

# DHINESH RAJASEKARAN

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## Education

<b>Master of Engineering - Robotics</b> University of Maryland, College Park (3.7/4.0 GPA)	Aug. 2022 - May. 2024 <i>College Park, MD, USA</i>
<b>Bachelor of Technology - Electrical Engineering</b> SRM Institute of Science and Technology, Chennai (8.8/10.0 GPA)	Jul. 2017 - Jun. 2021 <i>Chennai, TN, India</i>

## Technical Skills

<b>Areas of Expertise</b>	<b>Autonomous Robots</b> , Embedded Systems, <b>Industrial Automation</b>
<b>Robotic Platforms</b>	<b>Omron</b> LD series, PF400, <b>UR</b> Robotic Arms, <b>AMRs</b> , <b>AGVs</b>
<b>Hardware Platforms</b>	AVR, <b>ARM</b> , <b>RealSense</b> , TI Sensors, IMU, LiDAR, <b>Cognex Vision</b>
<b>Programming Languages</b>	<b>Python</b> , C++/C, Linux/Bash
<b>Tools/Technologies</b>	<b>Gazebo</b> , <b>MoveIt</b> , <b>MATLAB</b> , <b>Kalman Filter</b> , <b>SOLIDWORKS</b> , <b>AWS</b>
<b>Proficient in Frameworks</b>	<b>ROS</b> , <b>OpenCV</b> , PyTorch, PID, Docker, <b>GIT</b>
<b>Proficient in Interfaces</b>	I2C, SPI, I2S, UART, RS422, CAN

## Career Highlights

- **Robotics Engineer** with 2+ years of experience, 2 **patents**, and expertise in **ROS**, **Industrial Automation**, **Perception**, Localization, Embedded Firmware, and **Sensor Fusion**.
- Demonstrated **technical expertise**, **attention to detail**, and **diligence** through successful completion of multiple long-term projects, professional experience and research initiatives.

## Professional Experience



<b>Khanjur R&amp;D, Silver Spring</b> Robotics Engineer	Feb. 2024 - Present <i>Silver Spring, MD, USA</i>
<ul style="list-style-type: none"><li>• Engineered a novel Flex PCB for <b>Soft Robotic prototypes</b> utilizing Shape Memory Alloys and <b>3D printed copper</b>, implementing basic teleoperation functionality.</li><li>• Developed a <b>Windows desktop application</b> using <b>Qt</b> and Python to <b>automate</b> a multi-sensor Test Rig with <b>DAQ</b> Toolbox integration, enhancing data collection efficiency.</li><li>• Actively contributed to <b>design reviews</b>, providing technical solutions and <b>programming expertise</b> for mobile robots while ensuring project <b>feasibility</b> and alignment with strategic objectives.</li></ul>	
<b>National Institutes of Health, Rockville</b> Robotics Research Associate	Sept. 2023 - Dec. 2023 <i>Rockville, MD, USA</i>
<ul style="list-style-type: none"><li>• Developed a <b>robot chemist</b> utilizing the <b>Omron</b> LD series <b>mobile robot</b>, <b>PF400 robotic arm</b> and an advanced High-Density Storage (HDS) system to seamlessly <b>automate</b> intricate chemical process.</li><li>• Utilized <b>OpenCV-based detection algorithms</b> to <b>autonomously</b> track vial movements within the system and tested under various lighting conditions &amp; multiple <b>industrial cameras</b> in accessing the efficiency and detection robustness.</li><li>• Built the <b>hardware &amp; calibrated camera</b> for a <b>6 DoF</b> robotic actuator using <b>ROS</b> &amp; <b>Intel Realsense</b> and designed an <b>electro-magnetic door handle</b> for human/robotic access to the HDS.</li></ul>	
<b>Solinas Integrity, IIT Madras Research Park</b> Robotics Engineer	Aug. 2021 - Jul. 2022 <i>Chennai, TN, India</i>
<ul style="list-style-type: none"><li>• Developed a <b>pipeline inspection robot</b> detecting leaks, <b>corrosion</b>, and defects in pipelines as small as 4-inch &amp; up to <b>1000 meters</b> long, utilizing YOLOv3 and withstanding 5 bar underwater pressure.</li><li>• Implemented <b>Sensor Fusion</b> with <b>Kalman Filter</b>, <b>PID</b> motor synchronization, and designed ARM-based Robot <b>Control PCB</b>. Led mechatronic systems development and 3D printing for crucial components.</li><li>• Developed an advanced <b>robot control station</b> featuring ATmega 2560-based infotainment PCB and Arduino Pro Mini control <b>joystick</b>, programmed in C++ for seamless system <b>integration</b>.</li></ul>	
<b>Digital Blanket, Bangalore</b> Embedded Engineer	Sept. 2021 - Jul. 2022 <i>Bangalore, KA, India</i>
<ul style="list-style-type: none"><li>• Designed a <b>Wet Floor Detection Sensor</b> using <b>FLIR</b> thermal camera and <b>ESP32</b>, with custom firmware for precise detection.</li><li>• Created a <b>ToF Sensor</b> library for <b>3D mapping</b>, people counting, and presence detection, successfully integrating it with <b>industrial automation</b> circuit boards and IoT nodes.</li><li>• Developed a <b>collision avoidance</b> system using <b>mmWave TI</b> sensor and designed a <b>smart home wireless sensor</b> platform, incorporating <b>industrial-grade</b> sensors for <b>IAQ</b>, TVOC, light, and temperature monitoring.</li></ul>	

