

# MONITORING AND CONTROLLING OF ELECTRICAL MACHINES AND ELECTRICAL APPLIANCES BY USING WI-FI BASED ANDROID APPLICATION

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## ABSTRACT:

“Android” is the world’s most adopted mobile stand which is means for creating application that look great and take advantage of hardware capabilities. The advantage of android is that it is an open resource working system is used in provisions of mobile application that is smart phone which will perform as a remote controller. Here the proposed system is measured to controlling and monitoring Machines and Electrical Appliances using android application where the slightly controlling and monitoring is achieved. Android mobile act as a transmitter and the acknowledged by Wi-Fi Router receiver interfaced to AVR microcontroller of 89S52 well-known is an superior edition of 89S52 microcontroller. Every time data is sent by android application as per code written is executed by AVR to distribute supply signal to triac through optical segregation. Hence the power to load associated in series with triac is controlled based on received signal and speed control of machines is achieved.

Apart from Speed controlling and monitoring, we also monitoring the a variety of Electrical Appliances like Fans, Lamps, opening and closing of Entrance gate, and detection of leakage of LPG gas in industry. User can control all applications from a single Android Application in their Smart phone.

**KEYWORDS:** Wi-Fi (wireless fidelity), AVR (Advanced Virtual RISC),  $\mu$ C (Microcontroller), VFD (Variable Frequency Drive), I/O (Input/Output), LCD (Liquid Crystal Display)

## I. INTRODUCTION:

For the improvement of quality product, many industries adaptable speed and constant speed plays very important role. Due to rapid advance in automation and process control the field of adjustable speed drives continuously. In recent technology, various alternate techniques are available for the selection of speed of drive system. Up to the 1980’s the dc motor was the choice for variable speed drive application. Induction motors are using any application such as Industrial drives control, automotive control, etc. In past few years there has been a great demand in industry for adjustable speed drives. Fan, pump, Compressors, domestic applications and paper machines etc. In this area DC motor was very popular but having many disadvantages so that microcontroller transformed research and development toward control of AC drive.

Here we are developing an Industrial monitoring and control application using the AT89S52  $\mu$ C and Android App. The main intention is to control and supervise the electrical appliances and machines used in the industry. Also we are interfacing android software which is used to wirelessly control the appliances and Machines in the industry/Home. The Android software is interfaced to AT89S52 via WIFI modem. The AT89S52  $\mu$ C is interfaced with Sensors to sense the different conditions such voltage, current and Speed of AC/DC motor. It is also interfaced with 230V relays which can be turned ON/OFF by the  $\mu$ C using Fan and Light.

In this system we are monitoring and controlling the:

- 1) AC & DC Motor.
- 2) Fans.
- 3) Lamps.
- 4) Entrance Gate

In case of controlling the speed of the electrical machines in this proposed system is more worthwhile than VFD. And by economical point of view VFD is quite expensive. The applications that has to be control and monitor depends upon the I/O ports of microcontroller, hence if the applications are more than I/O ports we have to use more I/O ports by using another Microcontroller.

• **Security of the system:**

In Previous System, the security of the system was a big deal therefore to prevent misuse of Android Application there is security authentication is provided, So that only authorized person will access it.

**II. LITERATURE REVIEW:**

As per our assessment, there exist many systems that can supervise home appliances using Android based phones/tablets. Each system has its exclusive features. Currently firm Companies are formally registered and are working to endow with better home Automation system features. Following models describes the work being performed by others [1].Explained in the model for home automation using Bluetooth via PC. But unfortunately the system lacks to support mobile technology [1].

Design of a trial product electrical device control system Using Web [2]. They also set the server with auto restart if the server condition is currently down .It has developed a telephone and PIC remote controlled device for controlling the devices pin check algorithm has been introduced where it was with cable network but not wireless communication[2]. Development [4] an application in a universal XML format which can be easily ported to any other mobile devices rather than targeting a single platform.

