International Journal of Electronics and Electical Engineering

Volume 3 | Issue 3 Article 9

January 2015

AUTOMATED INTELLIGENT RELAY COUPLED DOOR CONTROL SYSTEM USING ANDROID MOBILE TECHNOLOGY

A.RAJESH KUMAR
Department of Electronics and Instrumentation, Sri Sai Ram Engineering College, Chennai, India,
a.rajesh.kumar@gmail.com

C. DINESH
Department of Electronics and Instrumentation, Sri Sai Ram Engineering College, Chennai, India,
dineshc@gmail.com

R. ARAVIND
Department of Electronics and Instrumentation, Sri Sai Ram Engineering College, Chennai, India,
raravind@gmail.com

SRIKRISHNA. C
Department of Electronics and Instrumentation, Sri Sai Ram Engineering College, Chennai, India,
sri.krishna@gmail.com

PL. NAGARTHINAM
Department of Electronics and Instrumentation, Sri Sai Ram Engineering College, Chennai, India,
nagarthinam@gmail.com

Recommended Citation

KUMAR, A.RAJESH; DINESH, C.; ARAVIND, R.; C, SRIKRISHNA.; and NAGARTHINAM, PL. (2015) "AUTOMATED INTELLIGENT RELAY COUPLED DOOR CONTROL SYSTEM USING ANDROID MOBILE TECHNOLOGY," *International Journal of Electronics and Electical Engineering*: Vol. 3 : Iss. 3 , Article 9.
DOI: 10.47893/IJEEE.2015.1153
Available at: https://www.interscience.in/ijeee/vol3/iss3/9

AUTOMATED INTELLIGENT RELAY COUPLED DOOR CONTROL SYSTEM USING ANDROID MOBILE TECHNOLOGY

A.RAJESH KUMAR[1], C.DINESH[2], R.ARAVIND[3], SRIKRISHNA.C[4], PL.NAGARTHINAM[5]

[1,2,3,4,5,] Department of Electronics and Instrumentation, Sri Sai Ram Engineering College, Chennai, India

Abstract- The purpose of this project is to increase the knowledge of technology and services of smart homes for disabled people. There is a clear need for such new knowledge since the number of disabled people is significant. Indeed, new technologies and services of smart homes have the potential to increase effectiveness and efficiency of caring disabled. With right solutions there is a great potential to increase disabled persons' quality of life. The need for the development of such technologies and services increases due to the disabled individuals' desire to remain independent in their own homes, the increasing costs of health care, and the aging of the population. This article discusses the concept of secured door lock/unlock system for the differently able. The juxtaposition of safety vs. privacy can be alleviated with this technology. Moreover, as there is need to assist disabled to protect them from various forms of abuse, and prevent immoderation of pleasure giving activities.

Keywords- *Bluetooth Module, Android mobile, Atmega 328 microcontroller Duemilanove, Arduino-Commander App.*

I. INTRODUCTION

Day in day out --- it is becoming a very dangerous world out here - The kind of crimes.... the innovative methods adopted by the perpetrators and the vulnerability of the people particularly the differently able and the elderly who are alone at most of the times. When we thought about this an idea sparked – Why not use the same innovation for their safety? This project is one such attempt. Here we have tried to design a secured lock system which remains locked where the vulnerable person resides and can be opened using the trigger from the mobile phone of the person – after identification of the person.

II. EXISTING MODEL

The existing model basically consists of colour TFT LCD monitors unit with high definition CCD Camera. It is suitable for apartment, villa, and office building and so on.

It includes:

- Indoor units (monitors) and outdoor unit (camera). With built-in infrared lights, supports Night Vision (>2m).
- Hands free communication and inside intercom functions with 8 chord ringtones.
- Chrome/Brightness/Ring Volume can be adjusted.
- Button and interface (indoor unit): indicator, talk, monitor, unlock, inside the intercom, chrome, brightness, ring, melody, speaker, and microphone attached with LCD Monitor.
- The present systems have a camera/eye scope to view the person standing outside the door.
- The camera is not integrated with a lock or any kind of system to respond to the stimulus outside.
- Human interference is needed to respond to the stimulus. Hence there is a definite need to automate the system.

Fig 1. Existing Model

III. PROPOSED MODEL

We propose to automate the system with the help of an Arduino Board embedded with Zigbee/Bluetooth protocol Module. Zigbee uses the common radio bands with low power and low cost which ensures nominal price of the system at the end. The Arduino board is easily ineffaceable with mobile systems. This is possible only with a mobile version Android 2.3(Gingerbread OS) or higher.

A. Basic Circuit

The circuit shown provides a delayed visual indication when a door bell switch is pressed. In

addition, a DPDT switch can be moved from within the house which will light a lamp in the door bell switch. The lamp can illuminate the words "Please Wait" for anyone with walking difficulties.

