ABSTRACT

There are various methods or algorithms to find a solution way out of a labyrinth. The simplest algorithm is the wall following algorithm. This algorithm finds the solution of a labyrinth by following one of the side walls of the labyrinthuntil it discoversthe way out. The disadvantage of this Wall Followingalgorithm is that it could not find a solution of a labyrinth that contain separate wall in it or known as loop.

In order to overcome the above problems, a different algorithm will be embedded in a robot to finda way out solution of a labirynth that has loop in it. The Algorithms that will be used is the Pledge algorithm. By using this algorithm the robot will be able to overcome loops in a labyrinth. In this case the robot would also need a controller that can make it moves well through the labyrinth. The control method used is the PID control. The PID controls the speed of the robot's DC motor bycalculating the error value based on the input of ultrasonic placed on the front, right and left side of the robot to adjust the PWM value of the microcontroller. The microcontroller used is Atmega328p of the AVR family. The programming language used is Basic with BASCOM-AVR software version 1.11.9.8.

This final project produceImplementation of Pledge algorithm to field robot in solving labyrinth. The achieved system output isthat therobot can find a solution way out of alabyrinth thatcontain loop in it with several starting pointin 100% success rate. The best performance of the system occur in the value of PID constants of P=70, I=0.05 and D=30 indicated by the value of the system performance Mp=7%,tr=4100ms, td=2000ms, tp=4500ms and ts=7600ms.

Keyword: *Pledge* Algorithm, Field Robot, Labyrinth, PID Controller