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Automated Bathroom Safety System Especially for Elders

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ABSTRACT
The growth of the current modern medical industry has increased the human life's lifespan. Even though it's a happy topic most of the elderly do not have fits due to bad food habits and lack of adequate physical work. Many of these falls into the bathroom/toilet, falling due to slippery, strokes, fainting with a few physical disorders and sometimes inhale of sewer gases. Even if such events happen to someone lonely or when others do not know the immediate effect of the accident, they also have serious injured or even deaths at times. This is a very sad thing in a period that is growing in the field of science. The automated bathroom safety system especially for elders (BASS) is a simple solution for above mentioned situation. The main purpose of this is to protect and rescue the victim from the accident by using of the microcontroller, GSM module, and sensors.

KEY WORDS: *Food habits, Slippery, Fainting, Sewer gas, Protect and Rescue, Victim*

I. INTRODUCTION

Now the population growth and medical growth in the world are growing fast. This increases the lives of the average life period and the number of elder people increases. Generally, people who are at the age of 40 are subject to various physical illnesses by various factors such as changing food habits and the lack of physical work. Even if they can go to the bathroom/toilet-like places, sometimes they fall and fall for a various reason like slippery, fainting and sometimes inhale of sewer gases. It is not seen by others immediately at home and it is not possible for people to come to the house alone when it comes to such events. Further it is not easy to open the door which is already lock inside makes delay for him in rescuing, sometimes inability of others immediately notice leads to serious injure, blood loss, and in some cases, loss of life, we know about the such things member Accounting, either through friends or through the media often hear. They can save these situations from the greater damage by handling them quickly. The bathroom safety system is a simple solution for above mentioned situation. This is an automation system. We see this system and its processing in detail in this journal.

II. PROPOSED DESIGN:

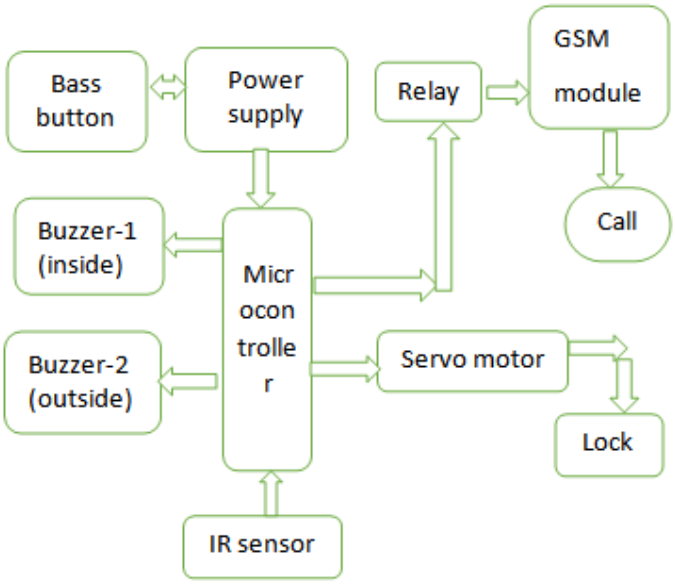


Fig 1: Functional block diagram of Microcontroller unit

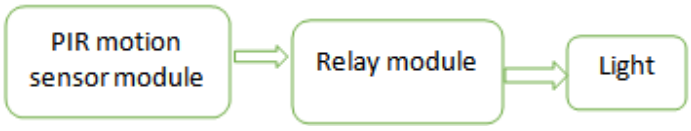


Fig2: Block diagram of Light operation system

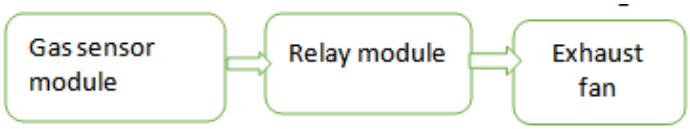


Fig3: Block diagram of Exhaust fan operating system

A. MICROCONTROLLER:

The Arduino Uno microcontroller board based on the AT mega 328. It has a 14-digital input /output pins (of which 6 can be used as PWM outputs),6 analogue inputs, a16 MHz crystal oscillator, a USB connection a power Jack, an ICSP header and reset button. It contains everything needed to support microcontroller simply connect it to a computer with a USB cable or power it with AC to DC adaptor or battery to get started. The recommended input voltage is 7_9V. Its flash memory is 32 KB it has 2KB SRAM and 1KB EEPROM. Its clock speed is 16MHz.

