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Smart Home Security and Safety System using Bluetooth spp pro Module

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ABSTRACT: Home security has been a major issue where crime is increasing and everybody wants to take proper measures to prevent intrusion. In addition, there is a need to automate home so that the user can take the advantage of technological advancement. The aim of this paper is to design and implement a home security system using Bluetooth module. The system is designed to detect burglary, leaking of gas, smoke, increase in temperature. On detecting any above actions, it activates buzzer and sends an alert message to owner specified mobile and provides an alert to surroundings. If there is an increase in temperature, fan rotates automatically. This whole process is controlled by an android application- Bluetooth spp pro. The user can enable or disable the sensors with the Bluetooth spp pro application which is connected through Bluetooth module.

KEYWORDS: Android, Bluetooth, Security, Sensors.

I. INTRODUCTION

Home automation is a general term that covers a variety of technological capabilities that can be installed in the home. Home automation can include controlling aspects of home remotely through a computer or phone, programming electronic devices to respond automatically to certain conditions or scenarios, or centralizing the control of a variety of items in the home into a single control centre.

Controlling

One of the applications of home automation is detecting an increase in temperature. An increase in temperature can be automatically controlled by running the fan.

Maintenance

Not only does home automation make our home more efficient and easier to operate, it can also help us to keep it maintained. Appliances can be connected to devices that monitor their activity; so a self-monitoring furnace, for example, can tell when it needs cleaning, and an air-conditioner can report that it needs a new filter.

Home Security Package

Burglar alarms, fire alarms and surveillance cameras are the most common home security devices. The devices in the home security systems package will be connected through a central control panel. It will work based on the telephone line and contact the cops if the alarm is triggered. Motion detectors will be fit in various parts of the house. Security cameras will also be put in the appropriate places. Siren unit will be placed in one place and the digital keypad will be placed near the entrance. All the door and windows will have magnetic sensors.

Advantages of Wireless Home Security System

Wired home security systems work using the telephone line. So if the telephone line is cut off, their main control panel will not work. Wireless systems do not have this problem. They can just be connected to power. If they have proper battery backup they will work even during power outages.

What can home automation do?

Home automation can:

- Increase your independence and give you greater control of your home environment.
- Save you time and effort.
- Improve your personal safety.

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- Reduce your heating and cooling costs.
- Increase your home's energy efficiency.
- Alert you audibly and visually to emergency situations.
- Allow you to monitor your home while you are away.

The Primary Elements of a Home Automation System:

- The operating system (for example, a computer, security system, a telephone or electricity).
- The device being operated (for example, a light or furnace)
- The interface, or link, between the user and the device. An interface can be a button, a keypad, a motion sensor and so on. For example, a thermostat equipped with a computer chip can be controlled by an interface such as a push button, which sends a signal to the furnace to adjust the temperature for different times of the day and night.
- The system is designed to detect burglary, leaking of harmful gas; smoke caused due to fire and after detecting suspicious activity.
- The whole process is controlled by an android cell phone application.

How can we control them?

There are two types of controls i.e., Remote control and automatic control.

- Remote control
  Remote control gives you the convenience of controlling lighting, appliances, security systems and consumer electronics from wherever you happen to be at the time, like your couch, car or even in your bed. There are several different "methods" of controlling devices remotely.
- Automatic control
  Automatic control adds even more convenience by making things happen automatically, without any effort being necessary. Examples include having your lights turn on at dusk and off at your desired time, having your whole home theatre turn on and tune to the desired station after one press of a button on your remote.

Advantages:

- Sensors used have high sensitivity and are easy to handle.
- Low power maintenance and low consumption.
- Can be easily modified for improving the setup and adding new features.
- Malfunctioning of single sensor will not affect the whole system.

The rest of the paper is organized as follows: section II gives the complete details about literature survey. The design and implementation of the proposed approach was completely illustrated in section III. Section IV gives the complete picture about the results and finally section V concludes the paper.

