Autonomous maze solving robot

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Declaration of Originality

Here by we announce that work and advancement expressed in this report and venture is totally our own work and nothing in this record is duplicate glue from some other sources.

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Autonomous Maze Solver Robot

Submitted to the faculty of the Electrical Engineering Department
of the University of Management and Technology Lahore
In partial fulfillment of the requirements for the Degree of

Bachelor of Science
In
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Motivation

To support the armed forces of Pakistan including Pakistan army and border military forces and the people of Pakistan who are suffering at the hands of land mines.

Dedication

The whole project is dedicated to every single person who has helped us till now in our lives especially our parents, teachers, friends and our beloved Country Pakistan.

Acknowledgements

Firstly thanks to Almighty Allah, who gave us the power to comprehend and understand the knowledge around us. Than our loving parents, who unprecedentedly loved and cared us, and has been a source of continuous inspiration and motivation for us. Their kind and sincere dedication has made us come this far. We acknowledge the efforts of our worthy advisor, Jamil Ahmed who deserves a huge token of appreciation for guiding us ina well-organized way. His profound knowledge is a constant source of inspiration for us. And last but not the least; we appreciate all other teachers we got back before this, for without them we might not have been capable of achieving such success.

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Abbreviation:

DC	Direct Current
PMDC	Permanent Magnet DirectCurrent
PWM	Pulse Width Modulation
AC	Alternating Current
EV	Electric Vehicle
PIC	Peripheral Interface Controller
LCD	Liquid Crystal Display
AMS	Autonomous Maze Solver

Abstract

The purpose of this project is to design a prototype which is capable of solving maze. The major feature of this robot is that it doesn't require someone to control it and its real time decision making. The project started from a simple idea of puzzle solving game that was transformed into practical concept. This practical phase finally transformed into different phases. The visions and concepts from the theoretical stages are shaped into the physical hardware components by fabrication of a prototype and coding was integrated into the system. The designed robot is capable to find the path through the maze and searches for an exit. The detection of the path is done using a technique called "Left/Right hand rule". The robotworks in automatic mode in which it searches the path and detects dead ends and tries to find exit of maze. The robot travels at moderate speed continuously detecting the closed ends using sensors. The reliability of this maze solverentirely depends on sensors usage. The platform of maze solver is versatile enough to accommodate any future development without affecting the main working of project. This project will create an interesting opportunity for students to try to use their coding and logical skills in implementing maze solving.

Chapter 1: Introduction

1.1 Introduction

Autonomous robots have wide area applications with far reaching effects.Maze solving is used to find path from end to end. It can be used in practical in wars for ammunition supplying and in fire emergencies. It will be of great use in logistics industry for self-navigating robots which can deliver merchandise on their own.The maze solving theory used here is based on the following concept that if anyone enters a maze or dark room, place his right hand on the wall, and starts moving forward while keeping his hand on the wall. He will eventually find a way out of the maze or dark room. Though it may not be the fastest route or shortest, but it does works! With the help of long distance ultrasonic sensors, it continuously senses the hurdles or wall and with the right hand rule it follows the path avoiding dead ends. This type of robot is also known as micromouse. There have been tournaments in Japan, South Korea and United States which has gained attention of students across the globe. Although the individual components of these maze solving robots remain nearly same and consist of a motor control system, sensing equipment, microcontroller and a mapping system(an optional part) for navigating the maze intelligently.