

## CHAPTER 1

### INTRODUCTION

The project aims at making agriculture using automation and IoT(Internet of things) technologies. In this **IoT enabled smart pumping system for agriculture** project by using IoT one Android App have to design which is having some security system. Only authorized person will access this system. By using Android App the pump get on/off controlling on the remote place. Microcontroller will be used as controller. The input given from the Android App will be controlled by GSM after receiving data from GSM controller controls the pumps. Relay will be used to on/off pump. Mobile App will be used for checking status of that pump or process. The proposed system is based on ATMEL 89c51 microcontroller. The transmitter mobile phone which uses certain codes corresponding to a particular relay to which the device is connected at the receiver. GSM modem receives the message from the mobile phone and gives it to the microcontroller which acts as to control the device.



**Figure 1.1 IoT network**

## **CHAPTER 2**

### **LITERATURE SURVEY**

In early years the water is supplied manually to everywhere .it required lots of hard work and it also consumes tremendous amount of human efforts. There was also transportation problem since sources are far away from field.

After while the human needs transport the water quickly that's why there was demand for some technology to overcome the problem due to that issue the pumps were devolved for small scale works. It reduces time as well as human effort but it not up to the mark.

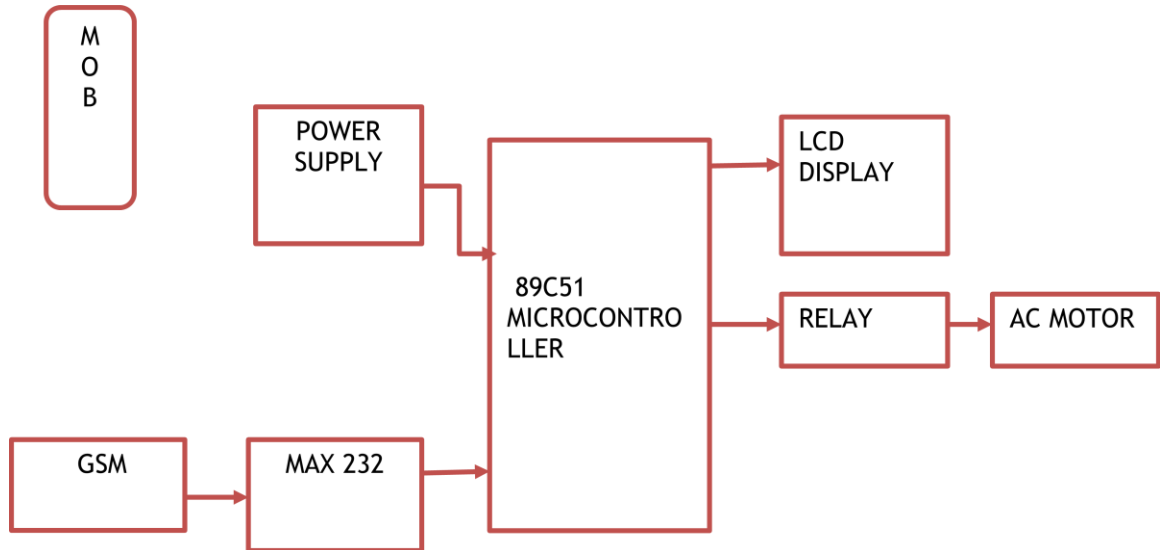
So there was some advanced technology used to increase the pressure difference mean while increase the discharge

Now it can reach up to more adequate levels or heights it also consumes less area than the previous one power consumption is get reduced and it is using for large scale industry

But one drawback is still there for starting or stopping the pump we need to operate switches manually. Due to unavailability of operator on time there will be wastage of water. For just starting or stopping purpose manual operator is required at the field.

## CHAPTER 3

### SYSTEM DESCRIPTION

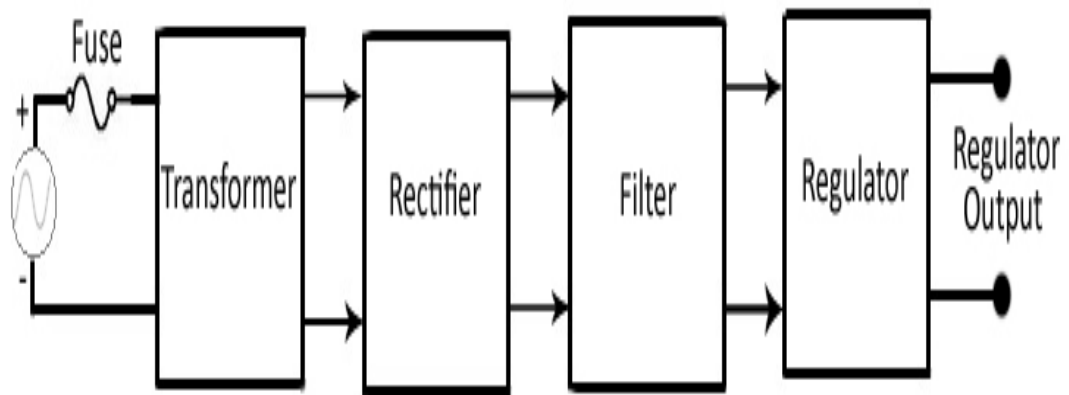


**Figure 3.1 Block diagram**

At the transmitter side the user sends a SMS to the GSM MODEM using AT commands indicating which device is to be controlled at the receiver side. Microcontroller controls the devices through relays depending on the code received by the GSM modem. LCD screen shows the display the message which is send through mobile via GSM