II. RELATED WORK

In this section, we will discuss about the information found by study and research that is critical and have an significant value in the input of the project. There are several methods have been proposed for development of home automation systems. This paper [1] focuses on the design and implementation of the smart home automation system using Bluetooth and infrared. Akash et al., reviewed on home based security and health control system using Raspberry Pi [2]. Persis Priyanka and Sudhakar Reddy discussed PIR based security home automation system with exclusive video transmission [3]. In this paper [4], based on all the systems surveyed and their advantages and drawbacks, it presents the features to be possessed by an ideal system for home automation with remote access. Jose et al., points out the shortcomings of existing home automation systems in identifying and preventing sophisticated intruders in a home environment[5]. In this paper[6], design and implement of a microcontroller based home security system with GSM technology have been presented and analyzed. In [7], home automation system interface is established through Bluetooth.

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III. PROPOSED SYSTEM AND IMPLEMENTAION

Our paper is aimed to develop a home based security system [8-10]which monitors intruders, smoke and fire. In any of the above mentioned cases, if any, activity is encountered; buzzer gets enabled and displays status messages on the LCD which is connected to the system. If any motion is detected or if smoke is encountered or if the temperature increases, the device detects, activates and sends an alert to user via Bluetooth application. An android application called Bluetooth spp pro is been installed in owner mobile through which sensors are enabled/disabled.

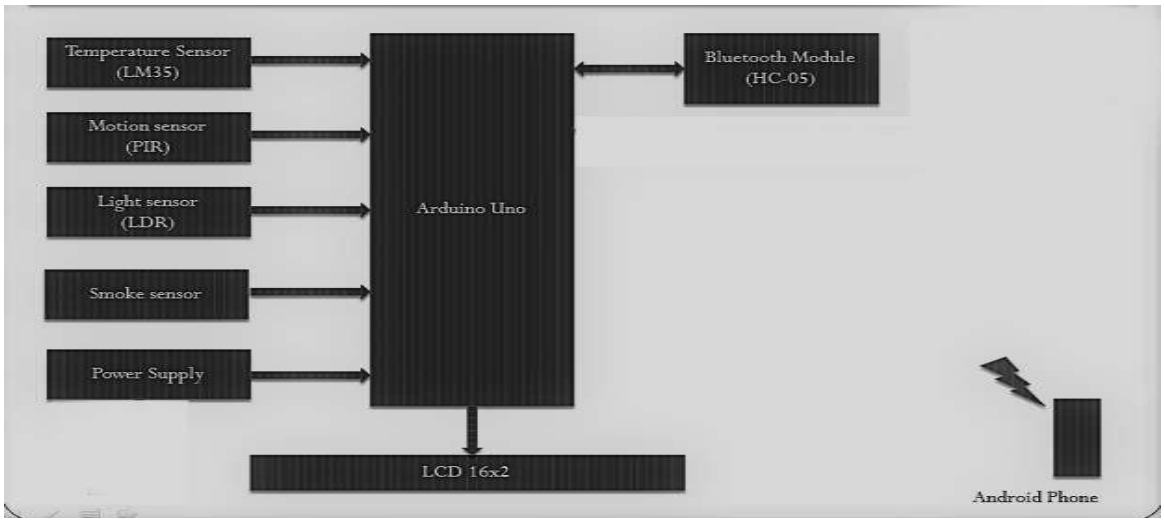

Figure 1: Block diagram

Block Diagram Description:

- Temperature Sensor is connected to the Analog port of the Arduino[11-15]. The output of the sensor is in linear form. The formula in the code converts the analog reading into the degrees Celsius.
- PIR sensor is Passive Infrared Sensor. It comes in a fully assembled package and is connected to the I/O pin of the Arduino. It is used for motion detection.
- Light Sensor is made to work using a LDR (Light Dependent Resistor), whose output is given to the analog port. The analog voltage is used to determine the day light intensity.
- Smoke sensor can be place in kitchens or in workshops to detect the gas leakage. The sensor is connected to the analog port.
- The LCD (Liquid Crystal Display) is connected to the I/O pins. LCD is used to display the real time data of the sensors.
- To monitor the status of the sensor the Bluetooth module (HC-05) is used and connected to the serial communication port of the microcontroller.
- The android phone has an application to communicate with other Bluetooth device. This type of software has been used to control the operation and monitor.