B. IR SENSOR:

IR Infrared Obstacle Avoidance Sensor Module has a couple of infrared transmitting and getting tubes. At the point when the transmitted light waves are mirrored, the reflected IR waves will be gotten by the beneficiary cylinder. The installed comparator hardware does the handling and the green pointer LED wakes up.

The module includes a 3-wire interface with Vcc, GND and an OUTPUT stick on its tail. It works fine with 3.3 to 5V levels. Upon block/reflectance, the yield stick gives out a computerized flag (a low-level flag). The installed present fines tune the scope of task, compelling separation run is 2cm to 80cm.

C. PIR MOTION SENSOR:

The PIR movement sensor is perfect to distinguish development. PIR mean "Detached Infrared". Fundamentally, the PIR movement sensor estimates infrared light from articles in its field of view.

Thus, it can distinguish movement dependent on changes in infrared light in the earth. It is perfect to identify if a human has moved in or out of the sensor run. The sensor has two worked in potentiometers to alter the postpone time and the affectability.

D. SERVO MOTOR:

Servo Motor SG 90 is tiny and lightweight with high output power. This servo can rotate approximately 180 degrees (90 in which direction) and works just like the standard kinds but smaller. We can use any server code, hardware or library to control these servos. Its operating voltage is 5v. Its operating speed is 0. 1s/60 degree and it's torque 1. 8kg. cm. BSG 90 micro Servo Motor has 3 wire interfaces in which that connections should made as follows.

- Red wire. _5V
- Brown wire _ Ground
- Yellow wire. _ Digital pin

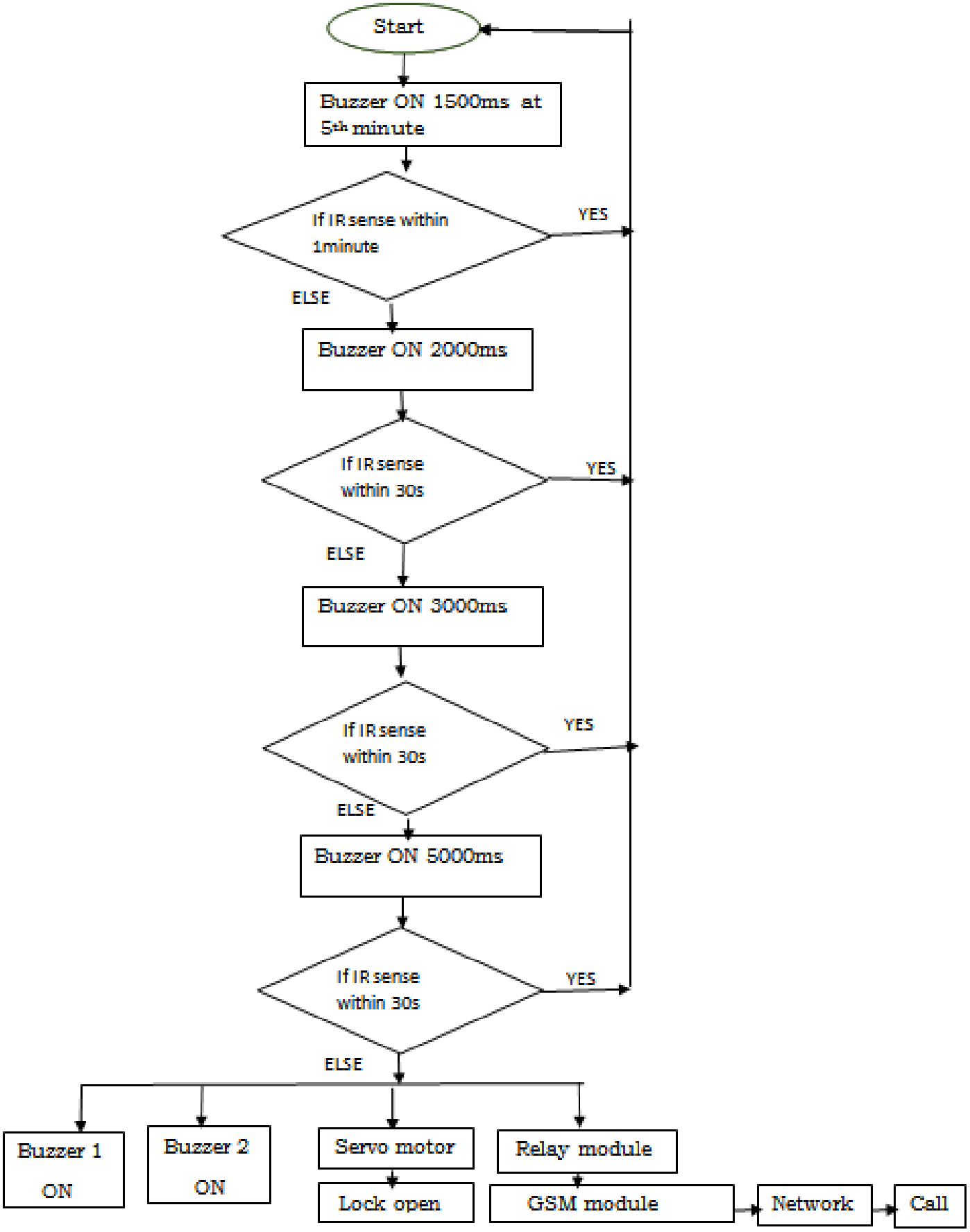
E. GSM MODULE:

