Dhinesh Rajasekaran

+1 (240) 739 8844 ◇ dhineshrajasekaran@gmail.com ◇ Linked ◇ GITHUB ◇ Portfolio

Education

Master of Engineering - Robotics — Aug. 2022 - Dec. 2023
University of Maryland, College Park (3.7/4.0 GPA) — *College Park, MD, USA*

Bachelor of Technology - Electronics and Communication Engineering — Jul. 2017 - Jun. 2021
SRM Institute of Science and Technology, Chennai (8.8/10.0 GPA) — *Chennai, TN, India*

Technical Skills

Areas of Expertise	Developing Robotic Systems, Embedded Systems, Digital logic & Circuit Design
Tools/Technologies	**OrCAD**, MATLAB, Gazebo, **SOLIDWORKS**, **MoveIt**
Proficient in Frameworks	**OpenCV**, **ROS**, Docker, GIT
Programming Languages	**Python**, C++/C, JavaScript, Linux/Bash
Proficient in Protocols	I2C, I2S, SPI, UART, USART, RS422
Hardware Used	Arduino, Raspberry Pi, **STM, ESP, Jetson**, Teensy, **Intel RealSense**, TI Sensors

Professional Experience

National Institutes of Health, Rockville — Sept. 2023 - Dec. 2023
Robotics Research Associate — *Rockville, MD, USA*

- Developed a **robotic chemist** utilizing the Omron LD series mobile robot, PF400 robotic arm and an advanced High-Density Storage (HDS) system to seamlessly **automate** intricate **chemical** process.
- Utilized **OpenCV-based detection algorithms** to autonomously track vial movements within the system & designed an **electromagnetic door handle** for human/robotic access to the HDS.
- Built the hardware and tested the detection algorithm under various lighting conditions and across multiple **industrial cameras** in accessing the efficiency and detection robustness.

Amazon, New York — May. 2023 - Aug. 2023
Solutions Architect — *New York, NY, USA*

- Developed an **automated tool** to facilitate database migration process from a SQL to a No-SQL database.
- Tool developed using Python & JavaScript integrates various **AWS** technologies like **DMS, RDS & DynamoDB** to deliver a CLI and web-based interface **automating** the entire process and providing robust **user experience**.

Solinas Integrity, IIT Madras Research Park — Aug. 2021 - Jul. 2022
Robotics Engineer — *Chennai, TN, India*

- Developed a **pipeline inspection robot** which can detect leaks, **corrosion** and defects on pipelines as small as 4 inch up-to a depth of 300 meters utilizing YOLOv3 and can withstand 5 bar underwater pressure.
- Responsible for **embedded firmware, digital circuit** and power electronics design for the control PCB based on **STM32** & DVR PCB based on **ATmega 2560** along with designing mechanical systems & 3D printed parts.

FlamencoTech, Bangalore — Sept. 2021 - Jul. 2022
Embedded Engineer — *Bangalore, KA, India*

- Designed **Wet Floor Detection Sensor** using **FLIR** thermal camera and **ESP32**, with custom firmware for precise detection.
- Developed a library for **ToF** Sensor for 3**D mapping**, people counting & presence detection.
- Designed PCB architecture for **mmWave TI** sensor, initiated custom wireless sensor platform integrating industrial-grade sensors for **IAQ**, TVOC, light, and T& RH.

Projects

Smart Kitchen Robot for Making Stuffed Indian Bread Variety: — **GIT**
Developed **world's first fully automated** & compact cooking robot that only requires wheat and water to be filled in containers, aloo parathas are made, **stacked** and stored in **hotboxes** with smart **IOT** control.

Autonomous Mobile Robot for Shape-Sorting Application: — **GIT** **Demo**
Developed an autonomous mobile robot for a demo construction site capable of **identifying & sorting** colored shapes by moving them to designated drop-off zone using gripper, **planning** algorithm, **OpenCV & RPi** on physical hardware.

Custom Robotic Arm for Pick & Place Operations using Stereo Vision: — **GIT** **Demo**
Designed a 6-DoF manipulator from scratch with 3D printed design. Programmed it for pick & place tasks using **MoveIT, ROS** 2, and **custom Stereo Depth Estimation pipeline**. Conducted a performance comparison against the **UR5e** arm.

Real-Time Steam Plant Man Hole Cover Detection using Single Shot Detectors:
Implementing YOLOv8, YOLOv5, and YOLOv3 via **transfer learning** on a local GPU, we targeted the detection of steam plant manhole covers. Integration included RGB and **FLIR** thermal cameras alongside GPS.

Bone Conduction & Accident Prevention Smart Helmet: GIT

Enhancing rider safety, our **patented** project integrates **Advanced Driver Assistance Systems (ADAS)** into helmets, offering real-time alerts and distraction-free infotainment, utilizing **HUD** and bone conduction technology with **i2s** integration.

ARIAC 2023 - Agile Robotics for Industrial Automation: GIT

Created ROS2-Gazebo-based **Industrial Robotic Manufacturing System** mirroring ARIAC 2023 challenge, emphasizing agility and autonomy in **Kitting tasks** with **AGVs**, manipulators, and sensors.

Black Box Device for Marine Vessels: GIT

Designed **tamper-proof solar-powered** black box for ocean vessels, logging data to coast guard **dashboard**. Features tamper alerts, **Iridium satellite** communication, **AI activity** monitoring, and **environmental** safety measures.

Ferry Smart - All in one Smart commute system: Demo

Designed & implemented a hardware-based solution which bridges the gap between different modes of public transport & act as single source for convenient **commutation planning** providing **ETA**, travel cost, Live tracking & **Carbon footprint tracking** among others.

Patents

HEAD GEAR SYSTEM AND METHOD FOR ENSURING THE SAFETY OF A RIDER OF A VEHICLE Dec. 2021
Patent No: 202141060755 Patent

- 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 No: 202141060759 Patent

- 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,** 1st **international hackathon** conducted by AICTE with 10 other Asian countries. 2021.
- **1st Prize** at Hackinfinity conducted by SSN collage of Engineering and **Mr.Cooper** company from **over 52 participants.** 2021.
- **1st 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.**