IV. RESULTS

This section gives the complete details about the results of the proposed approach. The operational description with pictorial representation is shown in this section. The overall design of the kit is shown below. It is having a Bluetooth module, fire and temperature sensors for power enhancement, and the load. Figure 2 shows the overall experimental setup of the system. Figure 3, Figure 4 and Figure 5 shows the experimental results.

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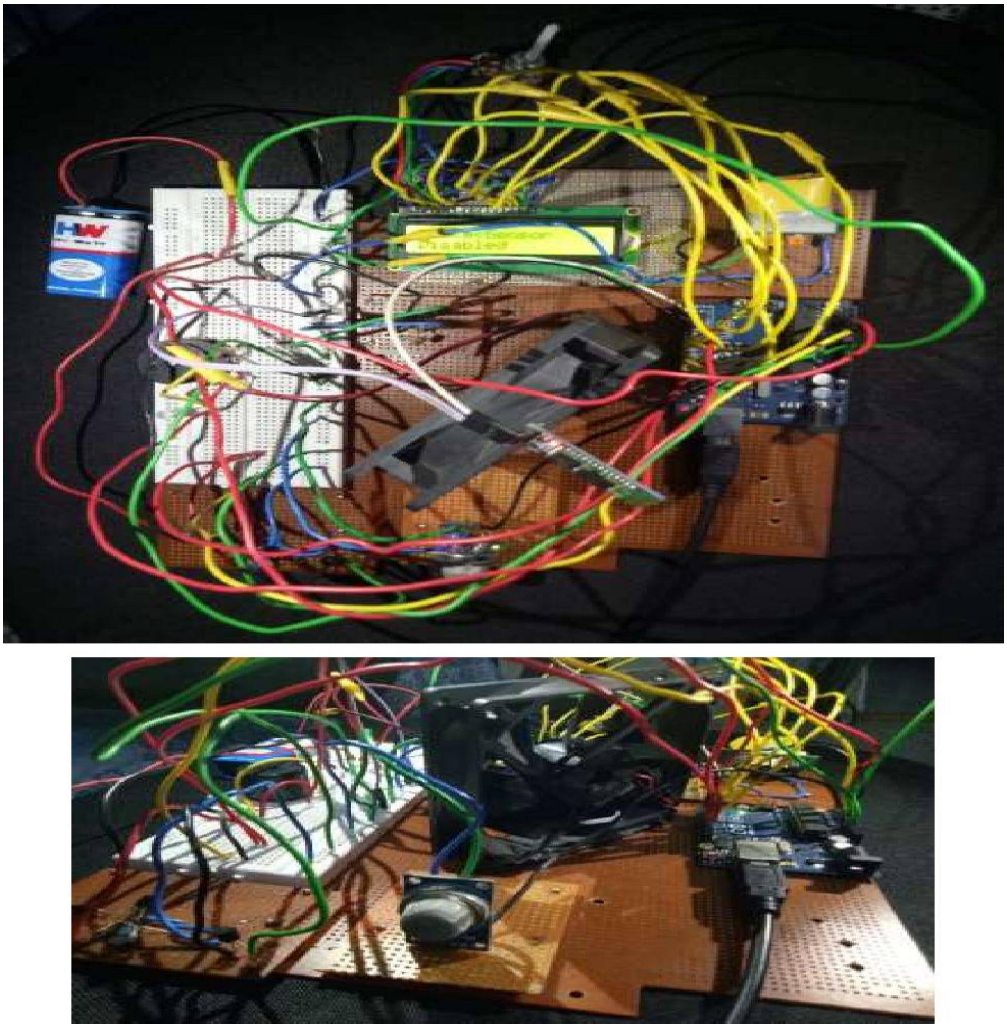

Figure 2 : Experimental setup of the system

The Figure 2 shows experimental setup of the Smart Home Security and Safety using Bluetooth. We have Bluetooth spp pro which act as a main controller of our system and small in size, is an open source and its supple platform for experimentation.

