

## DESIGN AND IMPLEMENTATION OF A CENTRAL INTELLIGENCE SYSTEM USING COUNTER SENSING

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**Abstract-** Electricity is a very important element of life and environment is being wasted in many ways. It is often seen that electricity is wasted for oblivion to close the switch. It can be reduced by controlling the switch automatically by central intelligence system. The idea of central intelligence system is about the new generation of homes automation, smart homes which are actually ordinary homes turned extra ordinary using the latest technology. A smart home is nearly automated that ensures safety, security and comfort for everyone under its roof by utilizing advance and complex technologies to make easier and simpler life. The main aim of the study is to design a central intelligence system and apply it to a model environment by counter sensing system. The total system worked successfully and it was able to minimize the electricity usage with minor gaffes. It can be used in offices and industrial purposes with some modification in the circuit designing to improve its operation.

**Keywords:** Central Intelligence, Counter Sensing, Interfacing, Rack and Pinion.

### 1. INTRODUCTION

Central intelligence system which means the automatically opening the door, auto switching of lights, fans of a room and counting the number of peoples shows by LCD display in the room. The system has an output from counter sensor which tells microcontroller the existence of peoples. Then microcontroller sends the response of the sensor to fan controller, light controller & LCD display to show the complete output. When any one enters into the room then fans, light will automatically on and display show the number of people in the room and when exits from the room then lights, fans will automatically switched off. It is one of the modern automation.

Electricity is a very important element of life and environment. But electricity is wasted in many ways. It is often seen that electricity is wasted for forgotten to closing the switch. It can be reduced by controlling the switch automatically as using counter sensor. Besides that it reduces the human efforts in many ways. It is also convenient hygienic and efficient to avoid bacteria mutual infections. A counter is a device which stores (and sometimes displays) the number of times a particular event or process has occurred, often in relationship to a clock signal. Normally it is used in the garments sector where a lot of employee is worked. Then manually counting is so much hard, to reduce this difficulties digital counting was developed [1].

The automatic switching of light, fan and counting on LCD display proposed in the whole world from several years ago,

America, Canada, French, Japan and China are controlled fan, light and counting on display from a long time ago [2].

Warner H. Wakaumi, 1992, [3] reported that the fan, light controller disclosed here in this particularly useful in cooling of electronic equipment and provides a feedback control characteristics form an exhaust air temperature sensor such that the change in outer temperature over the range of air flow rates is substantially equal to the change in temperature.

In very first St.meld1998, [4] described that a drive circuit for switching automatically fan comprises an actuating circuit, a counter control circuit and a current control circuit. The actuating circuit has a hall of IC to control two transistors in a state connecting and in a state of disconnecting sequentially so as to alternately magnetize two coils connecting to the connecting to the two transistors respectively.

G Demiris, 2004, [5] then working in the RCA laboratories on the effect discovered by Williams achieved the switching of colors by field-induced realignment of dichotic dyes in a home tropically oriented liquid crystal. Practical problems with this new electro-optical effect made Heilmeier continue to work on scattering effects in liquid crystals and finally the achievement of the first operational liquid crystal display based on what he called the dynamic scattering mode (DSM). Application of a voltage to a DSM display switches the initially clear transparent liquid crystal layer into a milky turbid state. DSM displays could be operated in Tran's missive and in reflective mode but they required a considerable current to flow for their operation. George H. Heilmeier was inducted in the National Inventors Hall of Fame and credited with the invention of LCD.

A relay is an electrical switch that opens and closes

under the control of another electrical circuit. In the original form, the switch is operated by an electromagnet to open or close one or many set of contacts. It was invented by Joseph Henry in 1835. Because a relay is able to control an output circuit of higher power than the input circuit, it can be considered to be, in a broad sense, a form of an electrical amplifier. A microcontroller(also microcontroller unit, MCU or  $\mu C$ ) is a small computer on a single integrated circuit consisting a relatively simple CPU combined with support functions such as a crystal oscillator, timers, watchdog, serial and analog I/O etc. Program memory in the form of NOR flash or OTPROM is also often included on chip, as well as a, typically small, read/write memory. Microcontrollers are designed for small applications, simplicity is emphasized. Some microcontrollers may operate at clock frequencies as low as 32 kHz, as this is adequate for many typical applications, enabling low power consumption (mill watts or microwatts). They will generally have the ability to retain functionality while waiting for an event such as a button press or other interrupt; power consumption while sleeping (CPU clock and most peripherals off) may be just nano watts, making many of them well suited for long lasting battery applications [6]. Microcontrollers are used in automatically controlled products and devices, such as automobile engine control systems, remote controls, office machines, appliances, power tools and toys. A counter sensor which responds to the quantity measured by giving as its output signal which is related to the existence of any people in the room, an IC (indignation circuit) is a counter sensor. The input is the sensor is the number of people the output voltage which is related to it [7].

