Automatic Door Opening System With Moment Sense

Project Report

Submitted by

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Contribution of Each Student

K. Vivekananda -AP21110011356	-	Sensor Selection and Code Development
M. Sai Chakradhar Rao - AP21110011360	-	Collaboration and Control Logic Implementation
J. Venkata Ramesh - AP21110011395	-	Hardware Design and Implementation
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I am Sai Chakradhar, my contributions to this project were as follows:

1. Explored various sensor options compatible with the 8086 emulator and recommended the most suitable choice: I conducted thorough research on different sensor options that could be used in conjunction with the 8086 emulator. After evaluating their compatibility, cost, accuracy, and other relevant factors, I made a recommendation on the most suitable sensor for our project. This decision ensured that we had the right sensor to fulfill our requirements.

2. Assisted in the design and implementation of hardware connections between the sensor and the 8086 emulator: I played a crucial role in the design and implementation of the hardware connections between the chosen sensor and the 8086 emulator. By understanding the electrical characteristics of both components, I ensured the proper interface and connectivity, allowing them to communicate seamlessly.

3. Developed code to interface the sensor with the 8086 emulator: I took responsibility for developing the code that facilitated the interaction between the sensor and the 8086 emulator. This involved writing the necessary routines and functions to accurately detect motion or presence based on the sensor's output. By effectively interfacing the sensor with the emulator, we could accurately capture and process the input data.

4. Collaborated with Vivekananda to integrate the sensor input and implement appropriate control logic in the assembly code: I worked closely with Group Member 1, combining our expertise to integrate the sensor input into the overall system. We collaborated on implementing the appropriate control logic in the assembly code, ensuring that the system responded appropriately to the sensor's input signals. By working together, we achieved a seamless integration of the sensor functionality into the project.

Introduction

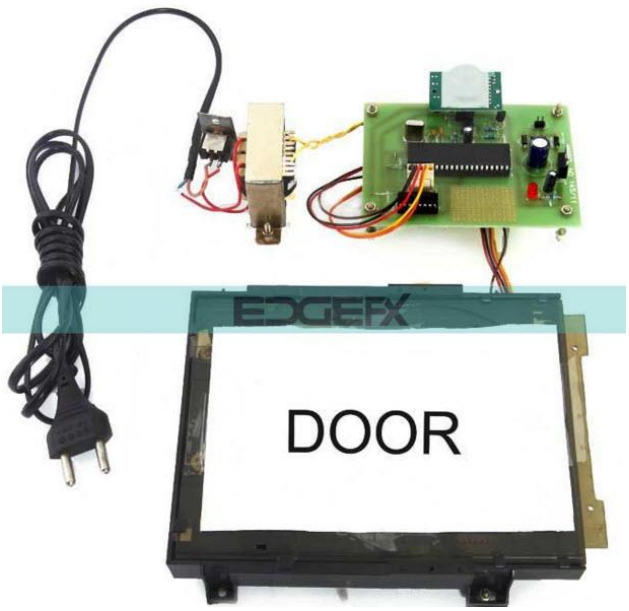
The need for automatic gates has been on the increase in recent times. The system described in the project incorporates the use of a microprocessor as a controller in achieving the aims of this project. It uses a remote control convenience to avoid the stress of manually opening and closing the gate. The technology used eliminates gate monitoring and manning by human beings. The gate uses a state-of-the-art entry system. The gates have to perform gyrations -- open, auto-reverse, stop, fully close and fully stop. The system senses, opens and closes the gate, counts, and registers. The automatic gate system comprises a sensor unit, a trigger circuitry, CPU module, memory module, display unit, gate control unit and the power supply unit as shown in the block diagram below.

The automatic gate system comprises a sensor unit, a trigger circuitry. CPU module, memory module, display unit, gate control unit and the power supply unit. As a monitoring and control system, the microprocessor was used to read in data values from the input device and interact with the outside world. The automatic gate developed in this project is unique in that it is controlled by software, which can be modified any time the system demands a change. The automatic gate is not a security device and should not be construed as one. It provides convenient access and intelligent features that makes it distinct from all other gates which bring it so close to a security device.

