Dhinesh Rajasekaran

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Education

Master of Engineering - Robotics — Aug. 2022 - Dec. 2023
University of Maryland, College Park — *College Park, MD, USA*

- CGPA of **3.7/4.0**
- Key Courses: Perception, 3D Vision, Planning & Software Dev for Autonomous Robots.

Bachelor of Technology - Electronics and Communication Engineering — Jul. 2017 - Jun. 2021
SRM Institute of Science and Technology, Chennai — *Chennai, TN, India*

- CGPA of **8.8/10.0**
- Key Courses: Digital Logic Design, Control Systems, Embedded Systems.

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 the **serial/batch evaporation** 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 Web Services, New York — May. 2023 - Aug. 2023
Solutions Architect Intern — *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.

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

- Designed & developed Endobot 2.0, a tethered **pipeline inspection robot** which can detect leaks, corrosion and defects on pipelines as small as 4 inch up-to a depth of 300 meters and can withstand 5 bar underwater pressure. **Link**
- Was responsible for **embedded firmware, digital circuit** & power electronics design, designing & testing the control PCB based on **STM**32 & DVR PCB based on **ESP**32 & ATmega 2560, designing mechanical systems & 3D printed parts.

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

- Designed & fabricated a **"Wet Floor Detection Sensor"** using **Lepton thermal camera**, ESP 32 & custom firmware for detecting wet floor using image processing. **Link**
- Developed a library for **ToF Sensor for 3D mapping**, people counting & presence detection.
- Designed basic **PCB** architecture for **IWR**6843 **mmWave TI sensor** and a custom wireless sensor platform capable of automating an entire building.

Projects

Smart Kitchen Robot for Making Stuffed Indian Bread: Link Patent — Mar. 2020 - Present
Developed **world's first** fully automated & compact cooking robot that only requires wheat and water to be filled in containers, aloo parathas are made and stored in hotboxes with smart IOT control. **Patent No: 202141060759**.

BlockMover: The Autonomous Shape-Sorting Mobile Robot: Demo — Jan. 2023 - May. 2023
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 RoboArm for Pick & Place Operations with Stereo Vision: Link Demo — Oct. 2022 - May. 2023
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 **UR**5**e** arm.

Training & Testing a NN based on YOLOv3 **for Custom Object Detection: Demo** — Apr. 2023 - May. 2023
Trained a NN based on YOLOv3model using **transfer learning** with custom dataset to detect humans & deployed on a mobile robot using IP Cam.

Mono-Camera Human Pose Estimation and Tracking using openCV: Link Demo — Sep. 2022 - Oct. 2022
Developed an **algorithm** using openCV and laptop web camera for human pose estimation in 3D Cartesian coordinates with depth info. It is capable of **tracking** humans from frame to frame and assigning unique IDs.

Bone Conduction & Accident Prevention Smart Helmet: Link Patent Oct. 2020 - Jun. 2022
Developed a prototype which acts as **ADAS** for bike users & prevents accidents by providing real-time warnings & alerts during distracted driving, accident detection, embedded HUD & bone conduction earphone. **Patent No: 202141060755**.

Black Box Device for Marine Vessels: Link Jan. 2021 - Feb. 2021
Designed & implemented a tamper-proof **solar powered device** capable of logging & sending all essential information from a vessel in **ocean to a dashboard** in coast guard control room where potential threats & alerts are indicated based on vessel activity.

Ferry Smart - All in one Smart commute system: Feb. 2020 - Dec. 2020
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.

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.

Technical Skills

Areas of Expertise	Developing Robotic Systems, Embedded Systems, Digital logic & Circuit Design
Tools/Technologies	OrCAD, **ROS**, **Arduino**, **Linux**, MATLAB, Gazebo, **SOLIDWORKS**, Nvidia **Jetson**
Programming Languages	C++, Embedded C, Python, JavaScript
Proficient in Protocols	I2C, I2S, SPI, UART, USART, RS422
Proficient in Frameworks	**OpenCV**, PyTorch, **PyTorch3d**, Docker, GIT

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 the 3 day hackathon.
- Played a pivotal role in understanding of problem statement, hardware 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 the 5 day hackathon.
- Guided the team members and coordinated with them **during the pandemic and developed a hardware prototype.**