry Team

- Developed a **3DOF** parallel manipulator robot as part of a 4U CubeSat payload for sounding rocket launched in June 2023 in USA.
- Supervised the development of robot's CAD utilizing Fusion360.
- Designed a **PID** controller for the robot to actuate it using micro-servo motors and integrated it with **Kalman Filters** in **MATLAB** & **C++**.
- Worked on the electronic circuits for the robots and designed **PCB** in KiCad

VisionTag - AutoAnnotation Software *2022*

Defence Research & Development Organization

- VisionTag is GUI software created using **Python**, **OpenCV** & **Qt**. It uses computer vision techniques to automate the annotation process of image datasets for training Deep Learning models.

Website of thrustMIT Rocketry Team *2022*

thrustMIT Rocketry Team

- Developed the official website of the team using **HTML**, **CSS**, **JS** & **Bootstrap**.