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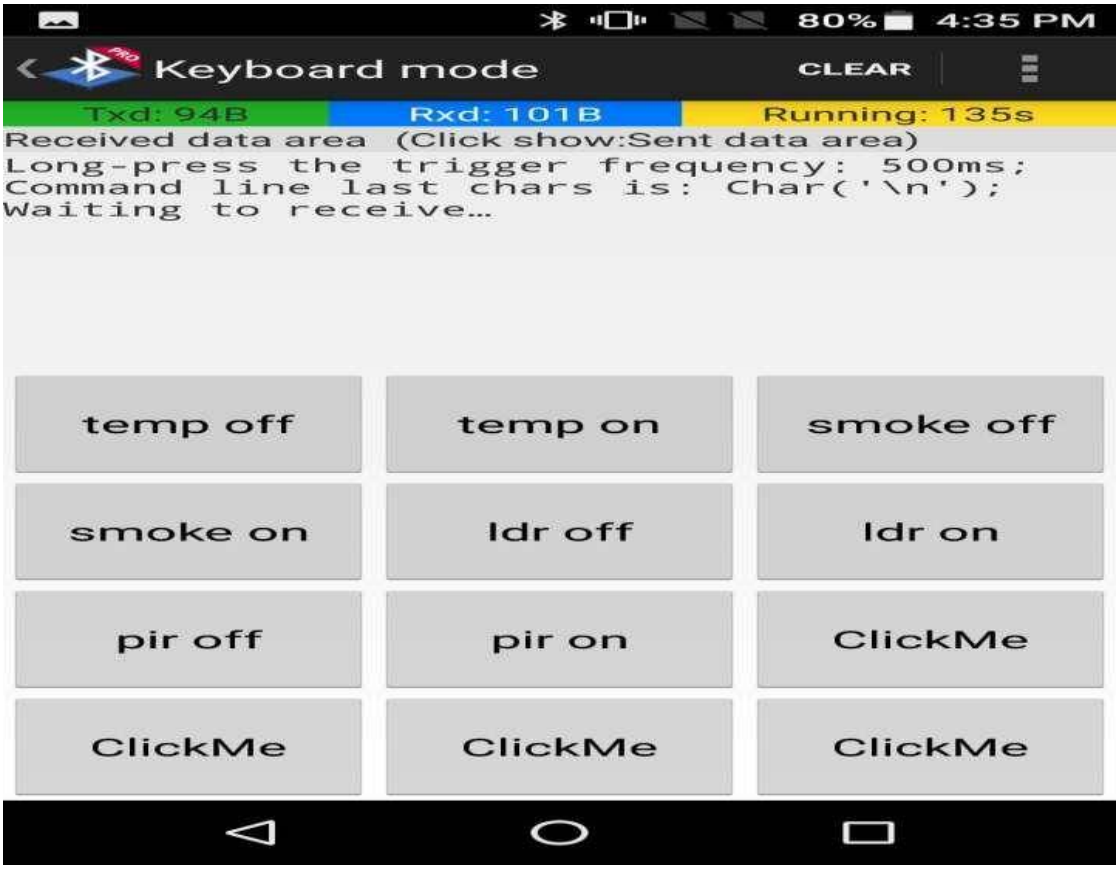

Figure 3: Android App

The android mobile has an application to communicate with Bluetooth ssp pro device as shown in Figure 3.

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Figure 4: Bluetooth connection

The figure 4 shows successful connection with Bluetooth ssp pro with other devices