Each of these system has their own unique features and on comparison to one another Lacks some advancement. Our designed system has application layer prototype. The application is able to synthesize the speech data with the help of Google Voice Reorganization. The Synthesized data are analyzed and further processing is carried out. In layman words, our design system provides features of controlling the home appliances using voice Commands. The use of socket programming is performed to connect the android application with the raspberry pi. This further adds security to our system. The data are received only by the server at the specified port and data are further analyzed. Our project is different in a sense it has its own software level application to control the home Appliances.Abbreviations and Acronyms.

**III. PROPOSED SYSTEM:**

Developing a Industrial monitoring and control application using the AT89S52  $\mu$ C and Android App. The main objective is to control the electrical appliances and

machines used in the industry. Also we are interfacing android software which is used to wirelessly control the appliances and Machines in the industry/Home. The Android software is interfaced to AT89S52 via WIFI modem. The AT89S52  $\mu$ C is interfaced with Sensors to sense the various conditions such voltage, current and Speed of AC/DC motor. It is also interfaced with 230V relays which can be turned ON/OFF by the  $\mu$ C using Fan and Light.

This System has the following features:

- AT89S52  $\mu$ C: AT89S52 is a very powerful processor which can be used in variety of applications. It has 51 core with 12 MHz CPU and 2KB GB of RAM. It also has 4 I/O ports, 1 serial Port.
- Android APP based GUI display: User courteous display through which we can monitor and control the appliances and machine. Also we can see current and voltage consumption and motor speed in the GUI window.
- Sensor interface to  $\mu$ C: Here we have linked various sensors to  $\mu$ C. To compute the current and voltage of AC motor we are connecting current transformer and potential transformer to  $\mu$ C via ADC. For calculating the current and voltage of DC motor we will connect a resistor in series and parallel correspondingly. Through these we will display the current and voltage using up of AC and DC motor on LCD and send it to Android APP using WIFI modem, Also we have connected an IR sensor to calculate the speed of AC and DC motor. The IR sensor will give pulses to  $\mu$ C according to the motor speed. We will send the speed to Android via WIFI.

• **RELAY BASED APPLIANCE CONTROL:**

Here we have associated 230V relay which can control the appliances working on 230v 10 Amperes. The ON/OFF commands can be given through Android APP using WIFI modem



Fig. Association of Relay and Android App

• **HOW IT WORKS:**

- The relay uses an electromagnet to mechanically switch electric appliances.

- A relay can be operated by a relatively small electric current that can turn on or off a a lot larger electric current.
- Using relays is safe because there is no any material contact.

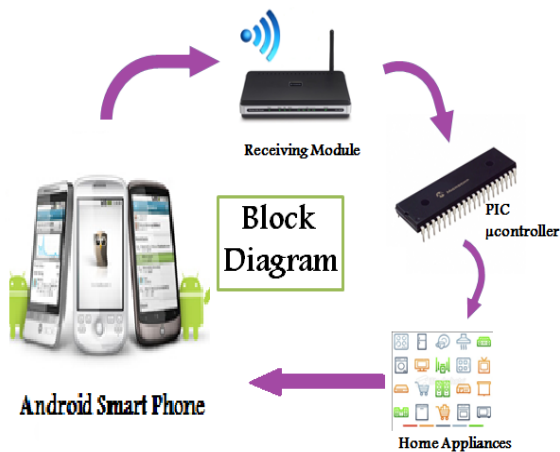


Fig. Structure Of the Module

## 1. SYSTEM HARDWARE DESIGN

Following components are used in hardware design.

1. Microcontroller (AT89S52).
2. Relay 12v.
3. WI-FI Module
4. Motor Driver Board (L293D).
5. LCD (16x2)

### 1. MICROCONTROLLER (AT89S52) :

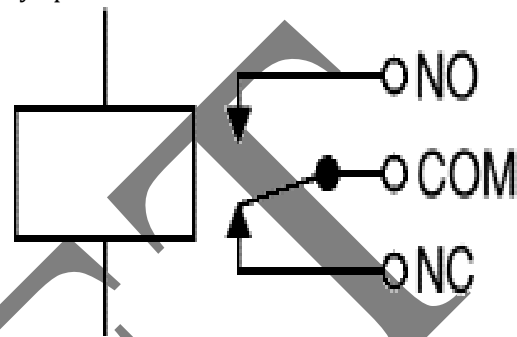
The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The gadget is manufactured using Atmel's high-density nonvolatile memory technology and is well-suited with the industry-standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective clarification to many embedded control applications.

