

Amrutvahini College of Engineering, Sangamner
Department of Electronics and Telecommunication
Mini-Project Synopsis
Academic Year: 2020-21

Project Title: Motion Based Automatic Door Opener.

Introduction:

Opening a door in places like hotels, Shopping complexes, and offices can be a tedious task and sometimes require a person just for the sake of opening door whenever a person arrives. Our system puts forward an automatic and precise door opening system based on human movement sensing near the door. This project proposes a system that allows for automatic door opening solution by sensing human presence near it. Our system achieves this functionality with the help of PIR sensors. PIR stands for passive infrared sensors. Every live body emits some infrared energy. This energy is sensed by a PIR sensor from a good distance. This signal is then processed and door is opened and closed based on this data. When a living being arrives within the sensor range, it detects its presence and sends out a command that opens the door. The door then automatically closes after a specific time delay if there is no further motion near the door. The system can be later enhanced by integrating counter mechanism so as to keep track of the number of persons inside the facility.

Related Work:

Many researchers have implemented an automatic door opening system. A new design for creating easy and safe accessibility conditions through the establishment of an advanced interaction between the person and the accessibility control of the building is implemented [1]. Based on this concept, an integrated architecture for door openers, called PathPass, is proposed that introduces easy to use equipment by the person and to the door's control unit allowing the performance of a wide range of operational modes. Remote control and finger print based system is used for door opening purpose [2]. Bluetooth technology is used by researchers for automatic gate [3]. Bluetooth can reduce the waiting time and error to open the door compared with RFID card. Gesture spotting algorithm with single wearable sensor is used by authors [4]. A door-opening activity monitoring system using a single wrist-worn inertial sensor to support assessing the performance of upper-limb movement during daily living is developed.

Research Motivation:

In the pandemic situation like COVID -19, opening the door manually is very risky because some people came from offices, hospitals and some public places. So when they touches to door sometimes it spread virus and it is dangerous for normal person at home as well as other places like theaters, malls, hospitals. Also, the physically challenged persons are not able to open or close the door. So, an automatic door opening system is necessary in such cases.

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Project Aim and Objectives:

The main aim of the proposed system is to automatically open and close the door with reduced delay and without use of human being. The main objectives of the system are to detect a human being and open/close the door automatically.

Proposed System Assumptions and Design:

Proposed system consists of PIR sensor for sensing the presence of a person near a door. When the person is sensed by the sensor, the control signal is sent by microcontroller to the motor driver circuit. This will start the motor and the door will be opened automatically. When there is no human movement, the data out of the PIR Sensor becomes LOW. Once the data out is LOW, after a small delay, the door is automatically closed and comes back to initial position.

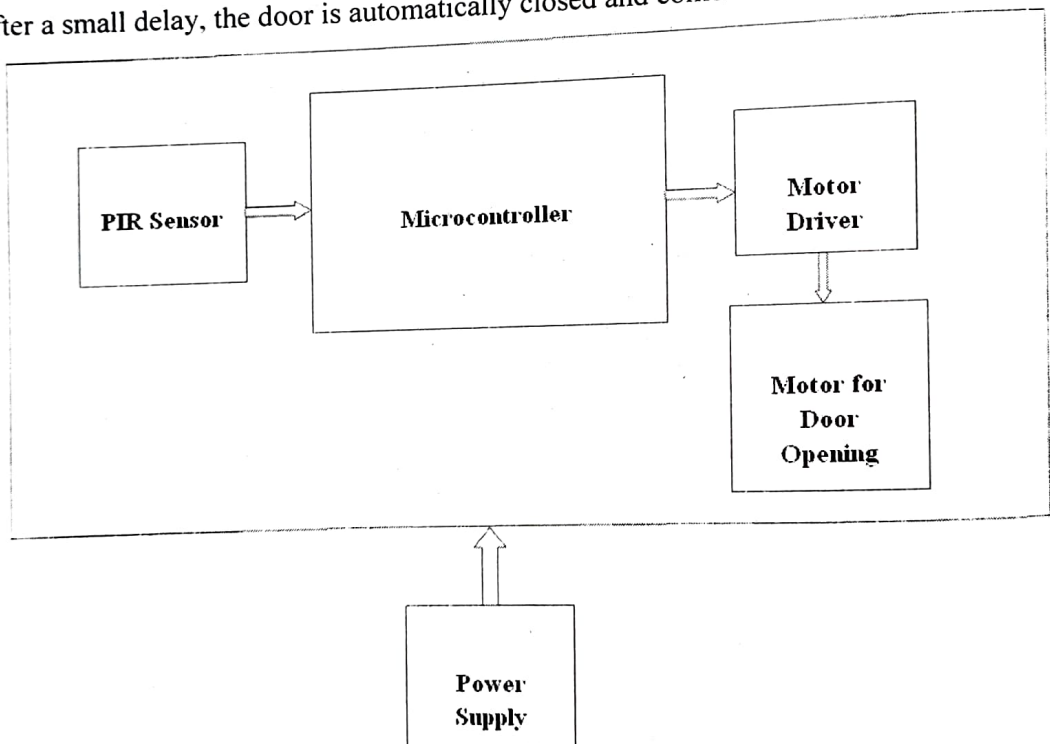


Figure1. Proposed System for Automatic Door Opener

Expected Outcome:

The system will be able to

1. Detect the presence or absence of a person near the door.
2. Open and close the door automatically i.e. without human intervention.

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References:

- [1]. P. Lymperopoulos and K. Meade, "PathPass: Opening doors for people with disabilities," 2014 4th International Conference on Wireless Mobile Communication and Healthcare - Transforming Healthcare Through Innovations in Mobile and Wireless Technologies (MOBIHEALTH), 2014, pp. 32-35, doi: 10.1109/MOBIHEALTH.2014.7015902.
- [2]. Pik-Yiu Chan and J. D. Enderle, "Automatic door opener," Proceedings of the IEEE 26th Annual Northeast Bioengineering Conference (Cat. No.00CH37114), 2000, pp. 139-140, doi: 10.1109/NEBC.2000.842418.
- [3]. K. Khreasarn and K. Hantrakul, "Automatic gate using Bluetooth technology (Open the gate with the strength of the Bluetooth signal on the smartphone)," 2018 International Conference on Digital Arts, Media and Technology (ICDAMT), 2018, pp. 54-58, doi: 10.1109/ICDAMT.2018.8376495.
- [4]. M. Tseng, K. Liu, C. Hsieh, S. J. Hsu and C. Chan, "Gesture spotting algorithm for door opening using single wearable sensor," 2018 IEEE International Conference on Applied System Invention (ICASI), 2018, pp. 854-856, doi: 10.1109/ICASI.2018.8394398.

Remark of Project Guide:


Project idea is based on embedded system domain. Useful for society.
Forwarded for your approval.

Remark of Project Coordinator:


forwarded

Remark of Head of Department:

Recommended


Mr. C. D. Bhos
(Project Guide)


Mr. M. B. Kadu
(Project Coordinator)


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