AN AUTOMATIC LIGHT AND FAN CONTROL SYSTEM USING ULTRASONIC SENSOR THROUGH WI-FI

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ABSTRACT

Power is wasted by human resource and power consumption is a major issue. Automatic smart fan controller is used to reduce power consumption and automatically sense human movement using ultrasonic sensor, to save electricity. Mainly, automatic ON/OFF fan system also can be made based on the presence and absence of the human inside the room. Flexibility and reliable functioning without human intervention. The automatic ON/OFF of fan system also based on the presence and absence of the human inside the room. The system is developed with the help of the at mega 328 microcontroller. Automatic under wi-fi through android apps from any Smartphone, home automation using a digital control and home automation system. An automatic control solution is suggested to control the fan ON/OFF condition . The system provide support in order to fulfill the needs of elderly and disabled in home. It has been a significant development in the area of an individual's routine tasks and be automated. Analyzing the current android phone market, most users are opting for Android based phones. Home Automation System (HAS) has been designed for mobile phones having Android platform to automate the wi-fi interfaced arduino controls a number of home appliances like lights, fans using on/off relay. The most efficient technology for short range wireless communication is used here to automate the system.

Keywords: ultrasonic, ATmega328, relay, wi-fi, Arduino, Android apps

I. INTRODUCTION

Human beings are wasting too much of electrical energy by not turn off the lights, fans and many other electrical appliances when they are not using it. To overcome this problem we have developed a sensor device that can be fitted anywhere in offices or homes. As the device will detect the presence of human and automatically it will turn on and off the device. To detect the presence of human we are using ultrasonic sensor. Electrical fan is one of the most popular electrical devices due to its cost effectiveness and low power consumption advantages. It is also one of the most sensible solutions for a comfortable and energy efficient. Arduino mini pro is used to control the ultrasonic sensor and electrical appliances. Relay modules are used to control the electrical and electronic appliances.

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II. LITERATURE SURVEY

The section presents the previous research that had been done on human detection system by using different types of sensors. This research work is based on human movement detection by using ultrasonic sensor. But it is a known fact that IR sensor detection accuracy decreases with increasing reflection distance and change in detection is seen due to the differences in temperature conditions.. But ultrasonic sensor have narrower sensor and it will detect the human movement. Another research paper focused on human tracking system using ultrasonic distance sensor. In our paper we have used a ultrasonic sensor will detect human movement and the fan will automatically ON/OFF. The advantage of our project is to reduces the power consumption.

III.PROPOSED SYSTEM

The idea of the project includes the voice commands that captured first and then processed in the Digital Signal Processing according to the voice. Home appliances could be turned on or off depending on the voice command given. These simple waveforms are changed over to advanced frame and decoded to suitable orders like words or keyword.

Features of proposed system are:

It is very cheap and affordable.

It is efficient and portable.

We easy to use.

Flexibility and reliable functioning without human intervention.

It reduces the power consumption.

IV.METHODOLOGY

The Arduino PRO mini board contains ATmega328 microcontroller. Ultrasonic sensor detect the presence of a human in the area and send signal to Arduino PRO mini. The device repeats this pattern continuously. Range of the PIR motion sensor is nearly 6 meters.
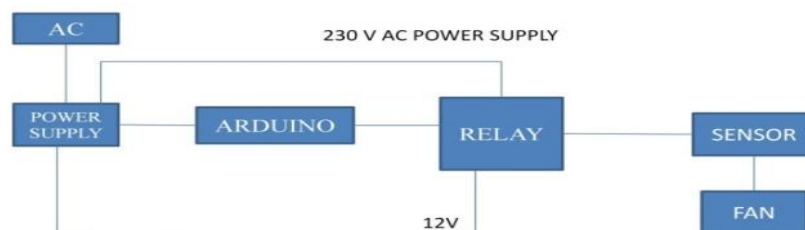

Fig 1: Automatic fan control

4.1 ARDUINO

Arduino is a microcontroller board. It has 14 digital Input/output pins, 6 analog inputs, a 16 MHZ quartz crystal used for oscillation, a USB connection. Arduino boards are relatively inexpensive to the microcontroller platforms. Arduino software is easy to use for beginners and it is a simple, clear programming environment. General Pin functions

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VIN: The input voltage to the Arduino board when it is using an external power source. The supply voltage through this pin, the supplying voltage through the power jack, accesses it through this pin.

5V: This output pin is regulated by 5V from the regulator on the board. The board can be supplied with power either from DC power jack (7 - 20V), the USB connector (5V), or the VIN pin of the board (7-20V). Supplying voltage via the 5V or 3.3V pins by passes the regulator and they can be damaged the board.

3V3: A 3.3 voltage supply generated by board regulator.

Reset: used to add a reset button to shields which block the one on the board.

4.2 ATMEGA 328

The ATmega328 is an single-chip microcontroller created by Atmel in the mega AVR. It has been modified Harvard architecture 8-bit RISC processor core. ATmega-328 has 32KB internal built in memory. This micro-controller has a lot of other characteristics.

