

## SYNOPSIS

**Project Group No: 201SOCUG0173**

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**Project Title: Trajectory Planning for Manipulator Using Genetic Algorithm**

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**Abstract:**

The mechanical arm manipulators are presently used in a wide number of applications and industries. Obstacle avoidance is a major problem faced by it while working. This is because mostly these manipulators are working in a crowded workspace. So to overcome this kind of problem an algorithm called Genetic Algorithm(GA) tries to find a suitable trajectory for the manipulator to move in its work space. This Algorithm uses certain operators like Selection, Crossover and Mutation. Before implementing this algorithm some kinematic analysis is done to generate the equations which will be the input for the algorithm. The coordinates of obstacles are passed as parameters to ensure that trajectory avoids obstacles. The algorithm is implemented for four sample inputs in the coordinate system and results are verified.

**Specific Contribution:**

- Implemented the Genetic Algorithm with operators like Selection , Mutation

**Specific Learning:**

- Was able to learn the real time application of Search Based Algorithm GA and the various options and parameters involved in it and how it affects the solution space.

**Technical Limitations:**

- For certain inputs the simulation was taking time in a normal system, however in systems with high processor specifications the output was generated quickly. Using Robotic Operating System (ROS) would yield results much faster.

**Keywords:** *Robotic Manipulator , Obstacle avoidance , Kinematic Analysis , Genetic Algorithm(GA)*

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