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I Won't Fall Down Robot

(Edge Detector Robot)

Abstract: Robots are physical agents that perform tasks by manipulating the physical world. They are equipped with sensors to perceive their environment and effectors to assert physical forces on it. Sensing first of all your robot would have to be able to sense its surroundings. It would do this in ways that are not and similar to the way that you sense your surroundings. Giving your robot sensors: light sensors (eyes), touch and pressure sensors (hands), chemical sensors (nose), hearing and sonar sensors (ears), and taste (tongue) will give your robot awareness of its environment. Movement a robot needs to be able to move around its environment. Whether rolling on wheels, walking on legs or propelling by thrusters a robot needs to be able to move. To count as a robot either the whole robot moves, like the Sojourner or just parts of the robot moves, like the Canada Arm.

I won't fall down is the arrangement used to detect the edges of the certain tables or few types of solid surfaces (mechanical robot) introduced to have the benefits of securing the robot falling from certain heights.

Keywords: Sensors, Robot, Motor Driver, Motors

1. INTRODUCTION

Robotics is part of Today's communication. In today's world ROBOTICS is fast growing and interesting field. It is simplest way for latest technology modification. Now a day's communication is part of advancement of technology, so we decided to work on robotics field, and design something which will make human life simpler in day today aspect. Thus we are supporting this cause.

Robot Sensors are essential components in creating autonomous robots as they are the only means for a robot to detect information about itself and its environment. As little as one sensor is needed by a robot, though increasing the number and variety of sensors tends to increase the robot's ability to get a more thorough understanding of the world around it.

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2. HARDWARE REQUIRED

A. Sensor

A sensor is an object whose purpose is to detect events or changes in its environment, and then provide a corresponding output. A sensor is a type of transducer; sensors may provide various types of output, but typically use electrical or optical signals. For example, a thermocouple generates a known voltage (the output) in response to its temperature (the environment). A sensor's sensitivity indicates how much the sensor's output changes when the input quantity being measured changes.

Capacitive sensing is a noncontact technology suitable for detecting metals, nonmetals, solids, and liquids, although it is best suited for nonmetallic targets because of its characteristics and cost relative to inductive proximity sensors. In most applications with metallic targets, inductive sensing is preferred because it is both a reliable and a more affordable technology

B. L298 MOTOR DRIVER

The L298 is an integrated monolithic circuit in a 15- lead Multi watt and PowerSO20 packages. It is a high voltage, high current dual full-bridge driver designed to accept standard TTL logic levels and drive inductive loads such as relays, solenoids, DC and stepping motors. Two enable inputs are provided to Enable or disable the device independently of the input signals. The emitters of

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the lower transistors of each bridge are connected together and the corresponding external terminal can be used for the connection of an external sensing resistor. An additional supply input is provided so that the logic works at a lower voltage.

Fig 2.1 Motor Driver

C. DC Motor

A **DC motor** is any of a class of electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor. Most types produce rotary motion; a linear motor directly produces force and motion in a straight line.

DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight motor used for portable power tools and appliances

Fig 2.2: DC Motor

3. SOFTWARE REQUIRED

A. Code vision AVR.
B. Proteus ISIS
C. Embedded ‘C’
D. Flash magic

We use Code vision AVR software to write the program and execute it, program is written in the embedded ‘c’ language, after completion of executing the program hex file program is dumped into the controller using flash magic

A. DC Motor

```
void LEFT()

{          //left motor

PORTB.0=0;

PORTB.2=1;      // enable

PORTB.4=1;    // right motor

PORTB.5=1;

PORTB.6=0;   // enable

PORTB.7=0;

}
```

The above function is used to move the robot in left direction.

```
 if
(PIND.4==1&&PIND.5==1&&PIND.6==1&&PIN
D.7==1)

     {

     FORWARD (  );

      }
```

The above function if port D pins:4,5,6,7 are high then robot moves in the forward direction.

B. PROTEUS ISIS

Proteus ISIS professional is a software simulation tool.

