SMRITHI S

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EDUCATION

National Institute Of Technology Karnataka(NIT-K, Surathkal) *Aug 2017 - May 2021*

Bachelor of Technology, Department of Mechanical Engineering; ***CGPA: 7.3/10.0***

Relevant Coursework: Automatic Control Eng, Graph theory, Mechanics of Machines, Machine Dynamics and Vibration

SKILLS

- **Languages**: Python, C, C++ **Platforms**: Linux, Nvidia Jetson, Arduino **Numerical Computing**: MATLAB AND SIMULINK
- **Libraries**: PyTorch, KDL Orocos **Tools**: Solidworks, Auto-Cad, Creo-Pro E, Ansys Suite, Comsol Multiphysics, Gazebo, ROS, Git

PUBLICATIONS

Conference Papers

1. Surya Prakash S.K*, Amit Shukla, and **Smrithi S*** "Automated Vision-Based Bolt Handling for Industrial Applications Using a Manipulator." *Proceedings of the 12th International Conference on Control, Mechatronics and Automation (ICCMA 2024)*, Brunel University London, November 11–13, 2024. (*Equal contribution)
2. Abhijith Prakash, **Smrithi S**, Sankalp Vishnoi, Dr. Biju Prasad "Autonomous Debris capture using eye-in-hand robotic system" *The Global Space Exploration Conference 2025, [Under review]*

Journal Papers

1. Dr. Kirti Kumari, Jyoti Prakash Singh, Shirish Shekhar Jha, and **Smrithi S** "Beyond Traditional Deep Learning: Fractional Order Backpropagation for Urdu Emotion Recognition." *IEEE Transactions on Neural Networks and Learning Systems [Under Review]*
2. Abhijith Prakash*, **Smrithi S***, Sankalp Vishnoi, Dr. Biju Prasad "Online reactive Trajectory generation for Space Debris capture", *IEEE Transactions on Automation and Robotics[Under review]*

Acknowledgments

1. Acknowledged for significant contributions in "Automated Vision-based Bolt Sorting by Manipulator for Industrial Applications" published in *2024 IEEE 20th International Conference on Automation Science and Engineering (CASE)*

PROFESSIONAL EXPERIENCE

Indian Space Research Organization (ISRO) Thiruvananthapuram, India

Engineer, Contract *Aug 2023 - present*

- **POEM Articulated Robotic Arm for Space Debris Capture Experiment**:
  - Developed algorithm and software for **autonomous detection and capture of a free floating object in zero gravity** using **eye-in-hand robotic arm system**. Developed Novel **optimisation based online reactive trajectory generation routine** minimising the interception time of the robotic arm to the object at a lesser computational cost

Indian Institute of technology, Mandi (IITMandi) Mandi, India

Research Internship (Under Guidance of Dr. Prof. Amit Shukla) *July 2023 - July 2024*

- **Robotic Systems for Bin picking application**:
  - Developed a pose estimation algorithm using **template matching with chamfer distance** (RMS error in pose: 0.005 mm) and achieved contour-based size estimation accuracy within 0.36mm.
  - Supported for evaluating advanced deep learning models on a custom bolt dataset, achieving the highest segmentation accuracy (mIoU: 0.95) with DeepLabV3+.

Cummins Ind PVT LTD Pune, India

Mechanical Test Ops and Lab Ops Engineer *Aug 2021 - May 2023*

- **Technical Research Center Laboratory Management**:
  - Successfully completed a 500-hour Cycle6 test on CPS B6.7 engines, achieving a **14.2 percent** cost saving (7.37L) and **99.3 percent** data quality
  - Supported in development of **uCheck tool and system health check** for test cell and engine health analysis. Increased data quality levels to **98.5 percent**
  - Certified as **ISO/IEC 17025:2017 Internal Auditor for Laboratory Management Systems**

ACADEMIC RESEARCH PROJECTS

Modelling and Simulation of Human Walking Towards Developing a Lower Limb Exoskeleton Aug 2020 - April 2021

Under the guidance of Prof. K.R Guruprasad

- **Bachelor Thesis**:
  - Worked on designing a lower limb exoskeleton using vertical 2R manipulators. Dynamic equations for human gait derived using Newton-Euler iterative formulations and modelled in MATLAB SIMULINK for swing and stance phase.
  - PID control of the joint angles (in the swing phase) was achieved in simscape. Error between derived trajectory equations and simscape model was noted to be 5 deg.

Inverse kinematics solution formulation using neural network Aug 2019 - Jan 2020

- **Project Under IEEE**:
  - Inverse sinusoid activation with sigmoid was used as loss function for solving inverse kinematics problems and modelled in simulink. The results were tested on a 3-link 2 Degree of freedom planar robotic arm.

LEADERSHIP & EXTRACURRICULAR

- Formula One Student team 2021: **Led vehicle dynamics** for the NR21 prototype FSAE car, upgraded pedal box, improved ergonomics and reduced weight. Secured 7th place at Formula Bharat 2021.
- **Volunteer teacher:** for English and Science subjects for 4th and 5th grade at the KREC Kannada medium school.
- **Volunteer teacher at Connectfor:** for mathematics to tribal communities girls through Evidyaloka NGO.