The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The

Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue execution. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset

### 2. RELAY (12V) :

Relay is an electromagnetic switch; consist of a coil, 1 common terminal, 1 normally closed terminal, and one normally open terminal.



Circuit symbol for a relay

The relay's switch connections are usually labeled COM, NC and NO:

COM = Common, always connect to this, it is the moving part of the switch

NC = Normally Closed, COM is connected to this when the relay coil is off.

NO = Normally Open, COM is connected to this when the relay coil is on.

Relays permit one circuit to switch a second circuit, which can be completely separate from the first. For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. There is no electrical connection within the relay between the two circuits; the link is magnetic and mechanical.

### WI-FI MODULE:

The ESP82XX Wi-Fi Module is a self enclosed SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP82XX is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. This module comes with AT instructions firmware which allows you to get functionality like Adriano Wi-Fi shield, however you can load diverse firmware's to make your own application on the modules' memory and processor. It's a very profitable module and has a huge and growing community support.

### LCD (16X2) :

LCD is used in a project to envision the output of the application. We have used 16x2 LCD which indicates 16 columns and 2 rows. So, we can write 16 characters in each line. So, total 32 characters we can display on 16x2 LCD.

LCD can also use in a project to verify the output of different modules interfaced with the microcontroller. Thus LCD plays a essential role in a project to see the output and to debug the system module wise in case of system failure in order to correct the problem.

**4. RPM COUNTER:**

A sensor is required to sense shaft speed. classic devices used for this intention are shaft encoders (rotary pulse generators), proximity sensors, and photoelectric sensors. Each of these devices sends speed data in the form of pulses. Two factors influence the superiority of this data:

- Number of pulses per revolution of the shaft (referred to as PPR). Higher PPR values result in better resolution.
- Symmetry of pulses. The symmetry of one pulse to the next can play a role in how consistent the RPM readings are. Symmetrical pulses give more accurate data. Photoelectric sensors typically give low resolution, due to the low number of pulses calculated per revolution. A photoelectric sensor must intellect a insightful target on the shaft. If more than one target is used to boost the PPR, then the symmetry from one pulse to the next is expected to be poor.

**BLOCK DIAGRAM:**

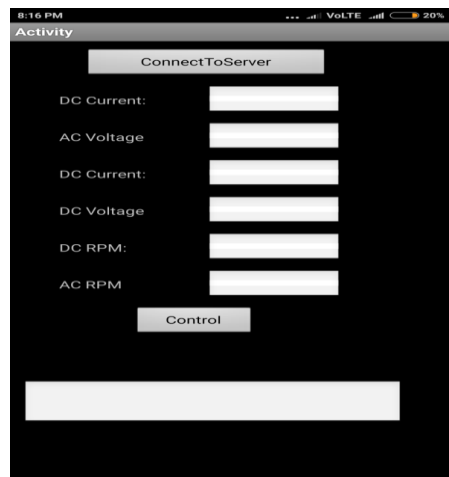
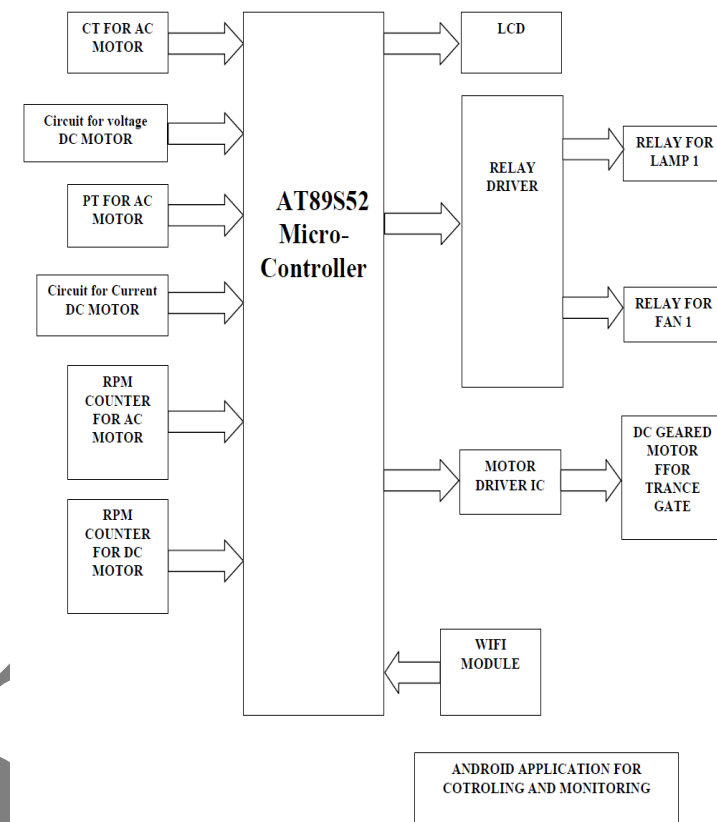