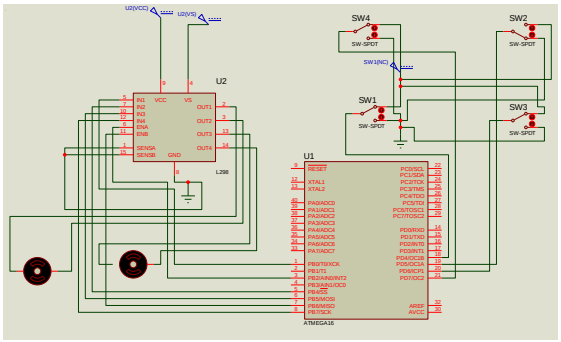

Fig 3.1 Simulation diagram of I Won't Fall Down

4. FUNCTIONAL DESCRIPTION

This is the design to avoid the edges; this robot is used for basical applications in day to day life. As with the improving technology there is a large scope and lots of usage with this kind of robot, without wasting time and getting efficient work will be possible with this robot.

Based on the human needs we can have different applications practically, like cleaning a table or even serving purpose etc. In this robot we use two wheels of same size and both the wheels consists of two motors (DC motors). And both the motors are connected to the motor driver (L298) in order to have movement in various directions.

ATMEGA 16 is the micro controller we use in this robot. A micro controller is also known as the brain of a robot. We have to write a program for it, in order to work the robot properly. Control over the robot will be given to micro controller like instruction written like a code by us.

The proximity interface board is used to make use of sensors placed on either sides of the robot. From the proximity interface board the sensors will get instructions. Microcontroller will pass the instructions to proximity sensor board.

The maximum speed of the robot is dependent on the rpm of the motor used. In this project we used 2 motors of 100 rpm of 12v. The turns to be taken when the sensors detect the edge to avoid falling. This will be done according to the instructions given in the program.

Finally, the robot will be having forward and backward turns, when the sensor found an edge it will take a turn either left or right. To take a turn for example to take a left turn then left motor will be stopped from functioning then the wheel on right side will take turn. In this way vice-versa for the right turn. The material we used for the base or in the other construction is acrylic material.

The simulated design consists of two dc motors, oneL298 motor driver, atmega16 microcontroller and one proximity interfacing board.

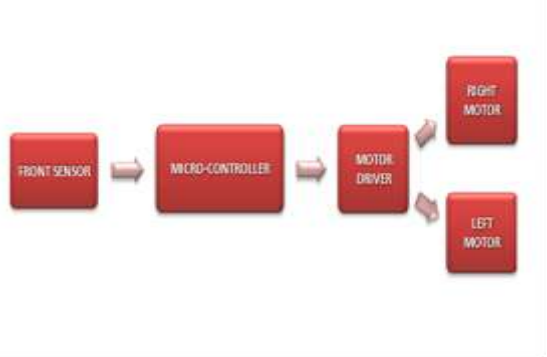

Fig 4.1: Block diagram of I won't fall down robot

Fig 4.2: Front view of I Won't Fall Down

Fig 4.3: Top View of I Won't Fall Down

The fig4.2 shows the front view of the Robot with the sensors placed around the robot, and fig4.3 shows that on the top a micro controller

is connected and the two wheels are connected with the dc motors to move around.

5. RESULT

Once the Robot I Won't Fall Down is Powered ON it will move, the sensor placed at four corners will continuously sense and send the value to the controller. Once the edge is detected the sensor will send the signal to the controller and the controller will stop the motor (left/right), in order to move the ROBOT left/right direction.
That results in securing the robot falling from certain heights.

6. CONCLUSION

A simple and computationally efficient edge detector model is presented. Under reasonable assumptions, it is possible to determine the surface edges. And given its configuration, and its position and surface characteristics, and whether the robot will slide, tip over or maintain its balance.

The mechanism of the robot has been developed, and the over-actuation of the system leads to the ability to find the edges by the normal forces by specific wheel torques. This property has been verified experimentally and can be used for the design of an active control.

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