### 3.1.1 POWER SUPPLY

The microcontroller and the device get power supply from ac to dc adaptor through 7805 5 volts regulator the adaptor output will be 12v DC non-regulated; power supply unit is used for the conversion of available power of one set of characteristics to meet specified requirements.



**Figure 3.2 Power supply design**

### 3.1.2 GSM MODEM

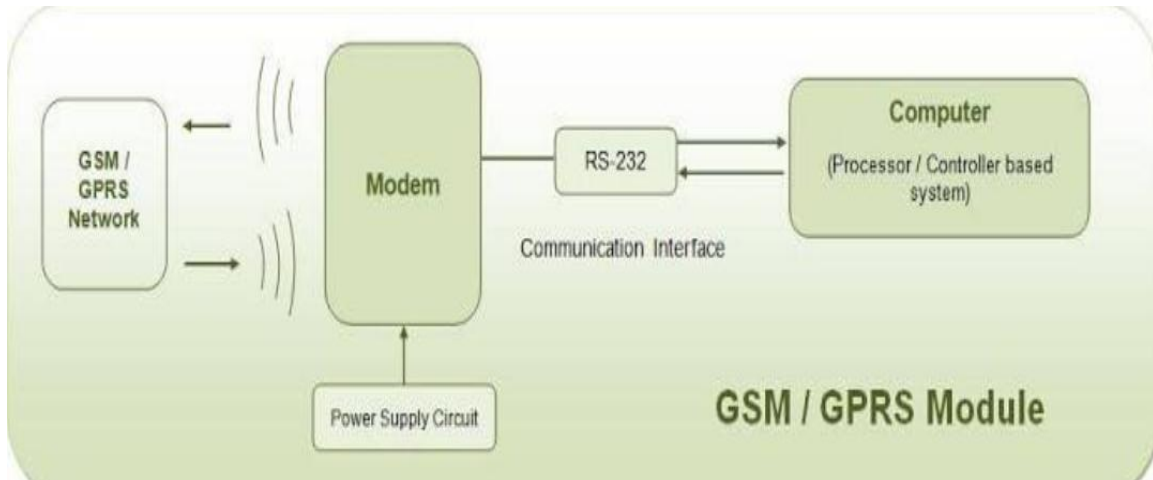
GSM modem is multifunctionality, ready to use rugged unit that can be embedded or unplugged into any application. The modem can be controlled and customize to various levels by using standard AT command. The modem comprises several interfaces—

1. Led functions including operating status
2. External antenna.
- 3 serial and control link.
- 4 power supply.
- 5 SIM card readers

#### Specifications

Frequency	890MHz/900MHz/1800MHz/1900MHz
GSM module	SIM 9000
Modem interface	Max232
Baud rate	9600bps
Power requirement	4.5 v-12v
Current requirement	<590mA
SIM9000 Temperature	-40c to 85c
weight	40g

**Figure 3.3 Specification of GSM**



**Figure 3.4 Working of GSM**

A GSM modem is a device which can be either a mobile phone or a modem device which can be used to make a computer or any other processor communicate over a network. A GSM modem requires a SIM card to be operated and operates over a network range subscribed by the network operator. It can be connected to a computer through serial, USB. GSM will allow communication anywhere, anytime, and with anyone. The functional architecture of GSM employing intelligent networking principles, and its ideology, which provides the development of GSM is the first step towards a true personal communication system that enough standardization to ensure compatibility.



**Figure 3.5 GSM Modem**

### 3.1.3 MICROCONTROLLER

The AT89C51 is a low-power, high-performance CMOS 8-bit microcomputer with 4K bytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard MCS-51 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 Flash on a monolithic chip, the Atmel AT89C51 is a powerful microcomputer which provides a highly-flexible and cost-effective solution to many embedded control applications.