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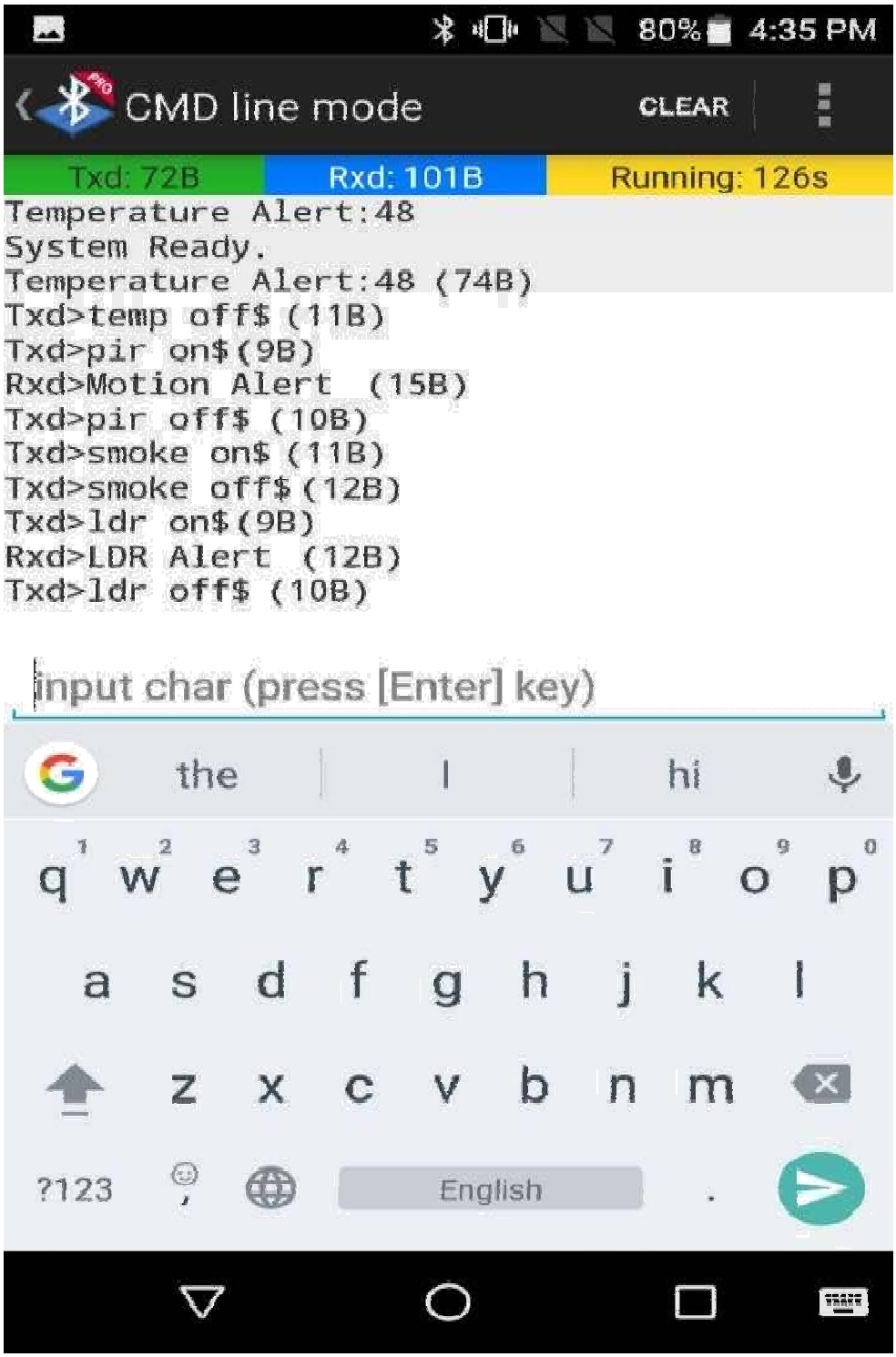

Figure 5: Enabling/ disabling of sensors

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The Figure 5 shows the Enabling and disabling of the sensors. The above snapshots was taken when there was violate in the door, so user can easily indentify where exactly there is contravene in the security system. i.e., (messages, notifications, recipients and email ID's etc.,)

V. CONCLUSION

The simulation Security is a big challenge everywhere because thefts are increasing day by day owing to the unsafe and insecure security systems in homes, and industries. Several conventional technologies are available to keep home properties safe. Our paper detects any suspicious activities like burglary, increases in temperature due to fire, smoke and activates the buzzer, sends an alert message to the user via Bluetooth application. The user can enable or disable the sensors using the android based mobile application- Bluetooth spp app.

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BIOGRAPHY

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