

# Remote Monitoring of Home and Agricultural Appliances through ATmega16

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**Abstract :** This paper addresses the current need to work on the wireless technology to monitor the agricultural appliances so that any troubles related to short circuits can be reduced and anyone can remotely have the access to the agricultural appliances. The use of WiFi technology helps to wirelessly control home and agricultural appliances within a range of 479 meters. The WiFi technology combined with ATmega 16 increases the number of devices to be wirelessly controlled to 32.

**IndexTerms – Atmega,WiFi,Embedded System,Atmel,AVR.**

## I. INTRODUCTION

Wi-Fi[4] systems are remote systems which have no wires among sender and collector dependent on radio recurrence (RF) innovation having a recurrence in the scope of electromagnetic range compares to radio wave proliferation. At the point when a radio recurrence current is given to a reception apparatus going about as sender, at that point an electromagnetic field is created that at that point spreads through the space which goes about as medium, which at that point is gotten by a collector. Wi-Fi typically uses[4] the 2.4 gigahertz (12 cm) Ultra High Frequency groups and 5.8 gigahertz (5 cm) Super High Frequency ISM radio groups, these groups are additionally subdivided into different channels. Each channel can be shared by time through numerous systems. A large portion of the materials assimilate or reflect them, which further confines go, yet limits the impedance between various systems in surged situations. Inside short range, some adaptation of Wi-Fi have speed over 1Gbps.This innovation expels the superfluous utilization of strings, links, switches and enables the gadgets to react remotely to one another's directions.

ATmega16[6] is a 8-bit microcontroller with an elite of Atmel's Mega AVR family which expends a low power. Atmega16 depends on improved RISC (Reduced Instruction Set Computing).Atmega16 deals with a most extreme frequency[6] of 16MHz.ATmega16 is a microcontroller having 40 pins. There are 32 I/O (input/yard) lines which are additionally partitioned into four 8-bit ports named as PORTA, PORTB, PORTC and PORTD.

Therefore the utilization of WiFi innovation alongside ATmega 16 microcontroller keeps the mishaps identified with short circuits in switch board and permits the maturity or crippled individuals to utilize the home and agrarian apparatuses without really contacting them.

## II. LITERATURE REVIEW

The instances of mishaps in youngsters, especially little children are expanding because of the unprotected outlets or machines. The little child regularly put metal items, for example, forks or blades into unprotected outlets which results in extreme electric stun through their bodies.

The American Academy of Pediatrics has given the measurements identified with electrical wounds in kids in the range 12 years and more youthful shows divider attachments, electrical wires, augmentation links and little machines as the basic territories for the wounds. Reportedly[1], electrical ropes and additional strings are in charge of about 60% of the mishaps with almost 16% event from divider attachments and the remaining around 25% from little apparatuses. The Consumer Product Safety Commission[1] gives a gauge that 86% electrical wounds that are accounted for happened in youngsters inside age 1-4.

An estimated[2] 3900 wounds occurring from sudden electrical stun are treated in clinics in a year as announced by the Consumer Product Safety Commission. Little youngsters putting metal items into unprotected divider attachments bringing about consuming their fingers and hands which represents almost 33% of the electrical stun related wounds. Different wounds which results from introduction to power incorporates little children gnawing electrical wires, tossing water from water weapons or place toys into divider attachments, little machines and continued stopping or unplugging wires.

As indicated by information provided[1] by Marshall Brain in 2005, alongside the kids who are harmed yearly from electrical stun, there are instances of around 100+ youngsters who bite the dust from electrical stun related mishaps because of uncovered attachments.

All out, 83 electrical stun related deaths[1] happened from January 2008 to December 2012. The cases gave about 0.4% of every single after death case got in the morgue of King George's Medical University, Lucknow, India. A normal of 17 individuals kicked the bucket because of electrical stun every year, with a normal yearly rate of 0.4 per 100,000 people.

Fig. 2.1 gives the recurrence of electrical stun related passings constantly of death. Out of the absolute passings occurred, 71 (85.5%) mortality were incidental, 12 (14.5%) were self-destructive and there were no instances of desperate electric shock (Table 2.1).

Table 2.1: The manner of death sin total 83 cases

Manner of death	N(%)
Accidents	71(85.5)
Suicides	12(14.5)
Homicides	0(0)
Total	83(100)

Figure 2.1: Frequency of electrical shock related deaths by the year.