Projects

- Smart Kitchen Robot for Making Stuffed Indian Bread Variety:
  - Developed the **world's first fully automated** cooking robot requiring only wheat and water inputs.
  - Automated alloo paratha making, **stacking**, & storing in **hotboxes** using novel robotic systems, sensors, and smart **IoT** control.
- Custom Robotic Arm for Pick & Place Operations using Stereo Vision:
  - Designed a 6-DoF manipulator from scratch with a 3D-printed design for pick and place tasks.
  - Programmed it using **MoveIT**, **ROS2**, and a **custom Stereo Depth Estimation pipeline**; compared performance with **UR5e**.
- Autonomous Mobile Robot for Shape-Sorting Application:
  - Developed an autonomous mobile robot for a demo site to **identify** and **sort** colored shapes.
  - Utilized a gripper, **planning** algorithm, **OpenCV**, and **Raspberry Pi** to move shapes to drop-off zones.
- ARIAC 2023 - Agile Robotics for Industrial Automation:
  - Created a ROS2-Gazebo-based **Industrial Robotic Manufacturing System** mirroring the ARIAC 2023 challenge.
  - Focused on agility and autonomy in **kitting tasks** using **AGVs**, manipulators, and sensors.

Patents

- HEAD GEAR SYSTEM AND METHOD FOR ENSURING THE SAFETY OF A RIDER OF A VEHICLE

Dec. 2021

Patent

Patent No: 202141060755
  - Patent published for the project "Bone Conduction & Accident Prevention Smart Helmet".
- BAKER BOT SYSTEM, SMART KITCHEN ROBOT MACHINE, AND METHOD FOR AUTOMATIC MAKING OF CHAPATI

Dec. 2021

Patent

Patent No: 202141060759
  - Patent published for the project "Smart Kitchen Robot for Making Stuffed Indian Bread".

Achievements

- One among the **Top 100 projects** at **KPIT Sparkle's** i-Innovate contest from **over 2700 submissions**. 2021.
- Runner Up** at ASEAN-India Hackathon from **over 3600 participants**, **1<sup>st</sup> international hackathon** conducted by AICTE with 10 other Asian countries. 2021.
- 1<sup>st</sup> Prize** at Hackinfinity conducted by SSN collage of Engineering and **Mr.Cooper** company from **over 52 participants**. 2021.
- 1<sup>st</sup> Prize** at National level **Smart India Hackathon** Hardware Edition from **over 20 submissions**. 2020.
- Gold Medal** Winner in **Research Day** conducted by SRM University from **over 45 submissions**. 2020.
- Certificate of Distinction** for Introduction to **Robotics** by Prag Robotics, Pvt Ltd, Chennai, India. 2019.

Positions of Responsibility

- Team Leader - International ASEAN-India Hackathon

Jan. 2021 - Feb. 2021

  - Elected as Team lead** among 6 students from **various countries** for 2 months and led the team to **victory** in a 3 day hackathon.
  - Played a pivotal role in understanding of problem statement, product design and helped **break the communication barrier**.
- Team Leader - Smart India Hackathon

Jan. 2020 - Dec. 2020

  - Team lead for a group of 6 students at SRM University for 12 months and led the team to **victory** in a 5 day hackathon.
  - Guided the team members and coordinated with them **during the pandemic and developed a Proof of Concept**.