A signal controller such a microcontroller takes the signal from the counter sensor and multiples it into a condition which is suitable for either display or in case of control system, then microcontroller sends the signal to the fan controller which control the light and fan and another signal from microcontroller is gone to the LCD display which counts the actual number of people in the room [8].

And this is for controlling lights, sensors circuit is so sensitive in light control system, that mean any external noise or any small variation in voltage will change the sensors circuit status. While these signals are changing due to these reasons, microcontroller will assume that some one pass in front of sensor and so a fault will occur. in order to solve this problem i have used soft and hard components “capacitors” to make light control system stable as much as possible.

## 2. DESIGN AND FABRICATION

### 2.1 Description

The Sensors PCW-TB06 is a battery powered people counter with 418MHz RF wireless data transmitter. Truly wireless installation drastically reduces installation cost. This system can often be installed in less than 10 minutes. Choose from side firing(S suffix for doorway mounting) or front firing (suffix for hallway mounting) as shown below. This sensor consists of two parts (IR transmitter and receiver) and are mounted on opposite sides of an entry or hallway to monitor traffic as the IR beams are

broken. When used with an optional PCW-SSRX Sensor Server, data can be collected on a central PC from one or more sensors and multiple facilities. Applications for these sensors may include but are not limited to: Retail Stores, malls, libraries, hotels and restaurants.

### 2.2 Block Diagram Presentation

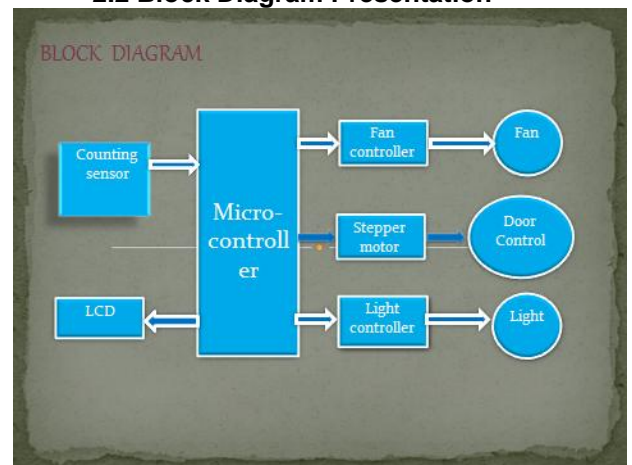


Fig.1: Block Diagram

The goal is to count the number of people that pass through a doorway. We set up a break-beam sensor so that a person passing through the doorway will break the infrared beam. This program keeps track of the number of times that a beam is broken and adds one to a counter variable every time. The beam is either 'steady' or 'interrupt' ed. The program uses a simple two-state machine. It is either waiting for someone to break the beam by entering the doorway, or for the beam to return to 'steady' indicating that the person has passed through. When the beam returns to steady, the program adds one to the counter variable.

A signal controller such a microcontroller takes the signal from the counter sensor and multiples it into a condition which is suitable for either display or in case of control system, then microcontroller sends the signal to the fan controller and light controller which control the light and fan and another signal from microcontroller is actual number of people in the room.

### 2.4 Circuit Diagram Presentation

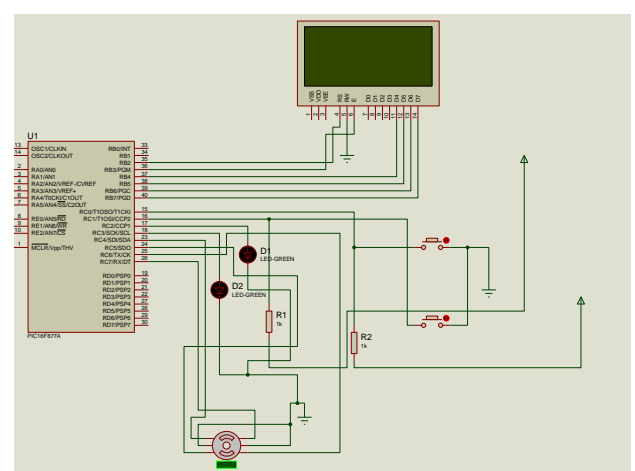


Fig. 2:Circuit diagram

The system block circuit diagram of this project is shown in Figure. For beginning, interface circuit between PIC 16F877, LCD and keypad is built. Micro C and proteus software brings an ease of software development previously unseen in the 8-bit micro controller. This software allowing editing source files in assembly language. Assembly language is a set of rules used in writing a program of PIC and the assembler is as a translator for assembly language into a machine language (hexadecimal). The ability to use micro C and proteus with multiple debugging tools allows users to easily switch from the cost effective simulator to a full-featured emulator with minimal retraining.