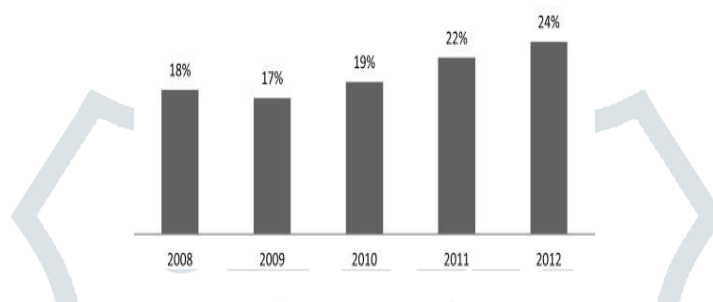


Figure 2.2: Age distribution of the electrical shock related victims.

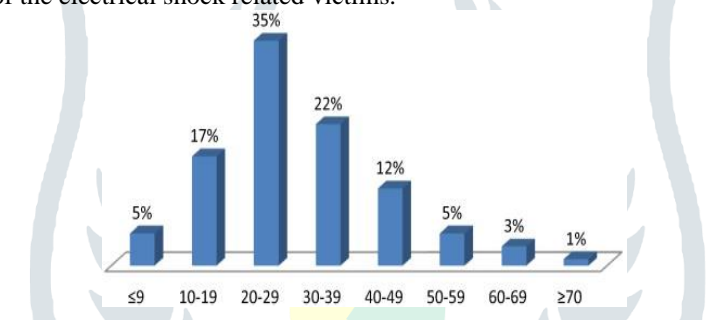
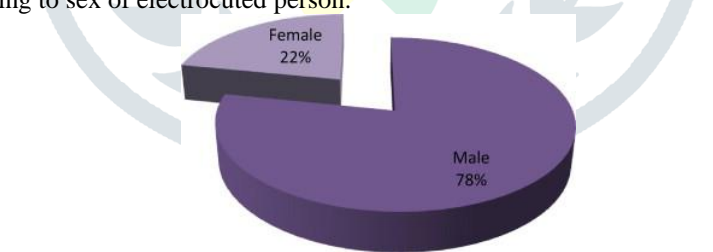


Figure 2.3: Cases corresponding to sex of electrocuted person.

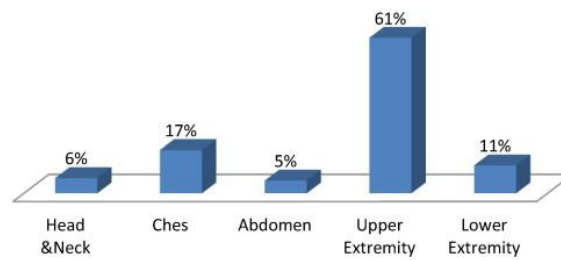


The upper segment of body was really the most well-known region of electrical stun which engaged with 51 deaths[1] (61%), included by the chest (14 cases, 17%) (Fig. 2.4). Among the harmed, the electrical influence marks were available just in 59 instances of mishaps (71.1%), both electrical impact marks and electrical establishing marks were available in 14 cases (17%), and no electrical contact marks were available in 10 cases (11.9%) (Table 2.2).

Table 2.2: Type of marks observed due to electrocution.

Electrical marks	59(71%)
Electrical&Ground marks	14(17%)
Not observed	10(11.9%)
Total accidents	83(100%)

Figure 2.4: Portion of body affected by shock.



Mishaps identified with workplace comprises of 49 passings (59%) included by family unit related mishaps ie 19 (22.9%) (Table 2.3). Mulling over the contact subtleties, the passings were for the most part brought about by contacting unprotected electrical wires (35 cases, 41.9%), trailed by cases identified with contacting electrical links (15 cases, 18.1%), contacting dynamo at work place (8 cases, 8.9%), iceboxes at home (1 case, 0.8%), unprotected electrical outlets (2 cases, 2.4%), substantial or little transformers (4 cases, 5.3%), contacting electrical water radiators in the washroom with wet pavements(9 cases, 11.1%), and by contacting clothes washers at home (5 cases, 6.6%) (Table 2.4).

Table 2.3: Cases according to manner of deaths due to shock.

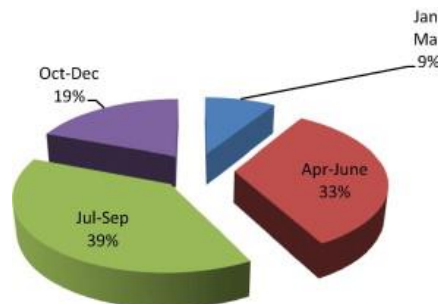
Manner of death	N(%)
Work accident	49 (59)
Household accident	19 (22.9)
Other accident	3 (3.6)
No accidents	12 (14.5)
Total accidents	83(100)

Table 2.4: Cases according to manner of deaths due to shock.

Type of material	N(%)
Electrical wire	35 (41.9)
Electrical cable	15 (18.1)
Water heater in the bathroom	9(11.1)
Washing machine	5(6.6)
Electrical stove	4(4.9)
Electrical outlet	2 (2.4)

There was an increase in electrical shock related deaths fatalities in the months of July–September (32 cases, 39%) (Fig. 2.5).

