

## ***e*-AUTOMATIC MOTOR CONTROL SYSTEM**

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### **ABSTRACT**

*In this paper e-AUTOMATIC MOTOR CONTROL SYSTEM, focusing on the scenario which is beneficial for farmers and for residential use. When the water gets dried up in the underground level, there is a chance of motor getting affected. To overcome this problem I come up with a solution by using Embedded as a platform, I am developing a device so that the motor gets automatically ON/OFF.*

**Keywords:** GSM Module, ATmega16, DC Motor, Moisture sensor, Ultrasonic sensor.

### **I. INTRODUCTION**

In this paper I describe how *e*-AUTOMATIC MOTOR CONTROL SYSTEM works and was used for farmers and for residential use. When the water gets dried up in the underground level, there is a chance of motor getting affected. To solve this problem I develop a system which automatically ON/OFF Motor.

### **II. PROBLEM**

#### **Case 1:**

Submersible motors, like any electric motor, require a good voltage supply at the motor terminals. A leading cause of submersible motor is under voltage or voltage spikes. This leads to failure of the motor.

#### **Case 2:**

If the level of the ground water gets empty, then the motor gets damaged if it is running for longer time.

#### **Case 3:**

If the tank is full and the motor is left running for longer time it leads to the wastage of electricity and water.

### **III. PROPOSED SOLUTION**

The aim of this paper is to turn ON/OFF 230v motor, when all necessary requirements are satisfied.

- A sensor is fixed to the motor; it senses the constant voltage as 230V (Voltage lies between 230-250).
- If there is any fluctuation in voltage or the ground water level gets empty or if the tank overflows then the motor gets automatically off and when the water level in the overhead tank decreases and little water is left there is no need of switching on the motor manually, the motor gets on automatically.
- The alert message is sent to the user interface using GSM module.

### **IV. EMBEDDED C CODE**

Embedded C is a set of language extension for the C programming language by the C Standards committee to address commonality issues that exists between C and C extensions for different embedded systems. It supports access to I/O and provides ease of management of large Embedded Systems.

Embedded C uses most of the syntax and semantics of standard C, e.g., main() function, variable definition, data type declaration, conditional statements (if, switch, case), loops (while, for), functions, arrays and strings, structures and union, bit operations, macros, etc.

#### **V. GSM Module:**

GSM is a mobile communication modem; it stands for Global system for mobile communication (GSM).

GSM is an open and digital cellular technology used for transmitting mobile voice and data services.



A GSM network consists of the following components:

- **A Mobile Station:** It is the mobile phone which consists of the transceiver, the display and the processor and is controlled by a SIM card operating over the network.
- **Base Station Subsystem:** It acts as an interface between the mobile station and the network subsystem. It consists of the Base Transceiver Station which contains the radio transceivers and handles the protocols for communication with mobiles. It also consists of the Base Station Controller which controls the Base Transceiver station and acts as a interface between the mobile station and mobile switching center.
- **Network Subsystem:** It provides the basic network connection to the mobile stations. The basic part of the Network Subsystem is the Mobile Service Switching Centre which provides access to different networks like ISDN, PSTN etc. It also consists of the Home Location Register and the Visitor Location Register which provides the call routing and roaming capabilities of GSM. It also contains the Equipment Identity Register which maintains an account of all the mobile equipment's wherein each mobile is identified by its own IMEI number. IMEI stands for International Mobile Equipment Identity.
- The module we are using here is GSM Module-SIM 900.
- A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone.
- In our paper by using GSM the user can check the status (on/off) of motor.

#### **VI. PRINTED CIRCUIT BOARD (PCB):**

- A PCB is the backbone of every embedded system.
- After finalizing the components and the interconnection among them, a schematic design is created and according to the schematic the PCB is fabricated.
- PCB acts as a platform for mounting all the necessary components as per the design requirement.
- Components like capacitors, resistors are generally soldered on the PCB.
- Printed Circuit Board is used in the simplest electronic products.
- Manufacturing circuits with PCBs is cheaper and faster than with other wiring methods as components are mounted and wired with one single part.

## VII. ATMEGA 16



### ATMEGA16 MICROCONTROLLER:

- ATmega16 is the “Heart of our project”
- ATmega16 is an 8-bit high performance microcontroller of Atmel’s Mega AVR family with low power consumption.
- ATmega16 is based on enhanced RISC(Reduced Instruction Set Computing) Architecture with 131 powerful instructions.
- Microcontroller is used to store information in memory in the form of 1 and 0.
- ATmega16 has a static RAM of 1 KB and EEPROM of 512 Bytes.
- ATmega16 is a 40 pin microcontroller. There are 32 I/O (input/output) lines which are divided into four 8-bit ports designated as PORTA, PORTB, PORTC and PORTD.