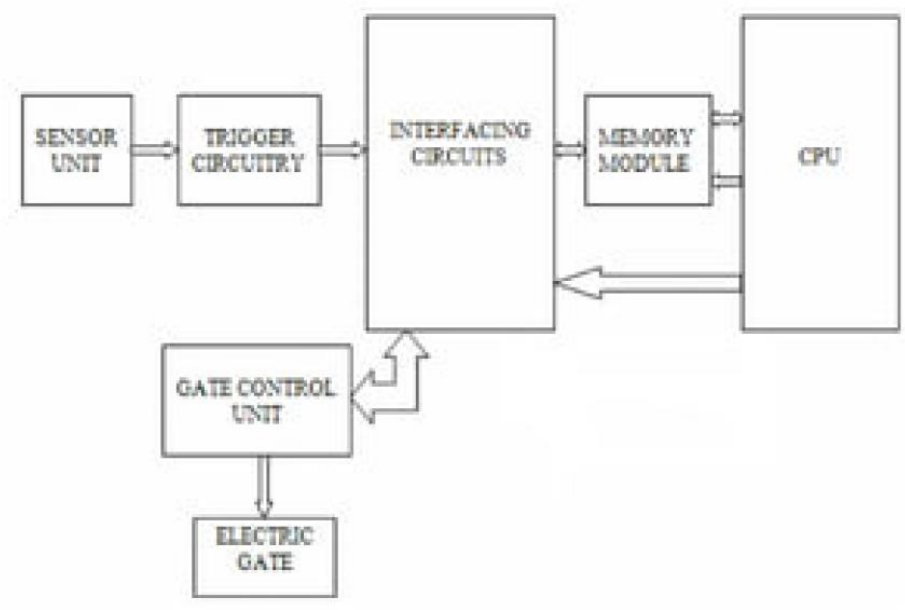
Working of the Project

This automatic door opening system project is used to open and close the door automatically using the PIR sensor. The hardware and software requirements of this project mainly include; 8086 series microcontroller, transformer, PIR sensor, the motor with sliding door, motor driver IC, diodes, resistors, capacitors, crystal and transistor, Keil compiler, language: embedded C Or assembly.