Figure 2.5: Distribution of cases of electrocution according to seasons.



Since the year 2000, 49 casualties[2]have showed up subsequent to coming into contact with power, which incorporates passings in ranches or fields, a portion of the passings included the supplies and wiring on the limits of homesteads, as detailed by Arthur Byrne, Public Safety Manager for ESB Networks. Out of six individuals who lost their lives because of electrical stun incorporates an agriculturist who was murdered while control washing on a homestead, another case showed up when a silage

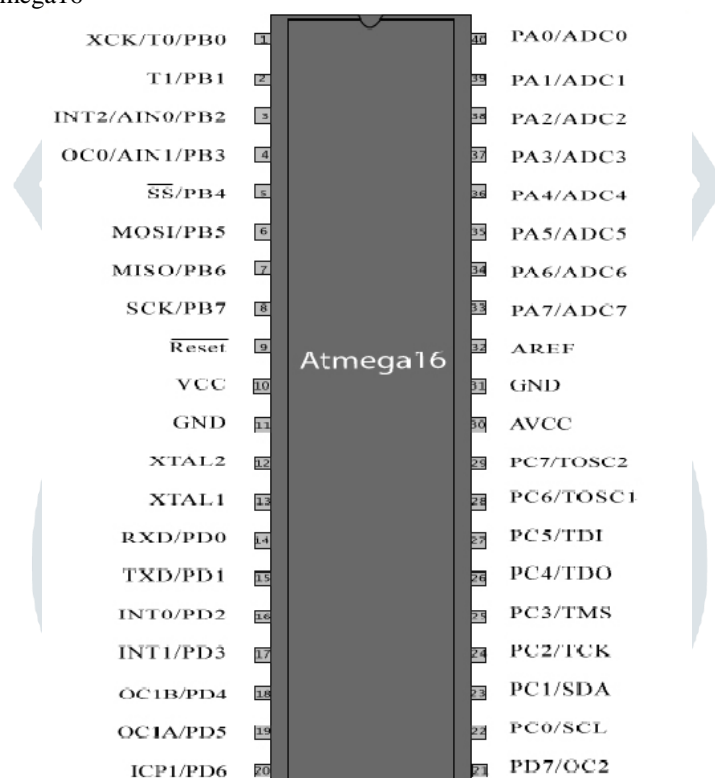
gatherer reached an overhead 10,000 volt line and two people[2] were gotten by the power while moving a high post under an overhead line.

### III. MAIN ELECTRICAL COMPONENTS

#### 3.1 ATmega 16 microcontroller

ATmega16<sup>[6]</sup> is a 8-bit microcontroller with an elite of Atmel's Mega AVR family which devours a low power. ATmega16 depends on upgraded RISC (Reduced Instruction Set Computing). Most of the directions execute just in one machine cycle. ATmega16 deals with a most extreme frequency<sup>[6]</sup> of 16MHz. ATmega16 has 16 KB programmable flash (temporary) memory, static Random Access Memory of 1 KB and Electrically Erasable Programmable Read-Only Memory of 512 Bytes. ATmega16 is a microcontroller having 40 pins. There are 32 I/O (input/output) lines which are additionally partitioned into four 8-bit ports named as PORTA, PORTB, PORTC and PORTD.

Figure 2.6: Pin Diagram of ATmega16



#### 3.2 WiFi Shield

The ESP8266 hub MCU Wifi shield is utilized to Wirelessly control and screen the apparatuses inside a scope of 479 meters. It makes the control of home and farming machines convenient with the goal that the mishaps identified with shortcircuits and issues identified with seniority individuals are diminished.

The ESP8266 hub MCU Wifi shield is appeared in Figure 2.7.

Figure 2.7: ESP 8266 node MCU Wi-fi shield

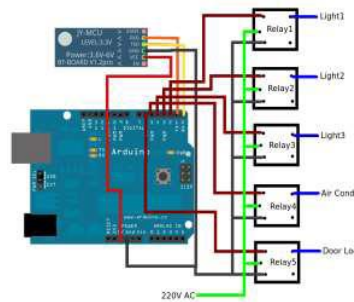


#### 3.3 Relay Board

The 4 channel hand-off board takes a shot at 12V supply to order four power apparatuses of 240V, controlled accurately from microcontrollers or low voltage circuits. It is perfect for observing 240V electrical machines.

