



UNIVERSAL AUTOMATION SYSTEM

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ABSTRACT:

Universal automation could involve high cost of ownership, inflexibility of interconnected devices, and poor manageability. When designing and creating a universal automation system, engineers consider several factors including scalability, how well the devices can be monitored and controlled, ease of installation and use for the consumer, affordability, speed, security, and ability to diagnose issues.

KEYWORDS:

HC-05 Bluetooth, Arduino Uno, Dc Motor, L293D Motor driver.

1. INTRODUCTION:

Home Automation enables you to use your home's Lighting, Heating, and home appliances (such as washing machines, dishwashers, and tumble driers) more conveniently and efficiently. And, at the same time giving you greater levels of comfort and security. These things need to be handled with care. The main problem we have is that we have limited period. We waste our precious time in doing many nonimportant activities. The activities can be done by the machine itself. For example, we must turn ON our device as per user's requirement. If we want to use when we are away from the switch or device, we can access it through mobile application. For example, is that we must start our Fan from specific position away from the switch or fan itself. To save time and for user's comfort, we can

access the fan from distance, after some time we will turn it off, then it will save a lot of electricity and time. So, we aim to design a system which can overcome these issues and provide protection from excess use of time and energy. The solution to this problem is connecting the unconnected devices to internet. With the rise of integrated smart devices, the cost rises. If you want to purchase the smart device, then you would have to pay more than normal device. So, we aim to connect the non-smart devices to the internet through the socket by connecting it with the mobile application. we can control, monitor power consumption, and do many more things with it. This paper proposes a smart controlling system, "Universal Automation system" with the aim to Automate the unconnected devices via the internet through the mobile application. We are using a micro-controller, a Bluetooth module and driver circuit to control the device. We have developed an android app to interface the device with users.

2. LITERATURE SURVEY

PAPER 1:

This paper demonstrates the integration of Smart home technology is being utilized more and more within homes, for various reasons. Whether just one device or an entire network, consumers are taking advantage of its many features and

capabilities to protect their homes, property, and loved ones. Whether you are newly adding this technology, or want to upgrade your current solution, it is best to work with a provider partnering with a reputable smart technology company.

PAPER 2:

This paper investigates Designed to save time and money for home security and safety, smart homes can remotely automate everyday tasks via internet connection. Imagine being able to close and lock garage doors, dim lights, or adjust interior temperatures from any mobile device or personal computer, regardless of your location.

PAPER 3:

Through the interconnectivity of smart home technology, and real-time surveillance and monitoring, homeowners can know exactly what is happening, and receive real-time alerts on any questionable occurrences. This includes elements such as alarm systems and security cameras, both of which can be set regarding device arm/disarm, checking that children arrive home safely, and even to ensure a frisky pet is behaving.

3. SYSTEM DESIGN AND IMPLEMENTATION

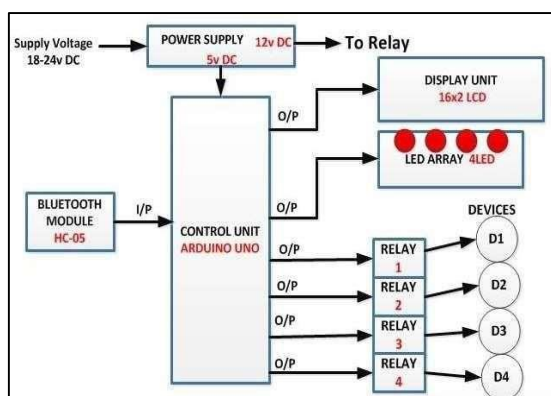


Figure 1. Universal Home Automation block diagram

The block diagram explains the following features:

- As per the block diagram the Power Supply is connected to the main controlling unit i.e., the microcontroller. The power supply consists of the stepdown transformer, bridge rectifier, filters, linear voltage regulator giving 5V DC. at its output.
- The microcontroller requires oscillations for its working which is provided by the Oscillator section.
- The microcontroller is prepared to use the Program is inserted in the IC using the programming device.
- The microcontroller is connected to different color LEDs for the indication that a task has begun or ended. The Bluetooth module is used for the communication between the embedded system and the Mobile Phone.
- When the User Enters commands through the Mobile App the Bluetooth module communicates with the Microcontroller and provides the Data.
- By keeping track of the Users input from the RTC by the microcontroller. Once the input is entered, the microcontroller decides to turn ON or OFF the Relay Module.