The GSM/GPRS Modem-RS232, is worked with Dual Band GSM/GPRS motor SIM900A; chips away at frequencies 900/1800 MHz Best suited for GSM based Microcontroller Projects. Choice for interfacing MIC and SPEAKER specifically to GSM MODEM for calls.

F. GAS SENSOR MODULE:

The conductivity of gas sensor is low in clean air. When the target combustible gas exists, the sensor conductivity is higher along with the gas concentration rising. MQ135 gas sensor has high sensitivity for ammonia, sulphide gases and sensitive to smoke and other harmful gases.

III. WORKING PRINCIPLE:



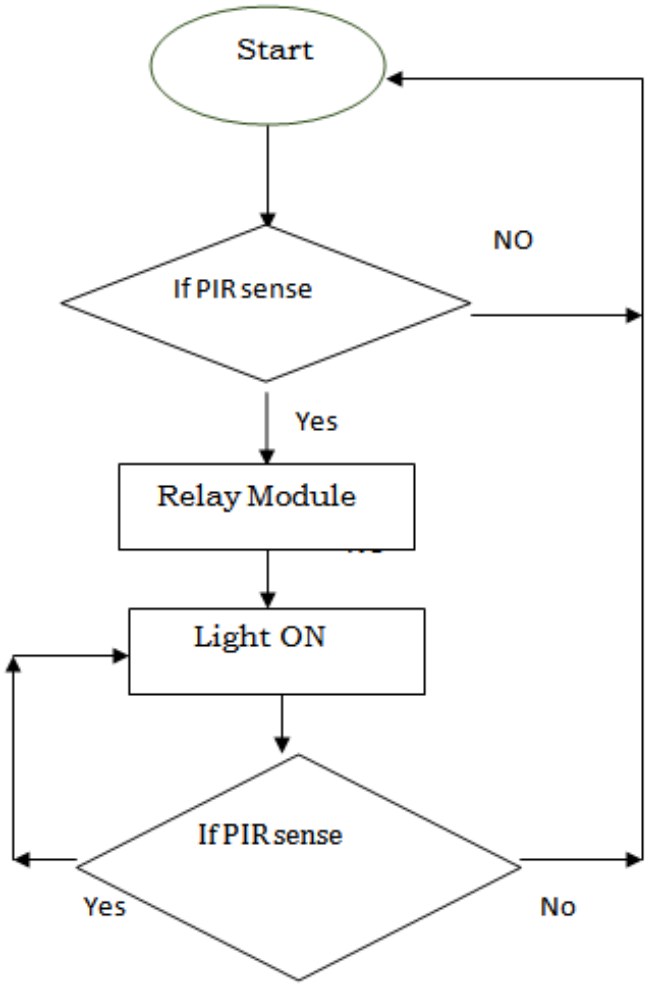


Fig5: Flow chart of switching the Light

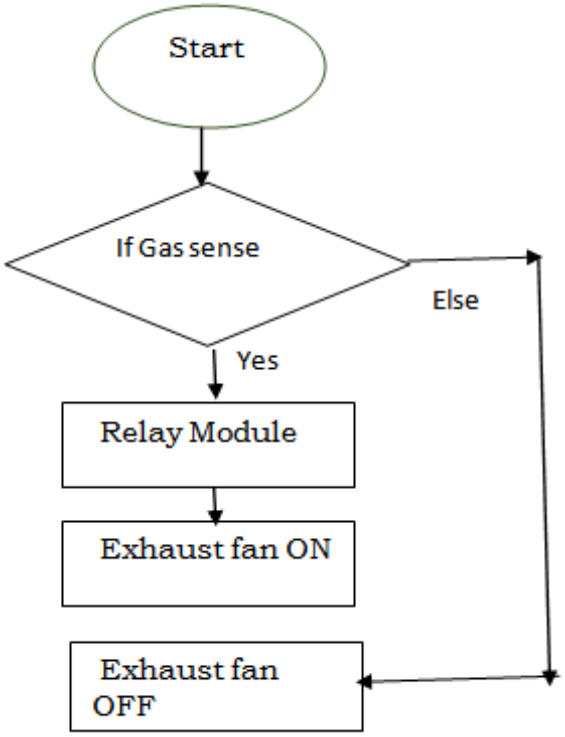


Fig6: Flow chart of switching the Exhaust fan

This system has a BASS Button outside the Bathroom/Toilet. Once the button is turned on, the system will begin to operate on the microcontroller. Once the room door is opened, the proximity sensor is sensible and immediately becomes light on. Beep sound will sound at 1500 ms in the first fifth minute since the system is turned on. The beep sound will be moulded by the IR sensor in the room and then you must make some small movements in front of it. For example, you can shake your hand in front of it. This sensor is designed to be easily understood by the person inside the room where there is no little trouble. Once the sense is turned, the system will reset, and the Beep Sound will sound again after 5 minutes. You can still follow the earlier practices. Perhaps If the sensor is not sense, the Beep Sound will sound 2000ms in the next one minute. If the IR sensor is not in the meantime, the next 30th second beep sound will sound 3000 ms again. If the sensor is not in the interval, then the 5000ms beep sound will sound from the next thirty seconds. If the IR sensor does not sense that time, the buzzer