GOKUL GS

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SUMMARY

Mechanical Engineer with hands-on experience in FEA, simulation, and software development. Self-motivated and focused on delivering reliable, high-performance solutions through R&D and cross-disciplinary collaboration.

SKILLS

- Python, ROS2, Solidworks, Ansys, Machine Learning, Matlab, Patran & Nastran, KiCad, Mechatronics, AutoCAD, MS Office, Documentation, Communication, Teamwork, Reliability, Leadership

WORK EXPERIENCE

Indian Space Research Organization (ISRO) **Jun 2025 - Present**
R&D Engineer – Mechanical & Software Systems (Contractual) *Thiruvananthapuram, Kerala*

- Developed a standalone GUI in MATLAB App Designer for conducting Operational Modal Analysis, incorporating multiple OMA methods to facilitate streamlined data input, processing, and visualization, improving workflow by 20%.
- Performed static structural evaluation of the metallic vibration test fixture for the Velocity Trimming Module (VTM) using ANSYS and MSC NASTRAN, validating stress distribution and deformation with a margin of safety of 1.27 under operational loading conditions to ensure structural integrity.
- Conducted a deviation study of the SITVC port under minimum thickness conditions of a solid motor using ANSYS, analyzing stress concentrations near weld locations to evaluate structural integrity and improve design reliability
- Developed a Python-based automation tool to generate X, Y, Z coordinates in the weld area of motor cases using CMM and thickness data, enabling accurate ID and OD profile extraction for FEM analysis in ANSYS.

Indian Space Research Organization (ISRO) **Jun 2024 - 2025**
Graduate Engineer Trainee (Research and Development) *Thiruvananthapuram, Kerala*

- Developed a neural network model to predict the aerospace hardware deviations for design clearance with more than 99% accuracy and integrated it with a user-friendly GUI.
- Co-authored a paper on the neural network surrogate model for aerospace hardware deviation prediction, published in the National Aerospace Manufacturing Seminar 2025, to be published in the International Journal for Numerical Methods in Engineering.
- Developed a Python-based algorithm to compute the time-varying propellant surface area for thrust/pressure prediction in a multi-segment Solid Rocket motor case, improving burn rate prediction accuracy by 20% compared to traditional geometric approximation methods.
- Designed and replaced a composite upper-stage vibration test fixture with a dynamically equivalent metallic fixture for the launch vehicle's Velocity Trimming Module (VTM), achieving over 95% dynamic equivalence with the original composite module through frequency and random response analysis in NASTRAN.
- Validated flight hardware by predicting microstrains using Finite Element Analysis in NASTRAN and correlating with test data from strain gauge sensors, achieving correlation coefficients of more than 0.96.
- Designed mechanical components for a satellite damping system using SolidWorks, followed by structural and modal simulations in ANSYS, to ensure less than 5% deformation, and also ensuring its design integrity and performance.

EDUCATION

APJ Abdul Kalam Technological University **2019 - 2023**
Bachelor of Technology, Mechanical Engineering

- **GPA:** 8.3

N S S Public School **2018 - 2019**
12th, Science

- **GPA:** 75.6

PROJECTS

Autonomous Mobile Robot Simulation | ROS2, Gazebo, RViz **Mar 2025 - Apr 2025**

- Modeled a mobile robot using URDF, visualized and validated its structure in RViz, and implemented motion control through ROS2 plugins; blended with SLAM for real-time mapping and autonomous localization, and developed path planning and navigation algorithms using ROS2's Nav2 Stack for goal-directed movement with real-time obstacle avoidance in a simulated environment.

Boston Dynamics Spot Design (SolidWorks) **May 2024 - Jun 2024**

- Designed a 3d model of the Spot Robot of Boston Dynamics in SolidWorks using a combination of surface and solid modeling techniques, achieving more than 95% geometric and visual accuracy.
- Incorporated advanced mating conditions and motion studies to simulate realistic joint articulation and walking sequences, enabling dynamic analysis and functional visualization of robotic movement.

Predictive Maintenance Analysis using different ML Algorithms (KNN, SVM, DT) **May 2024 - Jun 2024**

- Analyzed predictive maintenance capabilities of multiple machine learning algorithms (KNN, SVM, Decision Trees) using sensor data from Amazon's warehouse robots to identify stability and potential failures.
- KNN and SVM models outperformed others, achieving a 96% prediction accuracy, which enhances early fault detection and minimizes downtime in smart warehouse operations.

CERTIFICATIONS

- **ROS2 Nav2 [Navigation 2 Stack] - with SLAM and Navigation**: Udemy
- **ROS2 for Beginners Level 2- Tf | URDF | RViz | Gazebo**: Udemy
- **ROS2 For Beginners**: ROS Foxy, Humble - 2025 - Udemy
- **ROBO_AI - TOPAZ Robotics Internship**
- **Advanced Driver Assistance Systems**: Udemy
- **Ford EV Engineering**: Forage
- **GE Aerospace Explore Engineering**: Forage
- **Introduction to Self-Driving Cars**: University of Toronto, Coursera.
- **Certified SolidWorks Associate**: Udemy