4. SYSTEM DESCRIPTION

4.1 HC-05:

Data mode: Exchange of data between devices.

Command mode: It uses AT commands which are used to change setting of HC-05. To send these commands to module serial (USART) port is used.

1. VCC: Connect 5 V or 3.3 V to this Pin.
2. GND: Ground Pin of module.
3. TXD: Transmit Serial data.
4. RXD: Receive data serially.

5. State: It tells whether module is connected or not.

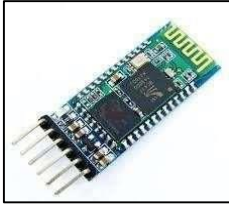


Figure 2. HC-05

4.2 ARDUINO UNO

1. Microcontroller: ATmega328P
2. Operating Voltage: 5V
3. Input Voltage (recommended): 7-12V
4. Input Voltage (limit): 6-20V
5. Digital I/O Pins: 14 (of which 6 provide PWM output)
6. PWM Digital I/O Pins: 6
7. Analog Input Pins: 6
8. DC Current per I/O Pin: 20 mA
9. DC current for 3.3V Pin: 50 mA



Figure 3. Arduino Uno

4.3 L293D MOTOR DRIVER

The L293D is a famous 16-Pin Motor Driver IC. As the name suggests it is widely used to drive engines. One L293D IC is capable of using two DC motors at the same time; and the direction of these two engines can be controlled independently.

- Supply Voltage to vcc2 (vs): 4.5 to 36 Volts
- Maximum Peak Motor current: 1.2 A
- Supply Voltage to vcc1 (vss): 4.5 to 7 Volts
- Transition Time: 300 ns

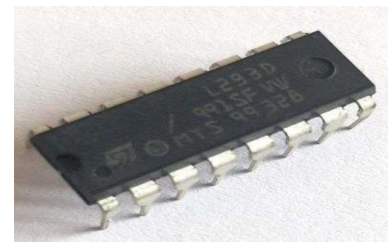


Figure 4. L293D motor driver IC

4.4 Dc Motor

A DC motor is any class of rotating electric motors that converts existing electrical energy into mechanical power. The most common types depend on the energy produced by the magnetic field. Almost all types of DC motors have some internal mechanics, either electromechanical or electronic, periodically changing the current direction in the vehicle component.

- Operating Voltage: 4.5 to 9 Volts.
- No-Load speed: 9000rpm.
- Loaded Current: 250 mA (approx.)
- Recommended or Rated Voltage: 6 Volts



Figure 5. DC motor

5. TEST RESULTS:

As the device is connected to the power supply, it will initiate the connection of Bluetooth then the RTC will be updated through the mobile application. As per the user, the controller will come into action to turn ON/OFF the relay module. The controller will continuously keep track input and act accordingly. The green LED

will be kept ON and relay module will be kept OFF indicating that the device.

6. TECHNOLOGY COMPARISON:

	Bluetooth	USB	IR Wireless
Data Rate	1Mbits/s	62.5kbits/s	20-40kbits/s
Range	10 mts	10 mts	<10mts
Networking	Ad-hoc	Point to point	Point to point
Frequency	2.4GHz	2.4GHz	800-900 nm

7. CONCLUSION:

This final project, an automation system has been created so that we can easily control home appliances like as light, fan, tube light, AC, bulb, etc. One of the objectives of this project is also to get us a smart automation and low-cost project. In this paper we have also provided information about Arduino Uno, Bluetooth controller and relay module. And the information about their work is given. Along with the component of home automation, its advantage has also been discussed. The system is easy and secured for access from ant user or intruder.

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