Fig 2: Architecture of At mega 328

AT mega 328 has 1KB Electrically Erasable Programmable Read Only Memory (EEPROM). This property shows if the electric supply supplied to the micro-controller is removed, even then it can store the data and can provide results after providing it with the electric supply.

Fig 3: At mega 328
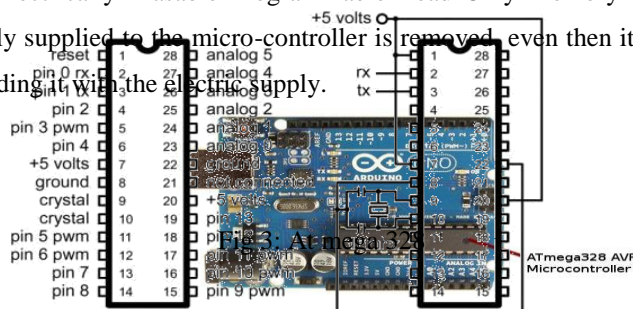
4.3 BREAD BOARD

A breadboard is a construction for prototyping in electronics. A breadboard is a polished piece of wood used for slicing bread. Because the breadboard does not require soldering, it is reusable. A variety of electronic systems can be used with breadboards, from small analog and digital circuits to complete central processing units.

Fig 4: Bread board

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V. MODULE DESCRIPTION

5.1 BSENSING MODULE

The principal of our project is based on ultrasonic sensor, also known as transceivers. These technologies evaluate attributes of a target by gauging the echoes from radio or sound waves respectively. Active ultrasonic sensors generate high frequency sound waves and measures the time interval between transmission of the signal and reception of the echo. This principle helps us in acquiring the distance between the object and the transmitter module.

Fig 5: Ultrasonic sensor

5.2 RELAY MODULE

A relay is a electrically operated switch of main voltage. It means that can be turned on or off, letting the current go through or not. Relay module is a separate hardware devices used for remote device switching. Minimum current required for a reliable operation and has a minimum holding current. On the other side of the module have 2 sets of pins. The first one has 4 pins, Ground and VCC pin for powering the module and 2 input pins Input1 and Input 2. The second set of pins has 3 pins with jumper between the JDVcc and the Vcc pin. With a configuration the electromagnet of the relay is directly powered from the Arduino Board and has something goes wrong the relay microcontroller could get damaged.
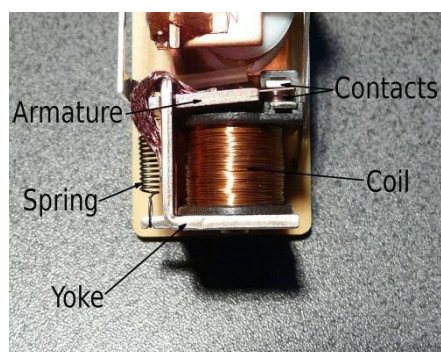
Fig 6: relay module

5.3 POWER REGULATOR

Voltage Regulator module(VRM) is a buck converter that provides an microprocessor and has an appropriate supply voltage. An unregulated power supply ranging from 9volt to 12volt DC. The correct supply voltage is communicated by the microprocessor to the VRM at startup via a number of bits called voltage identification. The correct supply voltage is connected by the microprocessor to the VRM at startup through a number of bits called VID(voltage identification). The VRM provides a standard supply voltage to the VID logic, which is the part of the processor whose only aim to send the VID to the VRM. When the VRM has received the VID

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identifying the required supply voltage, it starts acting as a voltage regulator, providing the required constant voltage supply to the microprocessor.
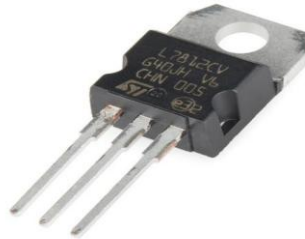

Fig 7: Power regulator

5.4 TRIACK MODULE

Opto coupled power triacks for AC voltage power control.

Pros: The advantage triacks are high power and switching frequency baside of ability of switch AC voltages.

The optocouplers is isolate the high voltage part of the circuit from the low voltage controlling part.

- up to xxx VDC

- up to xxx A/output

- 6000V optocoupler isolation

- Simple 1 port interface:

    4 inputs control the 4 triacs

    LED feedback for each inputs

- Output (2 screw terminal blocks/channel):

    triac pin A

    triac pin B

Fig 8:triac module

VI. OUTPUTS/RESULTS

The result shows the final hardware design of the proposed system. This clearly shows how all the components required for our system is connected.

