A REVIEW ON SMART HOME AUTOMATION SYSTEM

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ABSTRACT

The low cost and user-friendly remote in this paper using Arduino, the regulated home automation system is presented Board module for Bluetooth, smartphone, sensor for Ultrasound Sensor of moisture. In thesuggested application, a mobile app is used. A software that enables users to monitor up to 18 devices, including Home Appliances and Bluetooth technology sensors. Nowadays, the majority of traditional systems for home automation are Although the suggested system is a general system developed for particular purposes. There are more features to the suggested framework than Conventional devices for home automation, such as ultrasound, the sensor is used to detect the water level and the soil moisture sensor is used for the automatic irrigation method of plants. Also, this paper defines the system's hardware and software architecture, prospective work and scope. The suggested home prototype, the automation framework is implemented on hardware and tested as it has provided the exact and expected outcomes.

Keywords: Home Automation, Home Appliances, Arduino,Smartphone, Bluetooth, Wi-Fi.

I.   INTRODUCTION

The use of information technology in the home automation system is method of monitoring and control to eliminate human labor. The rapid development technology influences us to remotely use smartphones monitor the appliances in your house. The skill of automated devices is tofunction with flexibility, diligence and with the lowest rate of error. The design of a home automation system is a bigproblem for researchers and enterprises with home appliances. The automation method not only aims tominimize human labor, but it also helps to save time and resources. Early systems of home automation were used in labor-saving machines, but today their primary machines aim is to provide elderly and disabled people with facilities.To carry out their regular routine duties and regulate the home remotely the equipment. The Knowledge of Allied Industry (ABI) Research estimates that nearly l.5 million automatic homes are reported Equipment has been introduced in the United States of America (USA) In 2012, their rate of growth is 45.2 percent. Wireless in Different types of technologies focused on home automation systems such as ZigBee, Z-Wave, Global Framework for Mobile (GSM), GPRS (General Packet Radio Service), Infrared Radio Service Wi-Fi and Bluetooth are wireless fidelity (Wi-Fi) and as used, each technology has its own pros and cons. It is possible to introduce a wireless home automation system based on It's a low price and easy to build in an existing home. A Study work has shown that the Bluetooth device isfaster than wireless and GSM system. Bluetooth program is capable of serially transmitting data within a physical range ofup to 3 Mbps depending on the form of Bluetooth unit, 10mto 100m.

The approach proposed presents the specification and design and the method proposed Robust, low-cost and user- friendly home implementation Kit for automation using Bluetooth technology. The architecture of the proposed method is based on the Arduino board, the Bluetooth module, Sensors and software for smartphones. HC-06 Bluetooth module, the Arduino board is interconnected and home appliances are Connected via relay with the Arduino board. Smartphones The software is used for serial communication between the additional linked smartphone and Bluetooth module with the Arduino panel. The method proposed has the capacity not only to controls the appliances remotely, but it also tracks the sensors. Most traditional home automation systems nowadays are Built forthe elderly, people with disabilities or for any special intention. The approach suggested is not only acceptable forelderly people. People with disabilities, but it also offers a general reason. Kit for home automation, which can easily be implemented in existing residence. For the water level, an ultrasonic sensor is used for the soil moisture sensor is used for automatic detection and detection.

II.   LITERATURE SURVEY

Yadnya Adhiya et.al [1] have introduced the home is controlled through a Wireless home automation system. On input, the Arduino BT board is connected to appliances. Output ports controlled by a relay, the Arduino,

Bluetooth programmed. The board is built on the C language, which is a high-level interactive language. Bluetooth is being used to link the microcontrollers. Only approved users' access to the passcode area. The users have access to the appliances. For cellular networks, a Beta bond is established between the Arduino BT board as well as the smartphone. The python program is employed in this system, and it can be deployed on any Mobile OS environment, rendering it transportable. For getting feedback from the phone, which shows the device's state, one circuit is designed and executed. In [2] The system is designed and implemented employing Zigbee to regulate and manage the connected devices. System planners keep a record of carrier mobility and use it. This is achieved via a Wi-Fi connection, which utilizes a four basic Wi-Fi ADSL modern router. The network SSID and Wi-Fi security parameter are already configured. The information is first analyzed for safety purposes by the virtual home program, instead and re-encrypted and transmitted to the home's real network device after it has been declared safe. The Zigbee controller sends messages to the end over the Sensor nodes. The virtual home algorithm's safety and security of all messages it receives. GSM-based smart home is garnering attention because of cell devices and GPS module. Evaluates SMS-based home automation, GPRS-based home automation, and the dual frequencies (DTMF)-based home automation mainly for GSM communication [3]. The microcontroller examines all data and transforms them into instructions which the GSM module can comprehend. Depending on the instruction received by the GSM module, choose to use an appropriate form of communication from SMS, GPRS, or DTFC. The ADK is connected to the home appliances, and a link is established between the Android phone and the ADK. The household users are interconnected to the board's input/output ports (EMBEDDED SYSTEM), and their present state is transmitted to the ADK. The ATmega2560 microcontroller is used on board. It has a Standard USB host connection that's also based on the MAX3421e IC that may be used with Android devices in [4]. In [5] Smart Home using a cloud-based scheme involves the design and application of a host computer to gather data from household appliances and then send it to a cloud-based server computer to also be collected on Hadoop Distributed File System, that is filtered using MapReduce and used to enforce remote user required task.