## VIII. ARCHITECTURE

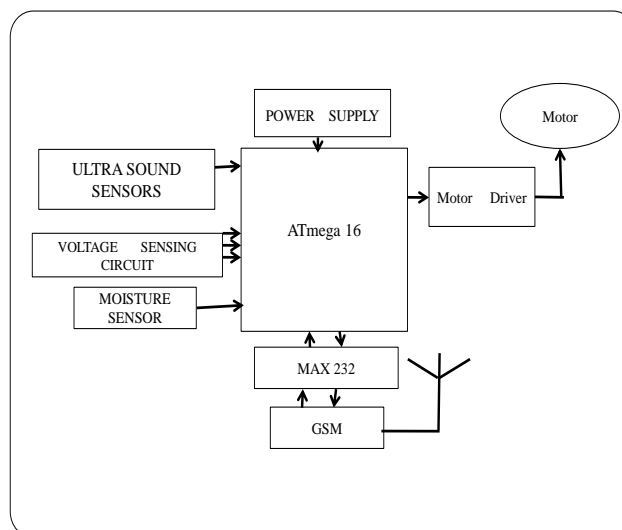


Fig: 1 Architecture of Project

## IX. WORKING OPERATION

Here ultrasonic sensor is placed at water tank and moisture sensor is placed at ground used to identify the water level in ground.

Ultrasonic sensor is used to identify the water level in water tank and send information to Atmega16. Atmega16 receives information from ultrasonic sensor if water level is low then immediately microcontroller check the water level in ground using moisture sensor, if sufficient water quantity is available in ground then

microcontroller turn ON the motor and also send a message to owner using GSM module. If sufficient water is not available in ground immediately microcontroller send a message (Motor will not turn ON) to owner using GSM. Now microcontroller continuously monitor the water quantity level in the tank if the tank is full then microcontroller turn OFF the motor and also send a message to owner using GSM.

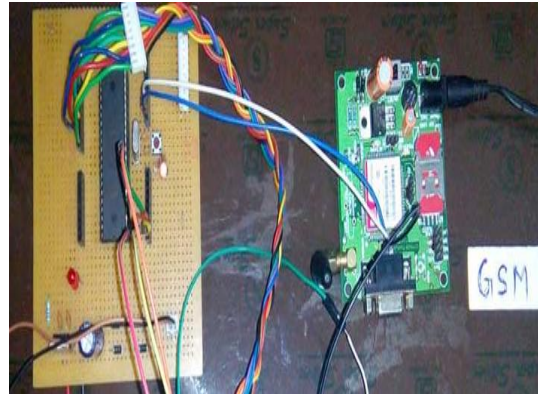


Fig 2 : GSM and ultrasonic sensor module interfacing to ATMEGA

#### X. ADVANTAGES:

- By using this device we have overcome the Problems major issues.
- It is easy to implement and cost effective.
- The life time of motor increases, when there is a constant voltage supply.
- The electricity and water will be saved due to automatic ON/OFF the motor.

#### XI. SAMPLE CODE for GSM:

```
AVR Studio - (C:\Users\SPHN\Documents\VALISE.asm)
File Project Build Edit View Tools Debug Window Help
Trace Disabled

delay_ns(2000);
PORTD_3=1; //GPS
delay_ns(2000);
disp_cstr(1,0," GPS TESTING.... ");
delay_ns(3000);

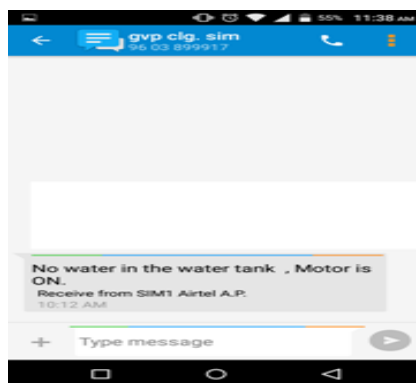
disp_cstr(1,0," GPS TESTED OK ");
delay_ns(3000);

delay_ns(1000);
PORTD_3=0; //GSM
delay_ns(2000);
```

## XII. RESULTS:

### Screenshots

1)



2)



## XII. CONCLUSION

With this paper I achieved the common user problem objective. This paper involved me in designing & development of automatic water level control system of software and hardware that connects together for solving the problem. This system employs the use of advance sensing technology to detect water in ground level and also in tank, and also gives the mobile alerts if there is no water in the ground.

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