ABSTRACT

In this thesis we consider two important issues for mobile robots navigation. These issues are the detection of obstacles in front of the robot within a corridor and the path planning through it. We proposed three algorithms for obstacle detection within a corridor environment using image processing techniques. Our algorithms use Hough Transform, Radon Transform, and color segmentation techniques for the process of obstacle detection.

The path planning problem for a mobile robot is considered. The path planning problem, in short, is the task of determining the optimal path from one point to another within an environment in terms of minimizing a given cost function. A survey on several well-known path planning algorithms is presented to determine a suitable algorithm to work with previous stages of our system and to propose modification to this algorithm to obtain a better performance if possible.

The work is mainly concentrated on the A* path planning algorithm. A complete implementation of standard A* Algorithm is provided. Some modifications to the standard A* algorithm are tested which produce safer paths. Direction of arrival restriction is added to A* algorithm. Some improvements to be done in the future work are suggested.