III.   METHODOLOGY

HARDWARE ARCHITECTURE
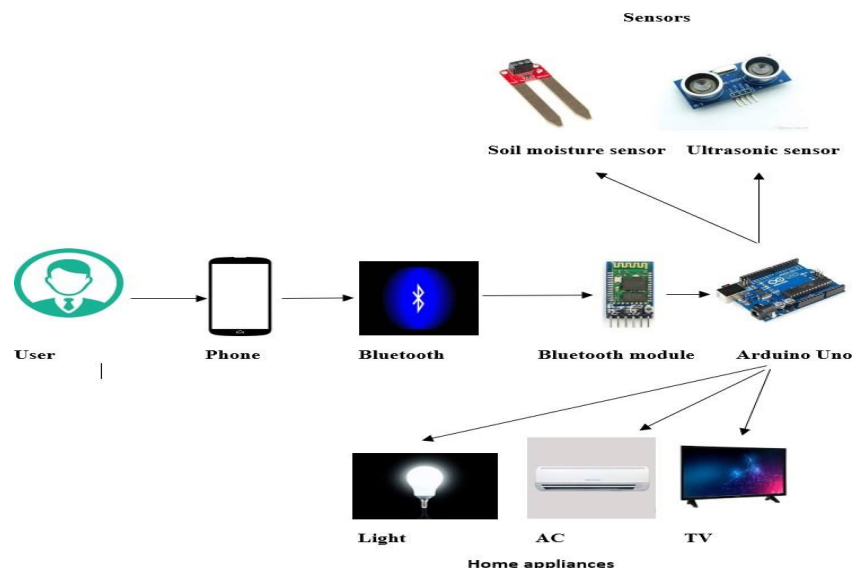
Figure 1: Block Diagram of Proposed Method

Smartphone, Arduino Board, and Hardware Modules Modulus for Bluetooth are all part of the planned home automation system. It connects with a smartphone through the use of a mobile app and a Bluetooth using Arduino board. In this research, the Bluetooth module HC 06 and 06 is employed for hardware execution on an Arduino Uno.
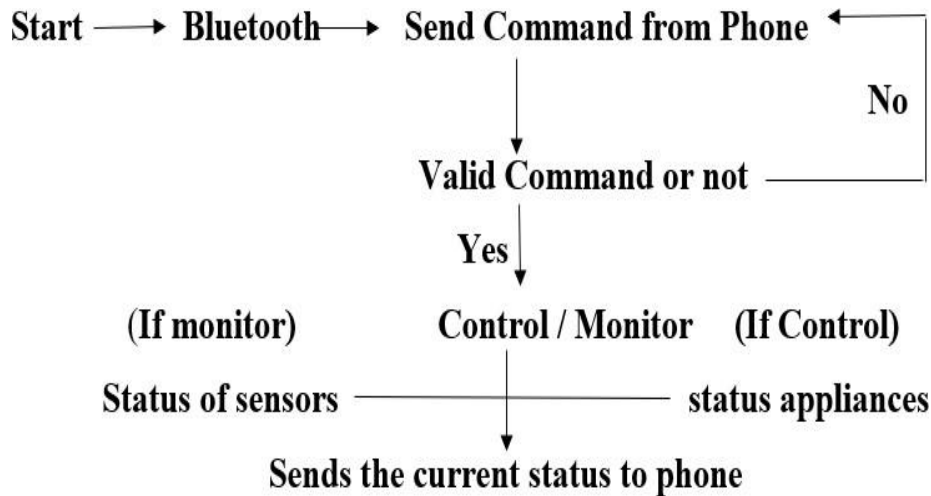
Figure 2: Representation of proposed home automation system

ARDUINO UNO

Arduino Uno is a microcontroller and open-source hardware. ATmega328P processor-based board. In Italian, theterm "uno" means "only" and was chosen to mark the initial release of Arduino Software. The ATmega328 on the board comes pre-programmed with a bootloader that enables new code to be imported. It's got 14 Digital input/outputand 6 pins of analog input and works at 5 Volts and frequency of a 16 MHz quartz crystal. It has a flash of 32 KB. RAM, 2 KB of SRAM and 1 KB of EEPROM.

BLUETOOTH MODULE HC-06

For wireless communication, the Bluetooth module HC- 06 is used between a smartphone and an Arduino Uno. HC-06 is a slave appliance and it can work at 3.6 to 6 volts of electricity. It's got 6 pins: State, RXD, TXD, GND, VCC andEN, respectively. For serial interaction link the TXD pin of theHC-06 Bluetooth Module to the RXD (pin 0) Arduino Uno and RXD Pin with Arduino Uno's TX (pin 1).

