



Wireless Industrial Automtion Using Arduino

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ABSTRACT: With advancement of technology things are becoming simpler and easier for us. Automation is the use of control systems and information technologies to reduce the need for human work in the production of goods and services. This paper proposes the control of industrial process like speed control of motor and used in other applications by using arduino and a smart phone. Here in this project we introduce low cost remote control for industries with compactable to any phone have Bluetooth connectivity. It provides the advantages of smart control. Working range as large as the coverage area of the 60 feet no interference with other controllers. In this project, the controller is controlled by a mobile phone that makes a Bluetooth connectivity to the Bluetooth module attached to the microcontroller.

KEYWORDS: Arduino, Bluetooth module, Smart phone, DC motor.

I. INTRODUCTION

In the scope of industrialisation, automation is a step beyond mechanization. Whereas mechanization provided human operators with machinery to assist them with the muscular requirement of work, automation greatly decreases the need for human sensory and mental requirements as well. Automation plays an increasingly important role in the world economy and in daily experience. Automatic systems are being preferred over manual system. Through this we have tried to control some industrial equipments as a result power is saved to some extent.

Conventionally, wireless-controlled remote use Wi-Fi connection & internet facility. Use of a mobile phone with IR blaster for remote control can overcome these limitations. But it is only available in high price range phones. Here in this project we introduce low cost remote control for our house and office with compactable to any phone have Bluetooth connectivity. It provides the advantages of smart control. Working range as large as the coverage area of the 60 feet no interference with other controllers. Although the appearance and capabilities of smart vary vastly. The control of smart remote involves three distinct phases: perception, processing and action. Generally, the preceptors are sensors mounted on the controller, processing is done by the on-board processor, and the task (action) is performed using relay or with some other actuators. In this project, the controller is controlled by a mobile phone that makes a Bluetooth connectivity to the Bluetooth module attached to the microcontroller. In the course of a pair, common Bluetooth password 1234 is used. ARDUDROID is a simple Android app to help to control the microcontroller from your Android phone wirelessly. This android app employs a simple Android user interface to

- 1) control microcontroller's digital and PWM pins
- 2) send text commands to microcontroller
- 3) receive data from microcontroller

Over Bluetooth serial communication using the ever popular HC-06 Bluetooth module. The received command from phone is processed by the ATMEGA 328P.

II. LITERATURE SURVEY

The personal universal controller is a remote control device for improving the interfaces to complex appliances. The PUC engages in two-way communication with everyday appliances, first downloading a specification of the

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appliance's functions, and then automatically creating an interface for controlling that appliance. The specification of each appliance includes a high-level description of every function, a hierarchical grouping of those functions, and dependency information, which relates the availability of each function to the appliance's state. Dependency information makes it easier for designers to create specifications and helps the automatic interface generators produce a higher quality result. We describe the architecture that supports the PUC, and the interface generators that use our specification language to generate graphical and speech interfaces.

III. SYSTEM OVERVIEW

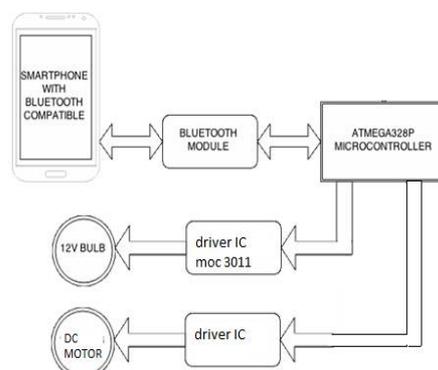


Fig. 1 System Block diagram

MICROCONTROLLER: The high-performance Atmel 8-bit AVR RISC-based microcontroller combines 32KB ISP flash memory with read-while-write capabilities, 1024B EEPROM, 2KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, a 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. By executing powerful instructions in a single clock cycle, the device achieves throughputs approaching 1 MIPS per MHz, balancing power consumption and processing speed. Today the ATmega328 is commonly used in many projects and autonomous systems where a simple, low-powered, low-cost micro-controller is needed. Perhaps the most common implementation of this chip is on the popular Arduino development platform, namely the Arduino Uno and Arduino Nano models.

BLUETOOTH MODULE: The Bluetooth module enables wireless connection to connect to any other Bluetooth device with SPP (Serial Port Profile), such as mobile phones and laptops. This module can host a connection or search and hook onto other connections. Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485 GHz) from fixed and mobile devices, and building personal area networks (PANs). Invented by telecom vendor Ericsson in 1994, it was originally conceived as a wireless alternative to RS-232 data cables. It can connect several devices, overcoming problems of synchronization. Bluetooth is managed by the Bluetooth Special Interest Group (SIG), which has more than 25,000 member companies in the areas of telecommunication, computing, networking, and consumer electronics. The IEEE standardized Bluetooth as IEEE 802.15.1, but no longer maintains the standard. The Bluetooth SIG oversees development of the specification, manages the qualification program, and protects the trademarks.

