



Adithya M N

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SUMMARY

→ Undergraduate Student with keen interest in Mobile Robotics and Machine Vision. My passion for robotics enthused me to take up various projects which helped me gain a lot of practical knowledge, shaping my views on how I learn subjects. Excited to take up an array of subjects and willing to pursue it with utmost dedication.

Technical Skills :

- **Subjects :** Robot Kinematics and Dynamics ◊ Computer Vision ◊ Deep Learning ◊ Autonomous Mobile Robots
- **Softwares :** Python ◊ MATLAB ◊ LabVIEW ◊ LaTeX
- **Frameworks & Libraries :** Tensorflow ◊ OpenCV ◊ Keras ◊ Scikit Learn

Languages : English ◊ German (B1 Level) ◊ French ◊ Hindi ◊ Telugu ◊ Tamil

EDUCATION

June 2017 - Present **S. R. M. Institute of Science and Technology, Chennai, India.**
→ B.Tech Mechatronics Engineering
→ **CGPA - 7.93/10**

June 2015 - April 2017 **Padma Seshadri Bala Bhavan, Chennai, India**
→ HSC - Informatics Practices (Java)
→ **CGPA - 8.8/10**

EXPERIENCE

Sept 2020 - Oct 2020 **Engineer Intern - Hinduja Tech Limited, Chennai, India.**
→ Worked on the project "Automatic Pizza Vending Machine".
→ Proposed a new methodology for the pizza cutting mechanism - Ultrasonic Cutting and the pizza cutter cleaning mechanism - Hydrophobic Coating
→ Coordinated with a team to solve tasks and was commended for the contribution made.

June 2018 - Dec 2018 **Industrial Trainee - Rexroth Bosch Pvt. Ltd., Chennai, India.**
→ Trained at "SRM-BRIN Center of Excellence in Automation Technology"
→ Exposed to industrial automation based on electronic and proportional hydraulics
→ Supervised a team of 5 and was tasked with several real world problems faced by industries such as problems during inspection, maintenance and troubleshooting repair.
→ Commended for problem solving skills and leadership skills.

PROJECTS

July 2020 - Oct 2020 **Path Planning in a 2D Environment**
→ Developed a differential drive robot model and built a custom 2D binary occupancy grid in which path planning was simulated.
→ Implemented probabilistic roadmaps as the motion planner to find the shortest path between the locations and a modified pure pursuit controller for efficient path tracking; in the software stack.

Jan 2020 - June 2020 **RoboCUBES - An Intelligent, Modular, Reconfigurable Robotics Platform**
→ Built a modular reconfigurable robot that uses modular cubes to autonomously detect many configurations and performs a specific functions based on the detected configuration.
→ Configured a complete modular software stack based on a novel "Self-Awareness" algorithm.
→ Developed a **patented** novel hardware addressing system designed to interact with the algorithm and detect the configuration autonomously.
→ Developed Object-detection/tracking, Lane Detection and implemented Visual SLAM for AI/CV Cube.

Dec 2019 - Feb 2020 **Behavioral Cloning in Autonomous Vehicles using Deep Learning**
→ Developed a self-driving car by behavioral cloning using the Self-Driving Car simulator in Unity. The trained model was able to autonomously navigate in a new track simulation.
→ Designed a modified LeNet model CNN to classify traffic signs and Developed a custom nvidia model CNN Architecture along with data augmentation to Train and Test the simulation data.

Feb 2018 - May 2018 **Virtual Digital Storage Oscilloscope**
→ Coordinated with a team of 5 with the aim of creating a "low cost" PC based Oscilloscope.
→ A comparative study between our research project and the industry standard "Keysight InfiniiVision DSO-X 2002A" was conducted and the corresponding trade-offs were studied
→ Developed an 8 channel Virtual DSO. Implemented in NI LabVIEW. Designed the hardware interfacing unit and interfacing system.