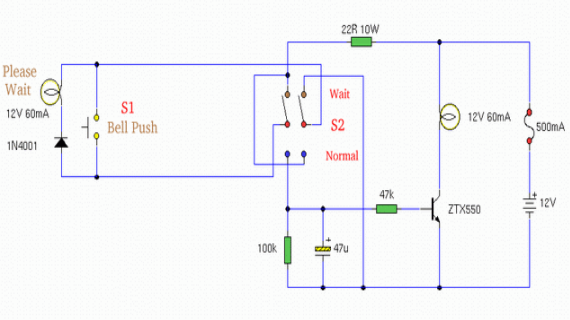

Fig 2. Basic Circuit Model

It works in the way described below:

- The circuit uses standard 2 wire doorbell cables or loudspeaker wire. In parallel with the doorbell switch, S1 is a 1N4001 diode and a 12 volt 60mA bulb. The bulb is optional, it may be useful for anyone who is slow to answer the door, all you need to do is flick a switch inside the house, and the bulb will illuminate a label saying Please Wait inside the doorbell switch or close to it.
- The double pole double throw switch sends the doorbell supply to the lamp; the 22 ohm resistor is there to reduce current flow, should the doorbell switch, S1 be pressed while the lamp is on. The resistor needs to be rated 10 watts, the 0.5 Amp fuse protects against short circuits.
- When S2 is in the up position (shown as brown contacts), this will illuminate the remote doorbell lamp.
- When down, (blue contacts) this is the normal position and will illuminate the lamp inside the house. Switch S1 will then charge the 47u capacitor and operate the transistor which lights the lamp. As a door bell switch is only pressed momentarily, then the charge on the capacitor decays slowly, resulting in the lamp being left on for several seconds. If a longer period is needed then the capacitor may be increased in value.

B. Three tier block diagram of the proposed model:

- Transmitter Circuit :

  The person is made to trigger the circuit using a doorbell and as soon as he presses it a LCD display placed above the door flashes as PLEASE WAIT and simultaneously a bulb inside the house(meant for the deaf person) gets switched off which is an indication to the disabled. The atmega 328 activates the camera placed on the eyepiece and captures the video and transmits to the Mobile with the help of Bluetooth module.

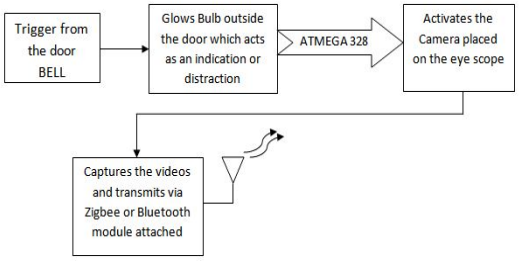

Fig 3. Block diagram of Transmitter Circuit

- Mobile Interface Receiver-Transmitter Circuit :

Due to the trigger, camera switches ON and there will be a live video streaming of the person standing outside the door. Now if the disabled knows the person he presses a button in the mobile that acts as elicit and opens the door. The trigger from the cell is done by an android application called Arduino Commander. This Arduino commander acts as an interface between the mobile phone and Atmega 328 microcontroller.

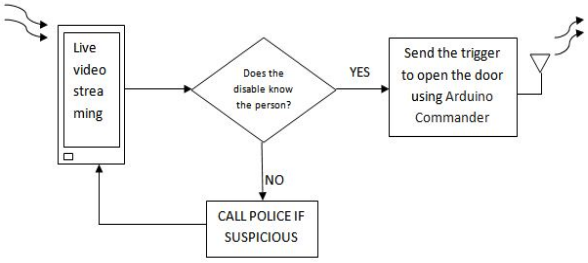

Fig 4. Block diagram of Mobile Interface Receiver-Transmitter Circuit

- Receiver Circuit :

  In this circuit the trigger is given by the disabled and is received by the atmega 328 microcontroller which is used for the relay coil is energize and it activates the servomotor which is attached to the door lock. The LCD display placed outside displays as “THE DOOR IS OPENING”. Simultaneously the door opens and it is programmed in such a way that the door opens for 10-15 sec and closes automatically. The time delay can be programmed for our convenience. If the person outside seems to be suspicious he can call the police. By this way the disabled is kept hoard.

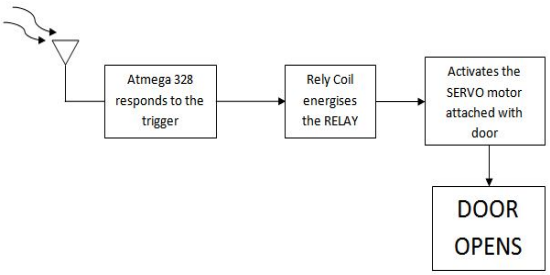

Fig 5. Block diagram of Receiver Circuit

IV. WORKING

A. Door Bell

A doorbell is a signalling device typically placed near an entry door to a building. When a visitor presses a button the bell rings inside the building, alerting the occupant to the presence of the visitor.