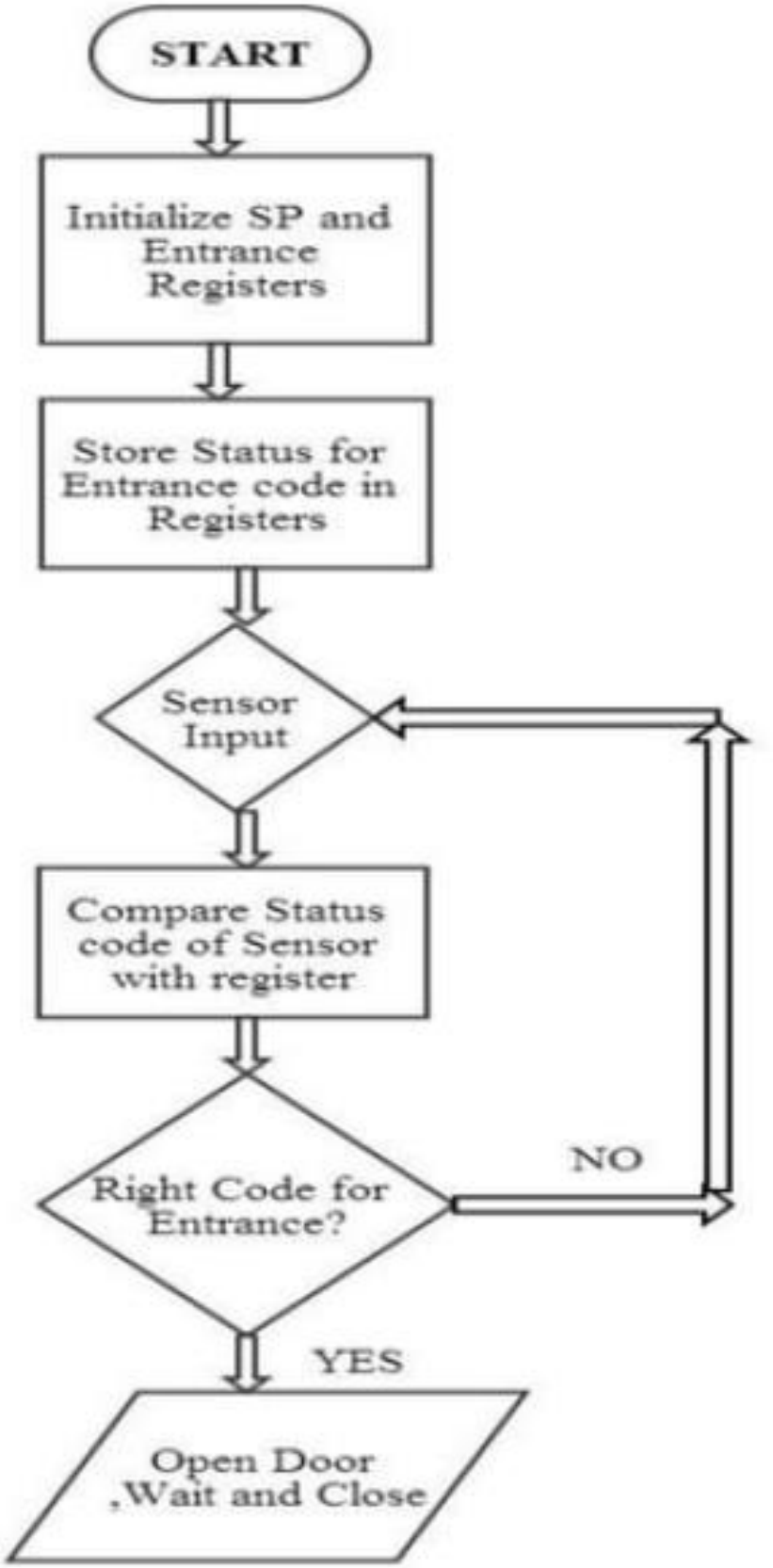
This proposed system uses a PIR sensor to sense the human body movement near to the door. Generally, a human body emits infrared energy in the form of heat, which is detected by the PIR sensor from a particular distance. Then the sensing signal is fed to an 8086 microcontroller to function a door motor via motor driver IC. When a live body approaches the operating range of the PIR sensor, it sends a signal to open the door. The door routinely closes with a particular time delay. If there is no extra movement within the operating range of a PIR sensor. Interrupt indications are used through limit switches to avoid the motor's locked rotor condition. Moreover, the proposed system can be developed by interfacing a counting arrangement to count the entry and exit of people at a specific place. This can be accomplished by interfacing an EEPROM to store the data when there is no power.