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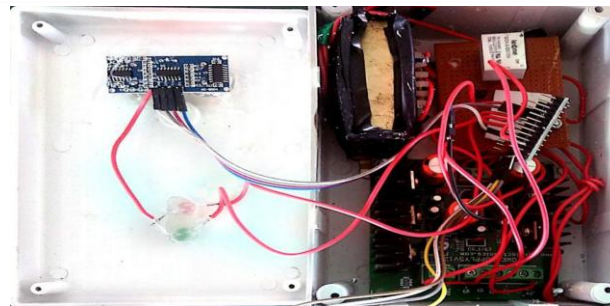
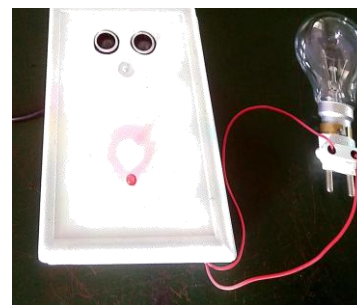Fig 10: Circuit connection with ultrasonic sensor

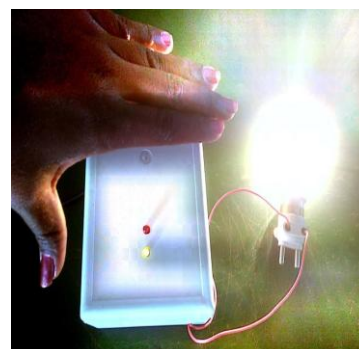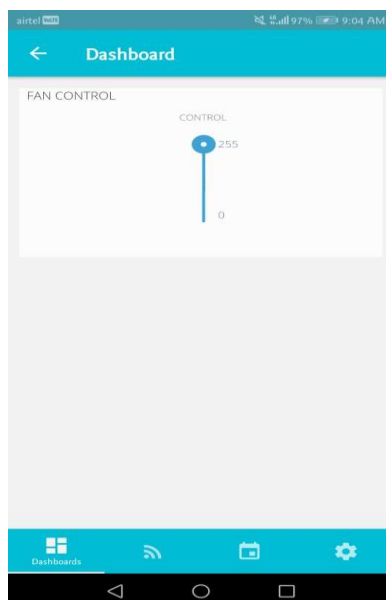Fig 11: Even though the switch is ON when dashboard seem to be LOW the light won't glow

Fig 12: Even though the switch is ON when dashboard seem to be HIGH the light Will be glow

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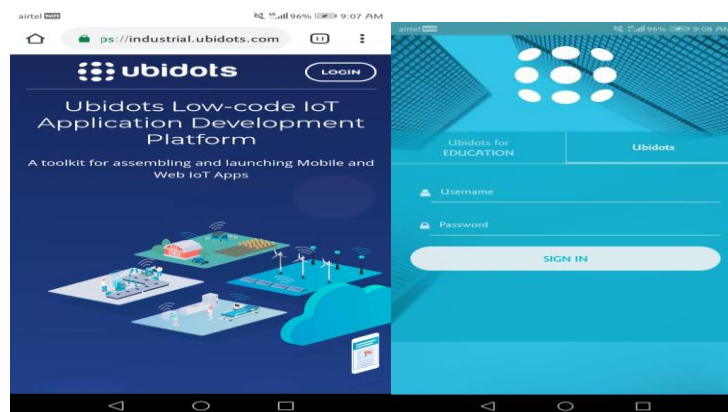
Fig 13:speed range for fan
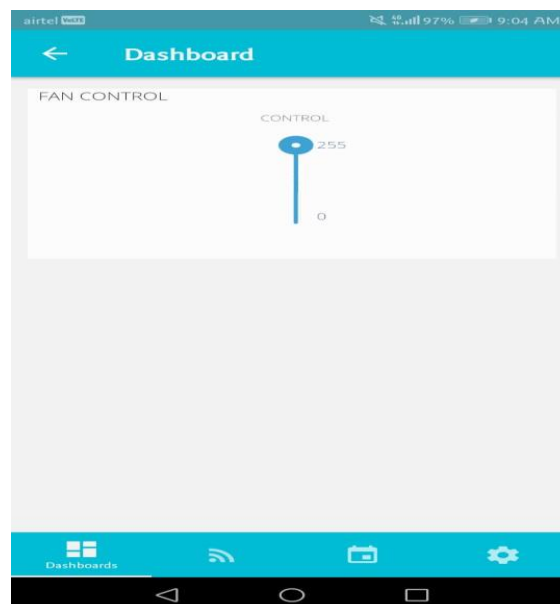

Fig 14: app login page

Fig 15: ON switch fan control

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VII. CONCLUSION

After designing, simulating,soldering and testing the circuit,the basic idea of the project to run the AC motor of the fan when it is sensed is greater than threshold value. It reduces the man power and increase the smoothness of the operation. It control the process parameter with better accuracy. The total project work has perfectly and has amount of unexpected functioning. As the technology is going developing day by day, the sensor output is connects to the microcontroller and it gives the output to the motor driver IC which runs the motor. It prefer things to be done automatically and in the same way projects reduces the work to mankind. To develop a smart home automation with help of Arduino and wireless technology. Our purpose is to develop such application is not only for common man and helpful for elderly and disabled. System allow user to monitor and control household appliances like lights, fan.

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