DC MOTOR DRIVER IC: The L293D is a quad, high-current, half-H driver designed to provide bidirectional drive currents of up to 600 mA at voltages from 4.5V to 36V. It makes it easier to drive the DC motors. The L293D consists of four drivers. Pins IN1 through IN4 and OUT1 through OUT4 are input and output pins, respectively, of driver 1 through driver 4. Drivers 1 and 2, and drivers 3 and 4 are enabled by enable pin 1 (EN1) and pin 9 (EN2), respectively. When enable input EN1 (Pin 1) is high, drivers 1 and 2 are enabled and the outputs corresponding to their inputs are active. Similarly, enable input EN2 (pin 9) enables drivers 3 and 4.

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SMART PHONE: A smartphone is a mobile phone with an advanced mobile operating system. Smartphones typically combine the features of a cell phone with those of other popular mobile devices, such as personal digital assistant, media player, GPS navigation unit and Bluetooth communication. In this project any smart phone with Bluetooth connectivity can use. The phone must work on Android platform. An android app named ARDUDROID is used to communicate with user, and by standard Bluetooth communication is used to communicate between phone and microcontroller.

IV.CIRCUIT DIAGRAM AND CIRCUIT OPERATION

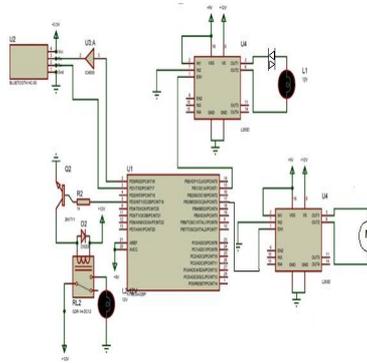


Fig. 2 Circuit diagram

This is combination of hardware and utility app, Fig 2 shows the circuit diagram ,so that can integrate all our remote commands into one Android device. Bluetooth module is the 1st level communication medium that can talk with android panel & controller. In 2nd level of communication added an infrared emitter to that controller is capable of sending IR commands just like conventional remote. Android application send commands continuously to the microcontroller via Bluetooth module. It is a wireless serial communication. Mobile phone should able to support android software, and should have a blue term application.

On first phase of communication , the mobile phone should be paired with the Bluetooth module . The Bluetooth module send the information about the device paired to arduino ,using the blueterm app the data is passed into arduino The devices connected to the corresponding port of the arduino will be turn on and off respective with the data passed from the blueterm app through mobile and Bluetooth . By using the variable switch in blue term application we can vary the intensity of bulb ,speed of a MOTOR,etc.

The information passed from Bluetooth module is processed using arduino ,and processed data is passed through a driver ic for the control of equipments . The triggering angle of diac is varied by using the pulse width modulated output from arduino through driver ic. In our project we are using a dc motor. We can control it's speed by using the pulse width modulated output and a driver ic.

V.FLOW CHART AND SOFTWARE IMPLEMENTATION

Arduino is an open-source prototyping platform based on easy-to-use hardware and software. Arduino boards are able to read inputs- light on a sensor, a finger on a button, and turn it into an output- activating a motor, turning on an LED,

publishing something online. For sending a set of instructions to the microcontroller on the board. We can use the Arduino programming language and the Arduino software (IDE).

The smart phone should be android phone which have a blueterm app. This app is available in the play store that we can be download it and install in the android phone. By using this app we can control the system.

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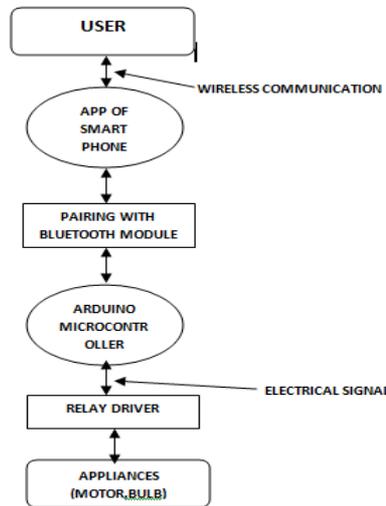


Fig. 3 Flow chart

VI.RESULT AND DISCUSSION

This chapter shows the final output scenario of the project. The working of the project is shown in this section



Fig. 4 working model

The android application which is downloadable is installed in the smart phone and connected to the respective Bluetooth terminal. Once the device is paired with the hardware Bluetooth, the screen indicating the appliance picture available inside the room to which the Bluetooth is connected is displayed. In our project we have connected two lights and two fans to the Bluetooth.

VII.CONCLUSION

This is one of the invocative projects based on smart phone to control our home or office smartly. Smart phone is nowadays an unavoidable device. So smart phone integrated project will reduce the cost of additional hardware units and get more convenient handling. This project will enhance our home security with simple cost. We know that lot of remotes using in our house and office. So why can't integrate them in to a single remote unit. Lot of multipurpose



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remotes are available in our market but they are limited in the case of applicability and high price range. So the sense our universal remote can replace millions of remotes in to a single one. In the project remote of DVD player and satellite receiver is replaced by universal smart remote and can control major functions of DVD & satellite receiver. Light dimming circuit is implemented in this project to vary the intensity of light and simple home automation usinandroid phone is also the part of the project. The advantages of this system is as follows:

- This is simple & cost effective project that have multiple purposes.
- This project can replace no. of remotes in to a single one.
- It is more efficient than general purpose remote.
- This project will enhance the home security.
- This project is capable for home & small offices automation.
- All the smart phone with Bluetooth connectivity is compatible for this project.
- Smart fan speed regulator can also be implemented using this project.

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