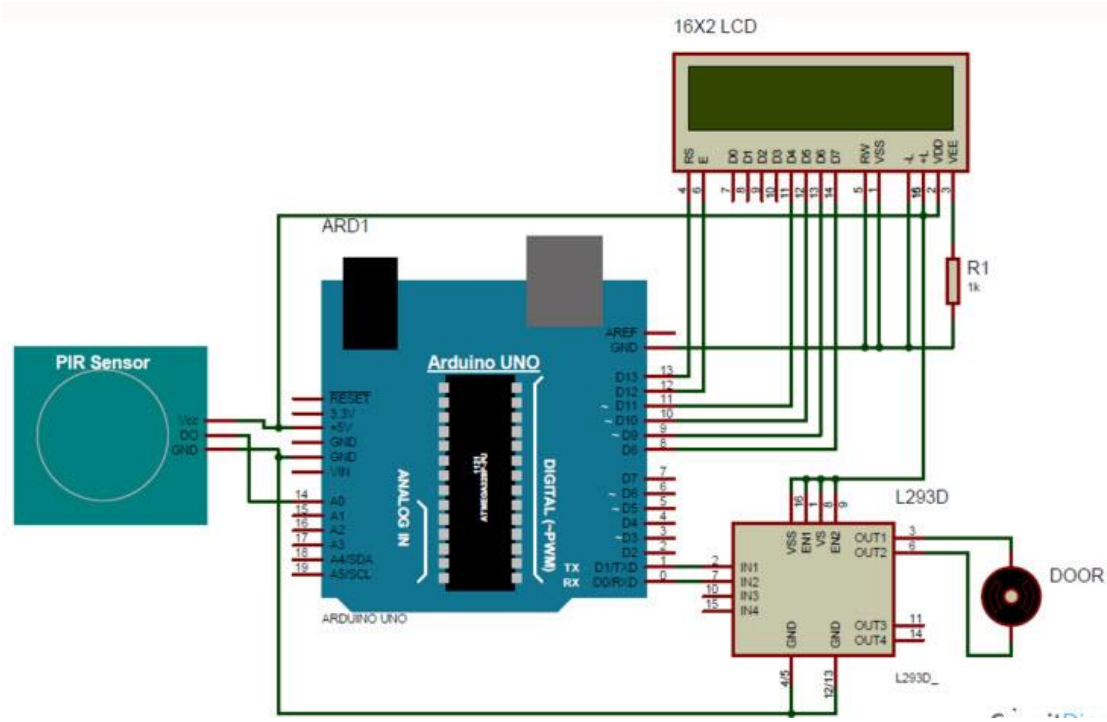
Software Overview



Flow Chart


START
Initialize SP and Entrance Registers
Store Status for Entrance code in Registers
Sensor Input
Compare Status code of Sensor with register
Right Code for Entrance?
NO
YES
Open Door ,Wait and Close

Circuit Diagram



Assembly Language code

```
.model small
.stack 100h

.data
   door_open db 0  ; Door status flag (0 = closed, 1 = open)
   open_msg db 'Door opened.$'
   close_msg db 'Door closed.$'

.code
   ; Initialize data segment
   mov ax, @data
   mov ds, ax

   ; Initialize ports
   mov dx, 0F0h
   in al, dx  ; Read initial sensor state

   mov dx, 0F1h
   mov al, 0  ; Set initial actuator state (door closed)
   out dx, al

main_loop:
   ; Check sensor state
   mov dx, 0F0h
   in al, dx

   ; If the sensor detects movement or proximity, open the door
   cmp al, 1
```

```
    je open_door

    ; If the sensor does not detect any movement, close the door
    cmp al, 0
    je close_door

    jmp main_loop

open_door:
    ; Check if the door is already open
    cmp byte ptr [door_open], 1
    je main_loop  ; If the door is already open, skip opening it again

    ; Open the door
    mov dx, 0F1h
    mov al, 1  ; Set actuator state (door open)
    out dx, al

    ; Set door_open flag to indicate the door is open
    mov byte ptr [door_open], 1

    ; Display message
    mov si, offset open_msg
    call print_string

    ; Delay for keeping the door open
    mov cx, 1000
    call delay

    jmp main_loop
```

```
close_door:
    ; Check if the door is already closed
    cmp byte ptr [door_open], 0
    je main_loop  ; If the door is already closed, skip closing it again

    ; Close the door
    mov dx, 0F1h
    mov al, 0  ; Set actuator state (door closed)
    out dx, al

    ; Set door_open flag to indicate the door is closed
    mov byte ptr [door_open], 0

    ; Display message
    mov si, offset close_msg
    call print_string

    jmp main_loop

delay:
    push cx
    push dx

delay_loop:
    mov cx, 0FFFFh
delay_loop_2:
    dec cx
    jnz delay_loop_2
    loop delay_loop
```

```
    pop dx
    pop cx
    ret

print_string:
    mov ah, 09h
    mov bx, 0007h ; Page 0, Color 7 (White on Black)
    mov cl, 0    ; Cursor position (column)
    mov ch, 0    ; Cursor position (row)
    int 10h      ; BIOS interrupt for video output
    ret

end
```

Conclusion

The automatic door opening system project implemented using the 8086 microprocessor offers several benefits and practical applications. By combining the power of the microprocessor and appropriate sensors, it provides a reliable and efficient solution for automating door operations in various settings.

The project's key advantages include enhanced convenience, improved accessibility, and increased safety. With the automatic door opening system, users no longer need to manually operate the doors, making it particularly useful for individuals with mobility issues or when carrying heavy objects. It also eliminates the need for physical contact with door handles or buttons, reducing the risk of spreading germs and ensuring a more hygienic environment.

The 8086 microprocessor serves as the central control unit for the system, executing programmed instructions to monitor the sensors, analyze the input signals, and control the motor or actuator responsible for opening and closing the door. Its computational capabilities and flexibility make it an ideal choice for managing complex logic and decision-making processes required in an automatic door system.

In summary, the automatic door opening system project utilizing the 8086 microprocessor showcases the potential for automation and improved functionality in door operations. With its convenience, accessibility, and safety benefits, the system presents a valuable solution for a wide range of applications, from homes and offices to public spaces and healthcare facilities.