➤ Features

- 1) Compatible with MCS-51™ Products
- 2) 4K Bytes of In-System Reprogrammable Flash Memory Endurance: 1,000 Write/Erase Cycles
- 3) Fully Static Operation: 0 Hz to 24 MHz
- 4) Three-level Program Memory Lock
- 5) 128 x 8-bit Internal RAM
- 6) 32 Programmable I/O Lines
- 7) Two 16-bit Timer/Counters
- 8) Six Interrupt Sources
- 9) Programmable Serial Channel
- 10) Low-power Idle and Power-down Modes



Figure 3.6 IC 89c51

### 3.1.4 MAX 232

Max 232 was created for one purpose to interface between data terminal equipment and data communication equipment serial binary data interchange. So as stated the DTE is the terminal of computer and the DCE is the modem or other communication device. The MAX232 device is a dual driver/receiver that includes a capacitive voltage generator to supply TIA/EIA-232-F voltage levels from a single 5-V supply. Each receiver converts TIA/EIA-232-F inputs to 5-V TTL/CMOS levels. These receivers have a typical threshold of 1.3 V, a typical hysteresis of 0.5 V, and can accept  $\pm 30$ -V inputs. Each driver converts TTL/CMOS input levels into TIA/EIA-232-F levels.

- 1) Meets or exceeds TIA/EIA-232-F and ITU recommendation V.28
- 2) Operates from a single power supply with 1.0uF charge-pump capacitors.
- 3) Operates up to 120 Kbit/s
- 4) Two drivers and two receivers
- 5) +- 30 v input levels ,Low current 8mA
- 6) ESD Protection Exceeds JESD 22
- 7) 2000-V Human-Body Model (A114-A)
- 8) Upgrade with Improved ESD (15-kV HBM) and 0.1- $\mu$ F Charge-Pump Capacitors is Available with the MAX202 Device.



Figure 3.7 IC MAX 232



### 3.1.5 RELAY

Relay uses an electromagnetic coil to move the poles of a switch when power is there. There are 3 pairs of connections known as common, normally open and normally close. The terminal block is the common (cd) connection and is connected either the upper or lower terminal block depending on the state of the relay

1. MI-1 pole series relay cover switching capacity 10A.
2. Slim type and small occupying area can offer high density P.C.Board technique.
3. Insulation distance of 8mm min. is designed. By using insulation that meets JIS insulation class E, a dielectric strength of 5000V min. and surge resistance of 1000V min is possible.
4. Employment of suitable plastic materials to be applied to high temperature and various chemical solutions.
5. Complete protective construction from dust and soldering flux.

#### **Vital role of relay:**

Switch on/off the device according to the microcontroller commands.

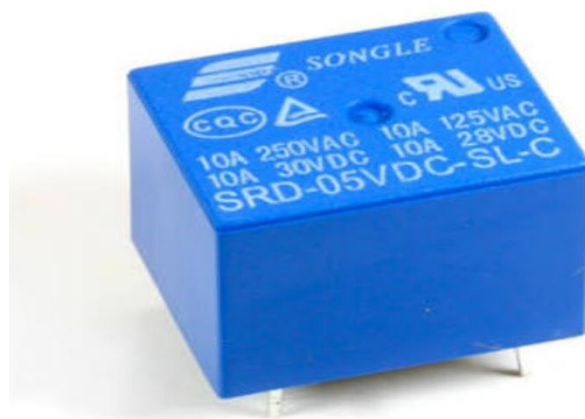
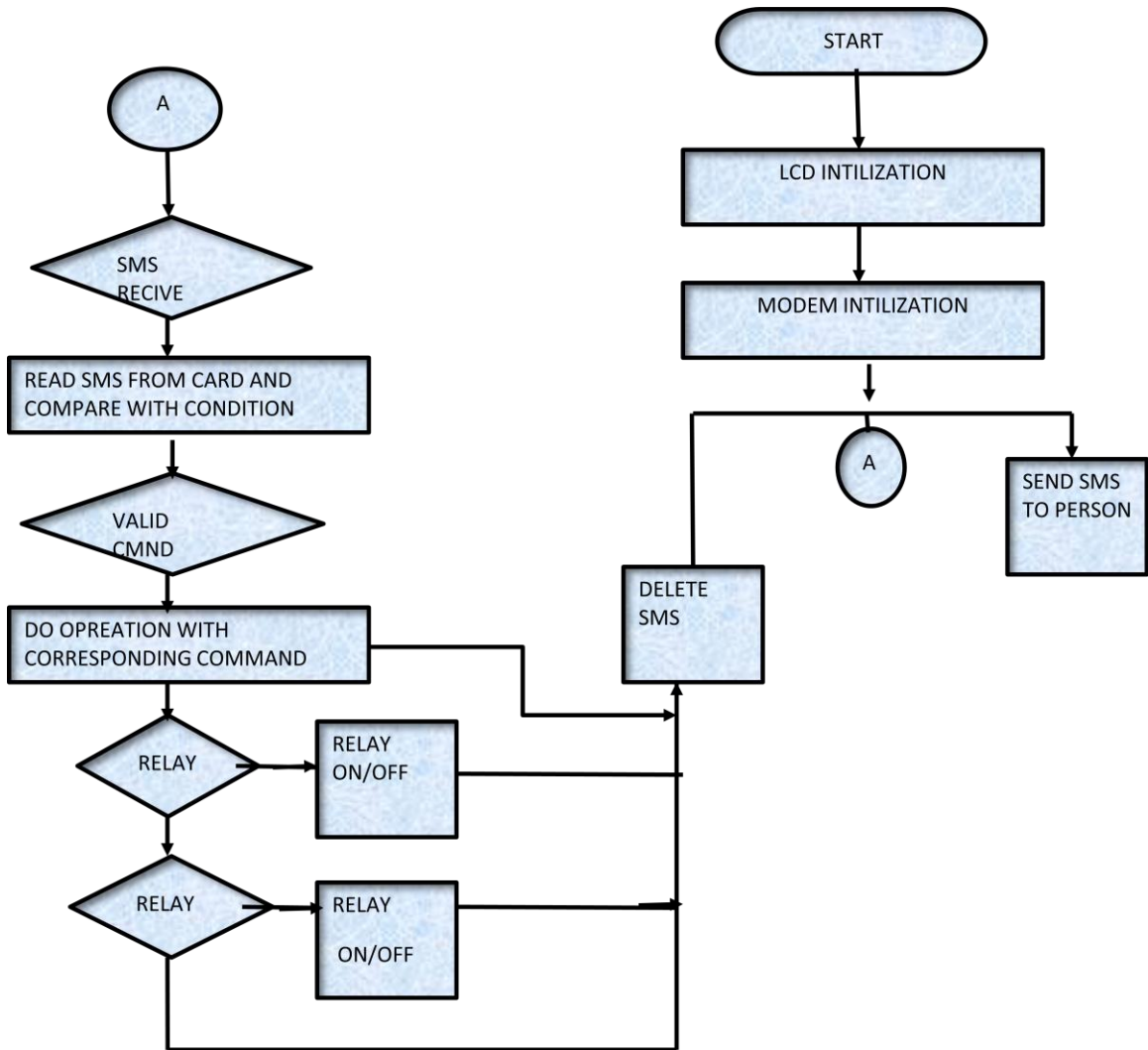