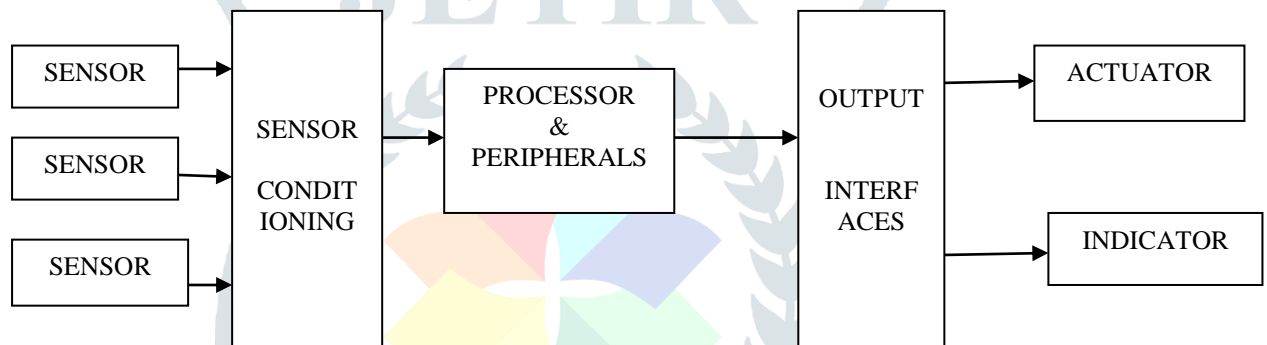
The hand-off board utilizes transfers of top notch, which can hold a most extreme of 7A Alternating or Direct present and 240 AC or 24V DC. Each hand-off has every one of the three associations - Common, Normally Open, Normally Closed which is taken out to a 3 stick screw terminals which enables the straightforwardness to connect and out associations. The board has a pointer which demonstrates control and a transfer status LED to ease investigating. The board can acknowledge contributions inside a wide scope of voltages from 4V to 12V.

Figure 2.8: Relay Board connection diagram.



#### IV. RESULTS AND DISCUSSION

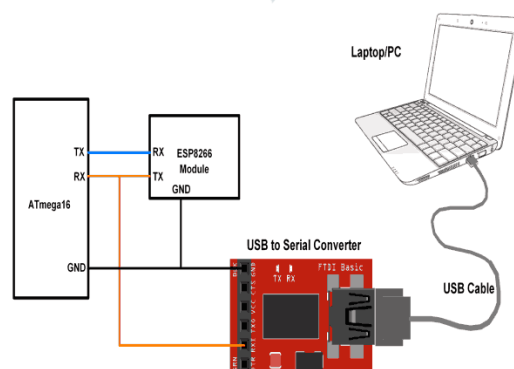
An embedded system[8] is a kind of framework which can be modified and controlled with a gave capacity inside a greater mechanical or electrical framework. It goes about as an interface among equipment and programming segments. In current timespan ninety eight percent of all microchips are made as parts of inserted frameworks.



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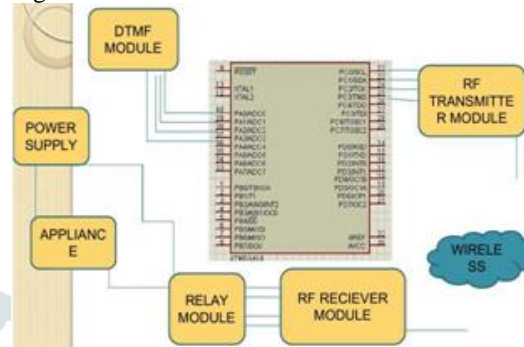
As appeared above square outline, an inserted framework associates the processor and peripherals to yield interfaces and sensors. The WiFi module[4]used is ESP8266 which has a ground-breaking handling and putting away ability ready. Along these lines it enables sensors and other expected gadgets to be incorporated through its universally useful information/yield pins. Its superb reconciliation on chip is intended to possess least Printed Circuit Board region.

Figure 4.10: Connection Diagram of module ESP826



The module ESP8266 is connected to Rx and Tx pins of ATmega16 as shown in above block diagram and connected to pc or laptop via USB to serial converter.

Figure 2.11: Connection diagram of ATmega16 microcontroller.



ATmega16 is a microcontroller which has 32 Input/Output stick which makes it reasonable to interface and control 32 gadgets at any given moment. The associations are made as needs be as appeared above square outline which makes it a versatile and low power utilization gadget.

## V. CONCLUSION

This paper centers around the present need of Wireless innovation for all individuals whether they are youthful, old or incapacitated. The utilization of Wireless innovation accompanies benefits like convenience, wellbeing, efficient, less odds of mishaps and so forth. This remote innovation empowers an individual to work an apparatus without really coming to it. In this way, as referenced in above information, there are less odds of stun related mishaps.

The inserted framework serves to interface the equipment types to the programming projects so any individual can utilize the innovation with no troubles and issues. The Wifi innovation is connected to ATmega16 microcontroller and can be accessed through an Android application which is effectively accessible at playstore, subsequently making this innovation all out easy to use.

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