### 3. PROJECT SET UP

This simple state machine for a door has two states -Clear and Blocked. The doors "clear" when no one is in the doorway. It is "blocked" when someone is passing through (or standing in) the doorway. The doorway has a break-beam sensor, which indicates "door Clear= true" or "door Block = true".

When the door is in the Clear state, and the sensor door Clear is true, then it stays in the Clear state (the leftmost arrow-loop). When the door is in the Clear state and the door get blocked ("door Block = "true", the bottom arrow-loop), then the door goes into the Blocked state. As long as the door remains blocked ("door Block=true") then the door stays in the Blocked state. When the person finally moves on, and the sensor door Clear becomes true again, the machine goes back to the Clear state (upper arrow-loop), and bumps up the counter by one.

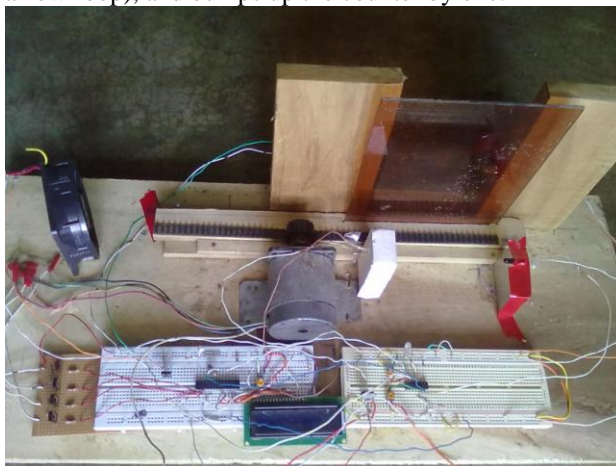


Fig.3 :Experimental Setup

### 4. CONTROLLING OF PROJECT

This project "Automatic Room Controller with Visitor Counter Using Microcontroller" is a reliable circuit that takes over the task of controlling the room lights as well as counting number of persons/visitors in the room very accurately. When somebody enters into the room then the counter sensor is incremented by one and the light in the room will be switch ON and when any one leaves the room then the counter is decremented by one. The light will be only switched OFF until all the persons in the room go out. The total number of persons inside the room is also displayed on the segment displays.

The microcontroller does the above job. It receives the signals from the sensors, and this signal is operated under

the control of software which is stored in ROM. Microcontroller 16F877A continuously monitor the infrared receivers, when any object pass through the IR receiver's then the IR rays falling on the receivers are obstructed, this obstruction is sensed by the Microcontroller.

### 6. RESULT AND DISCUSSION

By the use of this system we can save our valuable electricity energy, where electricity crisis is a common problem in our country. By done this project I gain a lot of knowledge about sensors, microcontroller, which is very helpful in modern automation. Also clear idea about various electronics elements and their uses & properties. This is very much comfortable for human beings where my project will reduce the effort of works of human beings. Exact counting will be maintained properly in where manually is very much hard

### 7. CONCLUSION

Smart homes are a natural extension of current electronic, information and communication technologies. The concept refers mainly to comfort, leisure and healthcare. However, the last 20 years of development have failed to achieve anticipated results. Demand has been slack, and the supply of smart home technologies is too low. The main objective of this project has been to identify those areas where progress has been recorded. Central intelligence system is very simple but by using this in our house hold work we can save our energy. In industry where a lot of fan and light are kept on without any needed, and we can count exact number of employees, so there is no possibility of unfairness in the industry and garments is well. Automatic opening and closing the door is a symbol of royalty and by this we can reduce the manpower to the gate.

### 8. ACKNOWLEDGEMENT

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### 9. REFERENCES

1. Griffiths, Melanie, "Smart Home Security", *Homebuilding & Renovating*, Retrieved 27 February 2012.
2. George Anogianakis, *Advancement of assistive technology*, IOS Press, 1997.
3. H. Wakaumi, K. Nakamura, T. Matsumura, Development of an automated wheelchair guided by a magnetic ferrite marker lane, *J. Rehabil. Res. Dev.* 29 (1) (1992), page 27-34.
4. St.meld 34 Handlingsplan for eldreomsorgen 1998-2001(Norwegian only)(White paper no 34: The Action plan for the care of the elderly 1998-2001)
5. G. Demiris, Electronic home healthcare: concepts and challenges, *Int. J. Electr. Healthcare* 1 (1) (2004), page 4-16.
6. M. Cooper, D. Keating, Implications of the emerging homesystems technologies for

- rehabilitation, Med. Eng. Phys. 18 (3) (1996), page 176–180.
7. R.A. Brooks, “The intelligent room project: cognitive technology”, in Proceedings of the 2<sup>nd</sup> International Cognitive Technology Conference, Aizu, Wakamatsu, Japan, 1997, pp. 271-278.
  8. I.S. Mckenzie, The 8051 Microcontroller, Prentice Hall, Upper Saddler River, NJ, 1999.