Figure 3.8 Relay

### **3.2 SOFTWARE DESCRIPTION**

- In this project one android app will used to operate the pump.
- There are various sites or methods from that android app are created. From all of that one method gets selected.
- Android app should be user friendly that is the first condition for the developing app. Because so many user are of this projects are farmers.
- There should be simplicity in the app.
- The procedure will be short for operating the app,

## 3.3 FLOW CHART



**Figure 3.9 Flow chart**

User sends SMS through mobile to GSM. GSM receives message and check whether it is valid or not if it is valid then GSM send the respective command to the microcontroller. Then microcontroller performs the operation as per the GSM command. As per the GSM command controller control the relay and status of the system displayed on LCD screen.

## CHAPTER 4

### ADVANTAGES AND LIMITATIONS

#### Advantages

- User can operate pump/motor from anywhere, from any distance
- User can operate pump via message.
- GSM technology, reliable operation, worldwide connectivity.
- Low cost.
- The status of various devices can be monitored and controlled from anywhere.
- The operation of system is very simple and can be used by anyone with a basic knowledge of operating mobile phone

#### Limitations

- Internet Connection is fluctuating which may create problems. SMS/Email Alerts has to send but may have range problem.
- For the operation specific app should be installed in the android mobile.

## **CHAPTER 5**

### **FUTURE SCOPE**

- It can be used for security using real time clock the appliances which need response in real time can also be controlled through the wireless link connecting more device.
- Provision to store several mobile number video recording once alarm get be created.

## CHAPTER 6

### APPLICATIONS

- Industry:-We can implement project in wide area over the machines and instruments. Control and Monitor circumstances by using concept of Artificial Intelligence and IoT.
- Constructions: - At the construction field it is useful.
- Power plant:-- To produce a energy or to produce electricity water is required
- Oil tank: -- In oil industry it can be used.
- Hospital: -We can plot sensors on patient's body and Doctor can check current status on his android phone and also take necessary actions and decisions.
- Home:-We can implement sensors to household appliances and monitor and control.

## **CHAPTER 7**

### **CONCLUSION**

Scarcity of water resources, rapid growth in urban population, stringent environmental regulations and process inefficiencies are some of the key challenges faced by India. A “Smart Pumping” system has the ability to combine greater efficiencies with GSM and microcontroller to regulate and control flow and pressure. Smart Pumping solutions ensure business profitability by collecting and managing real-time information on system performance and enable organizations or society to make better life style.

This project makes sense of any type of agricultural monitoring with very advance technique. Thus the agricultural are appreciated the technology which reduce their work and this project almost secure the overall system.

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