Gungeet Singh

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Education

University of Illinois at Urbana-Champaign **Aug 2021 - Dec 2022**
Master of Science in Aerospace Engineering *Urbana-Champaign, Illinois*

Thapar Institute of Engineering and Technology **Aug 2014 - July 2018**
Bachelor of Engineering in Mechatronics Engineering *Patiala, India*

Technical Skills

Technologies: SolidWorks, MATLAB, Latex, Arduino, Android Studio, WordPress, Elementor, WP Bakery Page
Languages: Bootstrap, JAVA, JavaScript, Python, HTML, C/C++, C#

Projects

Optimized Mission from Earth to Mars | *MATLAB, Python, Excel, Notepad*

- Designed a mission to Mars using the **Artemis Gateway** over a live **dataset of 9 years from JPL Horizon System**.
- Identified the **optimal launch window** to maximize the Mars exploration time and reduce the fuel consumption by designing a solver based on the principles of **Particle Swarm Optimization method**.
- Designed a **weighted function** and calculated the best optimized condition for a trade off between exploration time and fuel consumption and created a plot to **identify the weight ratio**.
- Developed a **caching solution** to handle **3B+ data points** hence increasing the overall **performance by 50%**

Optimal Thrust Control | *MATLAB*

- Built an optimal thrust **bang-bang controller** for a transfer from Low Lunar Orbit to Higher Lunar Orbit, to manage traffic in lieu of Artemis mission.
- Created a robust solver using **MEE**(Modified Equinoctial Elements) and **reduced computing time by 10%**
- Designed the solver using **Ode45** and **fsolve** with a **tolerance** limit of the order **1e-14 and 1e-9** respectively which follows the Runge-Kutta Dormand-Prince pair and least-squares algorithms to identify a unique solution.
- Performed a **parametric sweep** over various engines specification to identify the optimal thruster.

FEA on Heat Sink | *MATLAB*

- Designed a **heat sink** for the Intel Alder Lake LGA 1700 chip to dissipate a **temperature rise of upto 93°C**
- Generated a **rectangular global element mesh** of sides 1mm to perform the FEA.
- Analyzed **loading conditions** based on various combination of the **material**(Al6061, Al6063 and Cu) and **medium fluid** (air and water) to identify the best combination.
- Performed a **parametric sweep** over the **height** of heat sink to identify the **saturation** point of the heat dissipation in the corresponding sink.

ArmBot | *Arduino, CAM, SolidWorks, Android, 3D-Print*

- Built **3-way encoded RF wireless**, **gesture** controlled, **mobile** robotic arm with **modular end-effector** to grip and drill.
- Modified Mars rover's **rocker bogie arms**' design to build a Mobile base to maneuver over a rough terrain.
- Designed an Arm sleeve with **flex sensors** and a Hand glove with **accelerometer** and **gyroscope** to control the arm and base with right arm and left hand gestures respectively.
- Developed a **troubleshooting android application** to carry **health check status** of the armbot and verify the communication between the three Arduino's using **Bluetooth**.

Technical Experience

Tata Motors LTD. **Jan 2017 – June 2017**
Intern *Dharwad, India*

- Devised embedded system to **automate** the **manual transmission** of Trans Axle TA59 as a response to user feedback.
- Built **Automatic Kitting trolley** to carry the components to the assembly line following the concepts of **LFR**.
- Implemented **image processing** to identify part defect in the manufacturer plate with an **accuracy of 0.1mm**.
- Added quality improvements and **reduced lead time** by a factor of **60 minutes** by adding **Kaizens** as part of **JIDOKA** on the **assembly line**, led to increase in daily production from **90 to 103**.

Certifications

UIUC | *Graduate Certificates* **Aug 2021**

- Spaceflight Engineering