RRT* Path Planner

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Acme Robotics

Proposal Title: ***Path Planning of 4DOF Manipulator using RRT* algorithm***

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Objective

To develop a path planner for a 4 DOF robotic manipulator using RRT* algorithm for material handling equipments.

At Acme Robotics,these manipulators are used in manufacturing process where the environment is complex.

Operational and Performance Capabilities

The Path planner is being implemented in 4 DOF manipulator and it can be used in various fields depending upon the application

The key aspect using RRT* as a Path Planning algoritm is:

- Sampling based planning are used majorily because of its faster convergence and working in a complex environment.
- RRT* is a sampling based path planner used to find trajectories of the robots in real time.

Technical Approach:

In order for the robot end effector to reach a pose without colliding obstacles in its environment, we need motion planning.

We propose Randomly Rapidly Explored Trees (RRT*) path planning algorithm for our motion planning.

Phase 1 Tasks

- Develop Inverse Kinematics Solver for getting the target joint space variables from the input joint space coordinates.
- Develop the algorithm and test it using various unit tests such as google test and google mocks.

Phase 2 Tasks

- Implement and refine the algorithm by considering the path generated by the robot.
- Simulate the trajectory,map and the obstacles in the environment using MATLAB.
- Demonstrate and validate the output by testing it with several unit tests and comparing the output by solving though forward kinematics

Schedule:

Project Phase 1 Due Date : 10/18/2021

Project Phase 2 Due Date : 10/25/2021

Deliverable:

Phase 0 - We Propose a solution to the given problem

Phase 1- Algorithm Development,Unit Testing and Documentation will be completed.

Phase -2 Implementation of the algorithm and simulating our model in MATLAB.