November 2020

An Onboard Hardware Addressing System for Modular Reconfigurable Robots

→ This invention envisages an on-board hardware addressing system for a modular reconfigurable robot (MRR). The MRR is composed of atleast one central module and plurality of peripheral modules each of whom have dockable faces.
→ This invention is low cost, hardware level addressing system for the MRR. The modified power rails connect pins to a unique hardware address. Thereby autonomously detecting the configuration the MRR is currently in.

AWARDS AND PRIZES

January 2020

Runners Up : Make-A-Thon 4.0 by Lema Labs - Project : BlockBots
Most Popular Project Award - Make-A-Thon 4.0

June 2019

Placed 2nd: Maze Solving Robot Competition - Kaizen Robotics

December 2018

Placed 2nd: Course Following Robot Competition - Kaizen Robotics

April 2018

Best Project: Physics and Nanotechnology Research Day - Obstacle Avoiding Robot

CERTIFICATIONS

Robotics Certifications :

June 2020

Control of Mobile Robots - Georgia Institute of Technology (Coursera)

→ Primarily dealt with Control Systems. Worked on many navigation problem of mobile robots, developed switches using control theory to switch between “go-to-goal” and “obstacle avoiding” behaviour.

January 2020

Autonomous Mobile Robots - ETH Zurich (Edx)

→ Learned fundamentals on several probabilistic robotics concepts such as, mobile robot kinematics, map representation state estimation using perception, probabilistic map based localisation and motion planning.

June 2019

Kaizen Robotics Training Program - Lema Labs

→ Gained practical knowledge in robotics, register level programming- embedded C & arduino programming.
→ Tasked with several robotics projects, from ”ADC based speed control” to ”Maze Solver with shortest path algorithm”.
→ Developed a “Hand-Writing” robot using G-code conversion to convert data into motor commands.

Artificial Intelligence and Machine Learning Certifications :

May 2020 - July 2020

Self - Driving Cars Specialization - University of Toronto (Coursera)

→ This is a four course specialisation which lay the foundation for all concepts in Self-Driving Cars.

◊ **Introduction to Self Driving Cars**

→ This course laid the foundation for various segments incorporated in the development of an autonomous vehicle. Learned the various terminology, design considerations and safety assessment of self-driving cars.

◊ **State Estimation and Localisation of Self Driving Cars**

→ Introduced to different sensors and their use for state estimation and localization in self-driving car
→ Developed models for localisation sensors such as IMU and GPS and applied Extended and Unscented Kalman Filter for the estimation problem.

◊ **Visual Perception of Self Driving Cars**

→ Derived a pin-hole camera model and Performed intrinsic and extrinsic calculations on it.
→ Performed static and dynamic object detection using deep learning.
→ Applied semantic segmentation for the estimation of the drivable surface.

◊ **Motion Planning for Self Driving Cars**

→ Learned the fundamental concepts of all the different motion planners such as mission planner, behavioural planner.
→ Implemented Dijkstra’s and A* algorithm to find the shortest path between two places
→ Introduced to a Hierarchical motion planner to navigate autonomously through an environment using the carla simulator.

July 2020

Structuring Machine Learning Projects (Coursera)

→ Learned how to diagnose errors and reduce them in any machine learning system.
→ Analysed the effect of bias and variance with mismatched data. Introduced to transfer learning and end to end deep learning.
→ Implemented the techniques learnt in many advanced computer vision projects to name a few,
◊ Implemented **RetinaNet** CNN for Object Detection.
◊ Developed a **Resnet** and **Inception** CNN model for Blood Cells Classification.
◊ Developed a **VGG** Based CNN model for Fruits Classification.

June 2020

Machine Learning Advanced Certification Program (Simpli Learn)

→ Gained comprehensive & in depth knowledge in all the fundamental machine learning concepts.
→ Worked with real-time data, developed algorithms using supervised and unsupervised learning, regression, classification, time series modelling and recommender systems.
→ **Project** : Tasked to use machine learning to a dataset and classify the families using a PMT (Proxy Means Test) to verify income qualification. Trained the dataset in a 80% / 20% split with a random forest classifier and crossvalidated with the K-Fold Procedure. Achieved 94% accuracy in the trained model.