ULTRA SONIC RANGE SENSOR HC-SR04

It computes the gradient from a specific object via sonar. It has a broad object detecting distance of 2 cm to 400 cm (13 feet) with high accuracy. The HC- SR04 ultrasonic sensor utilizes SONAR to determine the location of an object. Ping relates to ultrasonic waves moving at 340 m/s that are transmitted to a input, and Echo velocity alludes to the sensing performance that is needed to assess range.

The water level inside the water tank is detected using an ultrasonic sensor in the future framework. Bluetooth Enabled to calculate the distance between the top of water tank and the flow depth, and then returns the data to a smart phone. For the first time, a floating plate would be used to improve water level prediction performance and provide better results than the traditional water level meter.

Table 1: Specification and limitation of HC-SR04

Parameter	Min	Typ.	Max	Unit
Operating Voltage	4.50	5.0	5.5	V
Quiescent Current	1.5	2	2.5	mA
Working Current	10	15	20	mA
Ultrasonic Frequency	-	40	-	kHz
Effectual Angle	0	15	-	Degree
Ranging Distance	2	400		cm
Trigger Input Pulse width	-	10	-	uS

SOIL MOISTURE SENSOR

The sensor for soil moisture is used to measure the quality of water and the soil inside. They are practically used in applications, such as System for science, farming and landscape irrigation. The Soil, humidity sensor has three GND, VCC and analog pins (AO). To the GND pin should be linked to the Arduino board interface, with field, 5-volt VCC and analog (AO) with analog (Analog) Arduino Board Input Screw. Soil moisture in the proposed technique, here sensor is used for the automatic irrigation system for plants and also transmit the water content measurement report to Users, so that they can track the value of water on their smartphone. Material from his application for a smartphone and will be further capable of turning on and off the supply of water for irrigation purposes.

SOFTWARE ARCHITECTURE

ARDUINO IDE

IDE stands for Environment of Integrated Growth. In the Arduino IDE tool, programming is done for the proposed framework. For serial time, the baud rate is set to 9600 bits per second. Arduino board and mobile interaction. To obtain an Arduino IDE instruction, "Serial. A variable 0" is used Serial data from the smartphone and the order Serial print. The Arduino board is used to serially transfer of data. The code for receiving serial data from your smartphone is given below.

```
int state;
    if(Serial.available() > 0) % checking for serial input
{

}
```

The state variable is used to store the value of the bytes and bytes obtained. It is then compared to distinct conditions and performs the Operation contextually. Arduino IDE code for ON and OFF switching the light is pictured below. Likewise, the state variable is compared to various conditions for more appliances to monitor.

```
if(state=='0') %condition check
    {
        Serial.println("Light On");
        digitalWrite(Light, High); %Turn on the light
    }
if(state=='1') %condition check
    {
        Serial.println("Light Off");
        digitalWrite(Light, Low); %Turn off the light
    }
```

BLUETOOTH TERMINAL APPLICATION

A smartphone software called Bluetooth (BT) easy for wireless communication between terminals, terminal is used for Arduino Board and smartphones. It is capable of transmitting ASCII data from the smartphone to the Arduino board serially using the Modulus for Bluetooth. ASCII data and their corresponding operations are Offered. Users, according to the proposed process, will be Capable of regulating no more than 18 devices and sensors using Bluetooth terminal program.

IV.   RESULTS

Proposed framework for home automation implemented on Arduino Uno hardware, HC-SR04 ultrasonic sensor, soil Humidity tracker, HC-06 Bluetooth module and smartphone. Arduino Uno is connected to the soil moisture sensor pin (AO)The Arduino Uno RX and TX pins is connected to the analog input pin AO, the Bluetooth module TXD and RXD pins, while the Echo and Activate Ultrasonic Sensor pins were linked to Arduino Uno pins 6 and 7 respectively, and their VCC pins were connected to a supply of 5V DC. The house, the lamp, electric motor and fan appliances were connected with the help of Arduino Uno digital output ports. Relays over used for switching circuits from 5V to 240V. The schematic of the planned 5V 240Vswitching circuitry home automation scheme.

V.   CONCLUSION

A low cost and user-friendly interface for this research work. The home automation system is seen. It has better quality. Current conventional smart homes based on Bluetooth It offers a general plan for home automation systems. It is not only good for the aged and disabled. but it is also beneficial to minimize human labor and save resources with the assistance of sensors. For the knowledge of readers, this is first paper on the method of home automation in which ultrasonic sensor for water level detection, a sensor and a floating plate are used. In the device proposed for inclusion has the capacity to transmit the system Sensor measurement study on mobile consumer apps. In addition, device capacity to connect up to 18 home appliances and sensors, the smartphone application was used. The device proposed is evaluated and tested within the range of 20 Meters and it reached 100% precision. The proposed system will only control the equipment inside the system. Short range, it is recommended for future research work to add more sensors to the range and interface, and it should be a device that is low cost and user friendly. Moreover, it is possible to interface the automation scheme with biomedical (EMG) with signals. For amputees, will be helpful and they will be able to use the action of their muscles to power the appliances.

VI.   REFERENCES

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