Fig. Monitoring GUI of the Android App

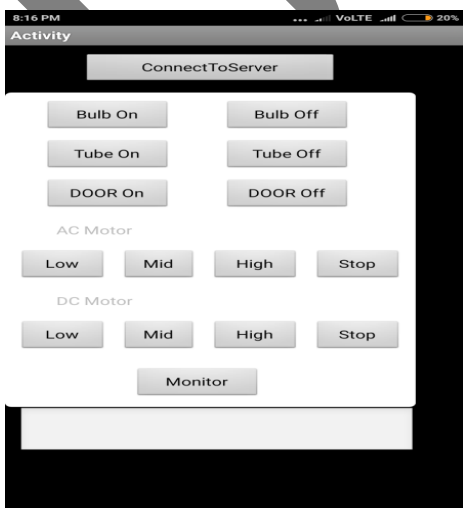


Fig. Controlling GUI Of the Android App

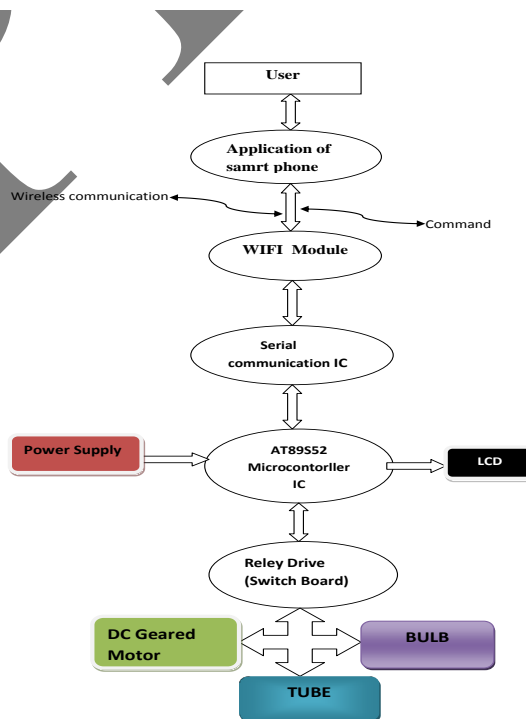


Fig. Flowchart of The system.

**ADVANTAGES:**

1. Operation can be achieved by any authorized Android Mobile
2. Android app is an open source system to develop any programming code.

3. Programming code is not always required to change for different input parameters.
4. More useful for the patients and disabled person.
5. Simple working than GSM based module.

**CONCLUSION:**

Hence, we can bring to a close that to control and monitor machines and appliances by using Wi-Fi based Android Application is achievable. It will be massive benefit to all Industrial as well as Domestic purposes.

**ACKNOWLEDGEMENT:**

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