# Computerized Sliding Door opening and closing using Microcontroller

**[1]Mr.U Shantha Kumar ,[2]Mr. Arunkumara B, [2]Mr.Mallanagowda.J [2]Miss.Lakshmi V [2]Mr.Amit Subraya Bhandari**

[1]Assitant Professor ,[2]Final Year Students of EEE Department
[1]RYM Engineering College, Ballari, Visvesvaraya Technological University, Belagavi
[2]RYM Engineering College, Ballari, Visvesvaraya Technological University, Belagavi

*Abstract :*    In this research work, an computerized sliding door System using an motion sensor was developed. It uses a sensor, a control unit & drive unit to open and close doors at the entrance of a our college building. The main aim of this research work is to learn in information about how the mechanical door system works and to understand the concepts involved. The less important aim is to fabricate a simple circuit model to show how the system works. The main activities involved in this work are the research done on how the automatic door works, sketching a detailed circuit & then fabricating a simple model.

**Keywords:** Microcontroller, Motion Sensor, L298N Motor Drive

## I. INTRODUCTION

In this modern-day, all around us becoming automated which makes our life more easy and more advanced. One of the most common systems is the computerized sliding door opening and closing system. We all must have seen this type of automatic sliding door in hotels, shopping malls, theatres, and other commercial buildings. These are the highly visited places where a person is always required to open and close the door for visitors. To reduce human effort most commercial buildings are used automatic sliding doors. This system is used to open the door when a person comes in front of the entrance of the door and closes it robotically after entering into the door. In this project tutorial, we will be learned How to make an mechanical door opening and closing system using Motion Sensors, Microcontroller and how its works.

## II. PROJECT CONCEPT OF COMPUTERIZED SLIDING DOOR

This project idea is very simple and easy to construct. The main parts of this project are Microcontroller, Motion Sensor and motor driver IC. Where the microcontroller is the main controller that will be used to control the whole system[1]. The Motion sensor is able to sense the infrared energy produced by the human body. For this reason in this project is used to detect human movement. The motor driver IC is used to control the DC motor. This system works like that when someone comes in front of the door (Motion Sensor), then the Motion sensor detects a movement and produces high output[2]. Microcontroller read that output and send commands to the L298N motor driver IC to open the door by controlling the DC motor. When nobody is present in front of the door, the Motion sensor doesn't detect any motion and produces high output. Again the Microcontroller read this that output and sends commands to the L298N motor driver IC to close the door by controlling the DC motor[3].

## III. COMPONENTS REQUIRED

| Name of the Component | Quantity |
|---|---|
| Microcontroller | 1 |
| Motion sensor | 1 |
| L298N Motor Driver | 1 |
| Green LED & Red LED | 1 each |

| Slide switch | 2 |
|---|---|
| 9 V Power Supply | 1 |
| Tempered glass | 1 (96.7 Inches*40Inches) |

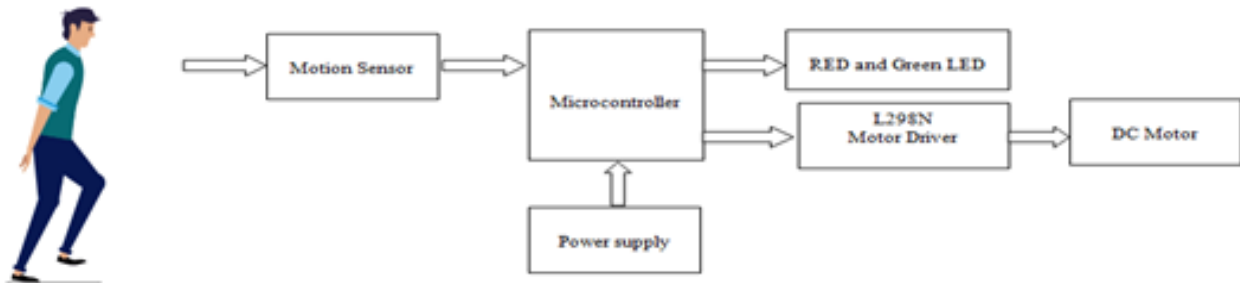## IV. BLOCK DIAGRAM AND WORKING



Figure 1: Block Diagram

Generally, the human body emits infrared energy. When a human body comes in the detection range of the motion  sensor then it detects the infrared energy of the human body and gives High output (+5v) from the output pin. When it doesn't detect the infrared energy of the human body, then it gives Low output (0) from the output pin. In this way, the motion  sensor detects motion and produces output[4].



Figure 2: Output Model

In this mechanical sliding door opening and closing system, the motion sensor is placed at the top of the entrance. When a person comes in the range of motion Sensor, then the motion sensor detects the movement of that person and its Data OUT Pin will become HIGH (+5). Then the digital Microcontroller read this HIGH output and it understands that there is a person approaching the door. Then the digital pin  of

Microcontroller become High (+5) and Low (0) respectively that immediately activates the L298N Motor Driver module to start rotating the DC motor at one direction and the door opens. At the same time, Green LED (LED1) starts glowing that indicating the door is open[5]. After some time (about 5 seconds in this project), the digital pin of Microcontroller become Low (0) and High (+5) respectively, which will once again activate the L298N Motor Driver module to start rotating the DC motor in another direction. Now the door will close automatically. This time, Green LED (LED1) becomes turned off and Red LED (LED2) starts glowing, which indicates the door is closed[6].

## V. BENEFITS OF COMPUTERIZED SLIDING DOOR

Savings mechanical doors conserve energy. They save energy from heating and air-conditioning that would have been required. Given that they open only when passing-by traffic is near, and close impulsively, mechanical doors will easily conserve temperature inside your premises. Thus, efficiently reduces wasted energy in multiple ways and may considerably lessen yearly heating and cooling costs, saving-up on electricity costs. Convenience Today's technically stylish mechanical sliding doors are user-friendly and virtually independent. It provides disabled and aged people easy access, since they are not obliged to open or close the door by themselves[7]. Manage safety person can remotely control mechanical doors. They can grant access to selective traffic or deactivate it, had there been children trying to access the premises. security and simplicity even though glass is regarded fragile and delicate[8]. The mechanical sliding glass doors are made of toughened material which is almost five times stronger than normal safety glass doors. Automatic sliding doors are not just transparent but secure as well. Convenient For Larger Merchandize An automatic sliding door does away with the aggravation and struggle associated with opening a heavy, manual door and instantly demonstrates to users the house/establishment they are entering cares about their convenience. Automatic sliding doors are quite large, generally twice as large as the standard entry doors. They allow not only the incoming user for the establishment.

## VI. Conclusion

This system which is the plan and building of a computerised sliding door using motion sensor was designed considering some factors such as economy, availability of workings and research materials, efficiency, compatibility, portability and also durability. The presentation of the system after test met design specifications. The general process of this scheme and performance is dependent on the presence of the person entering through the door and how closer he/she is to the door.

## VII. REFERENCES

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