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MANAN MADAN

SKILLS

> **Languages:** C,C++,Python

> **Data Structures and Algorithms:** Graphs, Trees, String, Dynamic Programming, Greedy Algorithms, Time and Space Complexity, Bit Manipulation, etc.

> **Robotics:** Robot Operating System, Gazebo simulator, Sensor Fusion, Kalman Filers, OpenCV, Perception(RANSAC, PointCloud Filtering, Object Detection), Path Planning

> **Natual Language Processing:** NLTK (Natural Language ToolKit), Pandas, Matplotlib, Networkx, BeautifulSoup, TextBlob, Regex, Web Scraping

CERTIFICATIONS

- Currently Pursuing **Robotics Software Engineer** NanoDegree by Udacity
- **Data Structures** (University of California, SanDiego)
- **Algorithms on Graph**(University of California, San Diego)
- **Algorithms and Data Structure**(University of California, San
- Diego)
- **C++ and Data Structures**(Coding Ninjas)
- **Arduino Programming** (Udemy)

EDUCATION

Netaji Subash Institute of Technology, Delhi — *B.tech Instrumentation and Control*

August 2018 - August 2022

Apeejay School, Delhi — *Science Stream*

August 2018 - August 2022

EXPERIENCE

Team ARES Robotics, Delhi — *Software Team Lead*

August 2018 - PRESENT

- Implemented full **ROS navigation stack** on simulation as well as on hardware platform
- Implemented and Tested AMCL (**Adaptive Monte Carlo Localisation**) using ROS
- Implemented the **Extended Kalman Filter** for fusing the output of the various sensor in order to accurately localize the robot.
- Coded an **autonomous differential drive robot** with various sensors such as Depth Camera, IMU, GPS, from scratch in **Gazebo**.
- Coded various **Path Planning** algorithms and tested them on **turtle bot** simulator in ROS
- Came up with a novel path planning technique based on the A* Algorithm to plan the **path according to the kinetic constraints** of the robot.

NSIT, Delhi — *Research Intern*

April 2020 - PRESENT

- Implement several **clustering** algorithms for clustering real-world categorical data
- Studied and implemented different types of **encoding** and **decoding** techniques to process data
- Worked on several algorithms and tools for natural language processing and web-scraping such as **chunking, chinking, regex parser**, etc.
- Coded a software that makes an **ontology** from a given set of material with the help of the **WikiData corpus**.
- Applied various **graph mining** techniques to derive meaningful information from ontologies.

PROJECTS

- **OpenPiBot**:
    - Uptill now in this project I have coded a simulation of a simple **differential drive robot** consisting of various sensors like IMU,

Depth Camera in **Gazebo from Scratch**. I have also implemented a simple controller to make the robot navigate in between 2 co-ordinates.
    - This is an ongoing project, and I plan on implementing an **Extended Kalman Filter for sensor fusion**, I also plan to implement **SLAM and Path Planning Algorithms**.

- **Simulating Path Planning Algorithms using ROS Infrastructure (Turtlebot and Gazebo)** :
    - In this project, we used the **Kinodynamic Path Planner with the turtlebot** differential drive robot to simulate the rover on Martian surface

- **Coding Kinodynamic A* Path Planning Algorithm with simulation in OpenCV**:
    - In this project, I coded a **path planning algorithm** that takes into consideration the robot's constraint while planning the trajectory. Further, I also **simulated it in OpenCV** for testing purposes.

- **Lane Detection Using OpenCV**:
    - In this project, **lane detection** was performed using the **canny edge detector**, **masking,** and **contour detection** by using the footage from the **DASH-CAM** of a car.

- **Ontology Construction:**
    - The aim of this research project was to build a **concept graph** from the given notes of a student. The graph is made using **Wikidata** and **NLTK**. After this several graph algorithms, were applied to applied different inferences from the graph.

ACHIEVEMENT AND AWARDS

- Represented team ARES - NSIT in **Indian Rover Championship (IRC)**, Chennai in 2019, and came in 10th place.
- Top 1% in JEE Advanced 2018