SRI RAMAKRISHNA INSTITUTE OF TECHNOLOGY

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DESIGN AND MAPPING OF AN AUTONOMOUS MOBILE ROBOT FOR PATH PLANNING AND OBSTACLE AVOIDANCE

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SYNOPSIS

We consider the issue of finding a suitable path for a mobile robot from one point to another that avoids collisions with objects (obstacles) in the environment. The motion, planning and control are achieved without floating point parameters and we present an algorithm for this problem. We also present an area-efficient architecture. We are using Arduino for motion, planning and control for providing efficient hardware in low cost. Due to uncertainty in the environment, a complex decision based mechanism is required for path planning based on sensing the environment. The autonomous bot consists of 3 ultrasonic sensors mounted at certain distance in chassis, which is used to determine the distance in three different directions: left, right and front. The robot will make its own decision, based on the presence of obstacle by implementing proper algorithm and also by neglecting floating points and concentrating only the usage of integer constants throughout the Robot. This will reduce the memory usage of a controller there by reducing the time required to execute certain commands, which directly increases the performance of the robot. The control for an entire robot is done with Arduino Mega. Algorithms are implemented in Arduino Controller in the form of Arduino Code developed using Arduino IDE. The robotic motion is achieved using Neema – 17 Stepper Motors coupled with an alloy wheel each. The Protection and Synchronism between Motor and Controller is achieved by using L298N Half Bridge Driver IC.