# SMART VILLAGE MONITORING AND CONTROLLING USING IOT &GSM

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## ABSTRACT

Now a day by the initiative taken by the Government of India in the scheme of “Smart India”, all villages will soon transfer to Smart Villages. This will be achieved by the Information Technology Platforms. For converting the Villages to Smart Villages, the Internet of Things (IoT) plays a major Role in India. By using IoT everything in the village is connected to the Internet and it is controlled by the users anywhere by remotely. In our project we have taken the problems in Smart Garbage System Soil Moisture Sensor to distribute water from the common tank to all users. In Garbage System the wSet and dry waste is identified separately and it regularly monitored whether the tank is full, then information given to municipality to clean that concern Garbage. In water level controller the utilization of water from common tank is controlled and managed by using the mobile application. Keep tracking of water level in the tank by float sensor and based on the water level it will be distributed to the users. The domestic public users also controlled by the user defined commands which is intercepted with the home of particular user.

Keyword; Gsm, Iot, Village Monitoring

## 1. INTRODUCTION

Some of India's greatest challenges are growing growth and rapid urbanization. This urban growth is inevitable to such an extent that the economic interests and

aspirations of the population are shifting and expanding. It will be reversed and managed properly by a variation of the "Smart City" standard of life between rural and industrial would include long-term social, economic and environmental development initiatives for rural populations that would be willing to inspire greater involvement in municipal government systems, promote creativity to create more diverse neighborhoods. "Smart Village" would ensure proper schooling, improved services, effective sewage systems, utilities, green health facilities, electricity, environmental control of waste, safe drinking water, resource quality, etc.

## 2. LITERATURE SURVEY

**Bah A et.al** proposed Sensor technologies for precision soil nutrient management and monitoring and discusses the potential of different sensors such as electrochemical sensors, radiometric and optical sensors, acoustic sensors and mechanical sensors. Such sensors play an important role in characterizing the soil nutrient variation and different soil nutrients in a non-destructive and rapid manner. They also suggested various sensors that are specifically appropriate to assess may be a few soil traits. The soil's physical and mechanical attributes are separated by acoustic sensors. [1].

S. Aswathy et.al proposed Smart Soil Testing aimed to provide services for soil testing at the farmer's doorstep by using the respective sensors to determine the pH material. The LCD is used to display the measured interest that allows farmers to receive a recommendation for crops and fertilizers on the website. Active observation helps the farmer to learn their land at any time. Data in the database must be analyzed effectively in order to produce efficiency. The smart soil monitoring system should provide a repository to help with the collection and processing of consumer details, plant data and fertilizer details. [2]

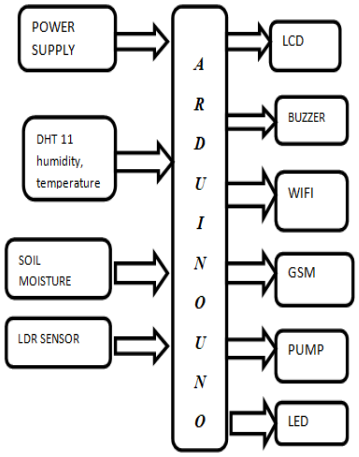
Anchit Garg et.al presented Applications of Soil Moisture Sensors in Agriculture. At present, the world is confronting a deficiency of water that is hampering rural turn of events and thus food creation. In this way, there is a requirement for prudent utilization of water and, in farming specifically, ideal utilization of water is significant since water is scant in many parts of India. Dampness from the dirt is key information in accomplishing ideal harvest water necessities. The dirt accomplishes limit on the field yet water permeation proceeds because of slender activity and gravity. In the event that dirt water surpasses the limit

of the field the overabundance water depletes out (immersion point). [3]

Sachin Kumar et.al proposed Techniques and methods for measuring soil pH. Soil pH is a principal field output level. As a consequence, the spatial variations will be discussed enough to strengthen the framework for the monitoring of agricultural precision. Soil pH influences the physical, concoction and organic properties of the soil. [4]

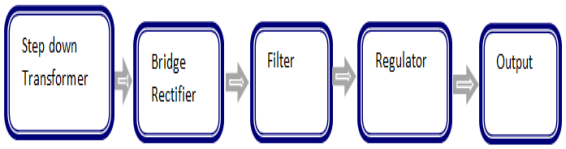
Rashid Hussain et.al proposed Control of Irrigation Automatically by Using Wireless Sensor Network and discusses that the Sensor of soil moisture detects soil moisture. The three layers of the soil are monitored by three sensors. Microcontroller controls the efficiency of the sensor and produces the signal. If the soil moisture level is high, the valve unit will remain closed and the valve unit will remain open when dry. The predictor indicates that the soil is dry or rainy. Microcontroller controls the operation of the engine and transmits data to the device. Irrigation water and livestock watering should be used for water conservation purposes. Heat raises the soil density and soil water content is conveyed via GSM-BLUETOOTH app to mobile farmers through SMS. [5].

## 3. BLOCK DIAGRAM




### 3. 1 Power Supply Block diagram:

A power supply block diagram represents the flow of electrical energy from AC input to regulated DC output through components like transformer, rectifier, filter, and voltage regulation.




