Course Project Documentation

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Problem Statement:

With the help of a robot having spray paint (or any other paint) end effector, we need to paint the given surface efficiently (reduce the number of steps required by the robot) and evenly (paint each point with same time and same frequency).

Type of robot used:

- The robot consists of a fixed base to which the robot arm is attached.
- The end effector (spray paint or paint brush) is attached to 2R arm.
- The surface to be painted must be in robot's workspace.
- The robot is manipulated by using forward and inverse kinematics.

Programming language and framework:

- C++ language is used for forward and inverse kinematics which uses Eigen library.
- The implementation will be simulated in ROS.

Initially proposed project:

- Initial intended robot was 2R arm mounted on top of a prismatic joint.

Final project:

- The robot implemented is a 2R arm which can paint a square surface when starting and ending points are given.

Demo of the project:

- As we see in the video included, the robot end effecter is initially at a random position.
- When it needs to paint a square, it calculates the distance of the square by using the standard formulas like distance of a side when diagonal is given, where the distance of the diagonal will be distance between the start and end points.
- The robot reaches all the points and then ends at the final point.

GitHub link of the project:

https://github.com/saikumarreddy03/paint_robot