outside the room will continue to sound continuous until the BASS button is turned off. The lock inside the room will automatically unlock by servo motor. Calling a cell phone number already registered by GSM module. This phone call can be understood by what he can do and take immediate action to recover the victim. Otherwise, when he comes out of the bathroom as normal, Microcontroller kit will stop its function after pressing the bass button. The light turns off in the next 5th minute because he does not sense by the PIR sensor when he comes out of the room. Whenever the gas sensor sense sewer gases like ammonia, hydrogen sulphide and some other harmful gases in bathroom/toilet then automatically turn on the exhaust fan or buzzer (when it runs in battery power).

IV. FEATURES:

- It has a battery, whenever power supply cut it automatically runs in battery power.
- It is also used in bathroom/toilets of Railway, Hotels and public.
- The use of the sensitive voice recognition sensor instead of the IR sensor on this BASS system can make its application simpler.
- By making small changes to this BASS system home, shop and industries can be converted into an automated safety system.
- It is also shock resist and water proof.

V. CONCLUSION:

By using this BASS device, elder people or those who suffer from some health problem may be able to save them from sever accidental injuries when they go into the toilet/bathroom. More importantly, this system may be able to make the victim to treat the victim as soon as possible through the automatic phone call, even if the person lives lonely. With the help of low cost, good, performance, easy to handle, this can be done in every home, with the health and mental health of the elderly and well-being of those affected by the bathroom/toilet fear.

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