Fig 6. A Simple door bell trigger Circuit

B. Camera

A camera is a device that records images that can be stored directly, transmitted to another location, or both.

These images may be still photographs or moving images such as videos or movies. The term camera comes from the word camera obscura (Latin for "dark chamber"), an early mechanism for projecting images.

Fig 7. A door Camera

C. Bluetooth Module

Bluetooth, standardised as IEEE 802.15.1, is a wireless technology standard for exchanging data over short distances from fixed and mobile devices, creating personal area networks (PANs) with high levels of security.

It was created by telecom vendor Ericsson in 1994.

Fig 8. Bluetooth Module

D. ATMEGA 328

Here we use an atmega 328 micro controller for controlling the opening and closing of the door. The high-performance Atmel 8-bit AVR RISC-based microcontroller combines 32KB ISP flash memory with read-while-write capabilities, 1KB EEPROM, 2KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers.

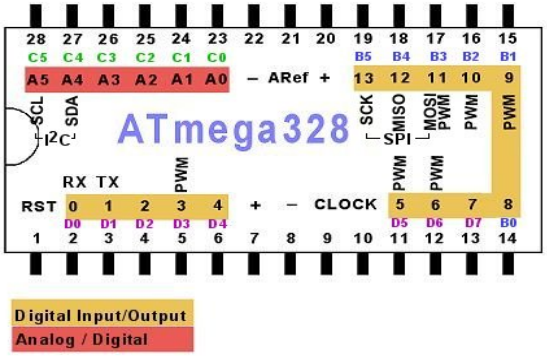

Fig9. Atmega 328 pin out

There are totally 32 pins in the circuit and has 4 ports.

E. Android mobile

Android is a Linux-based operating system designed primarily for touch screen mobile devices such as smart phones and tablet computers. Initially developed by Android, Inc., which Google backed financially and later purchased in 2005, Android was unveiled in 2007 along with the founding of the Open Handset Alliance.

Fig 7. Android Mobile with Camera

F. Arduino-Commander App:

We can control our Arduino board from our Android device over Bluetooth, Ethernet or USB (Diecimila, Duemilanove, Uno r1/r2/r3, Mega, Leonardo, Nano) using WYSIWYG interface, Android sensors or JavaScript script.

Fig 11. Servo motor control using the app (a snapshot)

G. Relay Circuit

A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism mechanically, but other operating principles are also used. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal.

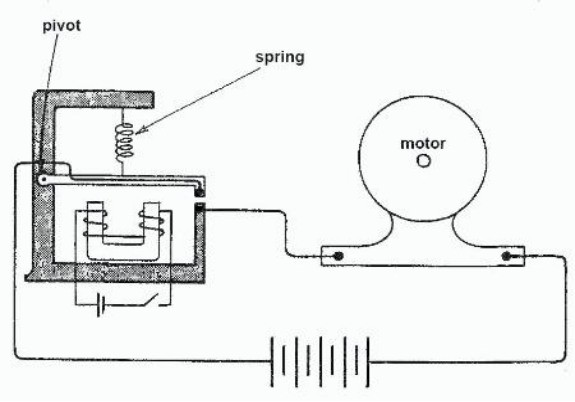

Fig 12. A simple relay

H. Servo Motor Control

A servomotor is a rotary actuator that allows for precise control of angular position. It consists of a motor coupled to a sensor for position feedback, through a reduction gearbox. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors. Servomotors are used in applications such as robotics, CNC machinery or automated manufacturing.

Fig13. Servo Motor

V. ADVANTAGES

1. It is the most secured system by eliminating the earlier flaws.
2. It is relatively cost effective as compared to its benefit.
3. Youngsters are tension free as the system fully safeguards the security of the elders.
4. Elders can live a free and relaxed life.

VI. CONCLUSION

- This paper deals with the introduction of a doorbell for the differently ambled.
- As most of the middle class are employed the disabled are in a very precarious condition and they need attention.
- Hence this would greatly increase the Quality Of Life of the disabled.
- Here a centralized control station can be used to control the whole system.
- This system would greatly aid in doing all the above.

ACKNOWLEDGMENT

We sincerely thank our parents and teachers for their constant motivation and support. We highly obliged to Mr. K.MADANAMOHAN (AP – III), Dept of Electronics and Instrumentation, Sri Sai Ram Engineering College for guiding us throughout this project.

REFERENCES

[1] http://english.cxem.net/home/home74.php.

[2] http://arduinocommander.blogspot.in/.

[3] www.zen.22142.zen.co.uk.

[4] http://en.wikipedia.org/wiki/Differently_abled.

[5] Servo Motors and Industrial Control Theory, by Riazollah Firoozian.

[6] Usb Complete, by Jan Axelson.

[7] http://www.satsleuth.com/schematics.htm

◈◈◈