### 3.2.Arduino-Uno Microcontroller Board

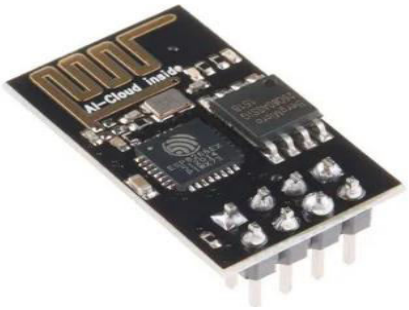

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller

and developed by Arduino. Cc it is easy-to-use hardware and Software. Arduino can input various sensors as input and reproduce the given output required for actuators, motors, etc. It's user friendly to those who have an awareness of basic electronics and C programming language. Arduino platform mainly contains a Hardware Board called Arduino Board & Software Arduino IDE to program it. Other external hardware as Sensor Modules, Motors, Arduino UNO, and Arduino Software (IDE)- 1.0. The Uno is a microcontroller board based on the ATmega328P. The Arduino consists of 14 digital input/output pins in which 6 are PWM outputs, and 6 are analog inputs, a USB connection, a power jack, and a 16MHz quartz crystal, an ICSP header, and a reset button. The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, Mac, OS, Linux) written in the embedded programming language. It is used to write and load programs on the Arduino board to rise from room temperature. The sensors can convert the result, which involves the change of output voltage, which triggers the detection.[10].

## 3.3 LCD


LCD signifies Liquid Crystal Display. An electronic display module, LCD finds its application in various electronic gadgets namely screens of calculators, mobile phones, television sets, computers etc. In this proposed module we utilize the 16× 2 LCD display. The representation- 16× 2, is indicative of the pixel matrix, having 16 columns and 2 rows, and thereby a possibility of having 32 characters. In here, each character is respectively made of 5× 8 pixel dots, thus making per character pixel count to be 40 pixels. The LCD display is easy to afford and extremely compatible.

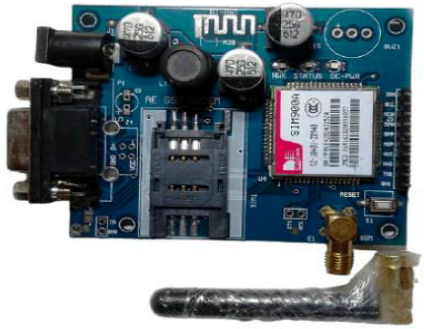
## 3.4 WI-FI MODULE




ESP8266 Wi-Fi Module is an independent system on chip with built-in TCP/IP protocol stack which allows the microcontroller to access the Wi-Fi network. The ESP8266 has the potential of either hosting an application or discharging the Wi-Fi networking functions entirely from an additional application processor. This module has a powerful enough onboard processing and storage capability that allows it to be

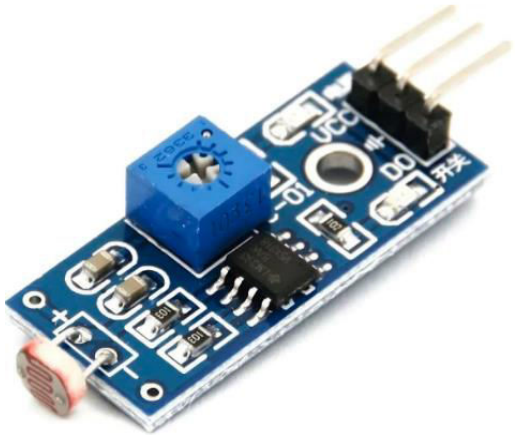
integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime.

## 3.5 GSM SIM900A



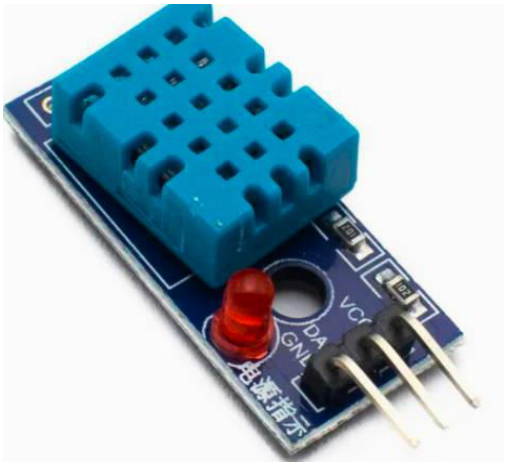
GSM/GPRS Modem-RS232 is built with Dual Band GSM/GPRS engine- SIM900A, works on frequencies 900/ 1800 MHz. The Modem is coming with RS232 interface, which allows you connect PC as well as microcontroller with RS232 Chip (MAX232). The baud rate is configurable from 9600-115200 through AT command. The GSM/GPRS Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. It is suitable for SMS, Voice as well as DATA transfer application in M2M interface. The on-board Regulated Power supply allows you to connect wide range unregulated power supply. Using this modem, you can make audio calls, SMS, Read SMS, attend the incoming calls and internet etc. through simple AT commands.

## 3.6 LIGHT SENSOR



A light-dependent resistor, also known as a photo resistor or photoconductor, or photocell, is a resistor whose resistance depends on light intensity. LDR's are lightweight, sensitive devices. The light sensor is a passive device that converts this "light energy," whether visible or in the infra-red parts of the spectrum, into an electrical signal output. Light sensors are more commonly known as "Photoelectric Devices" or "Photo Sensors" because they convert light energy (photons) into electricity (electrons). Photoelectric devices can be grouped into two main categories: those that generate electricity when illuminated, such as Photo-voltaic or Photoemissions, etc., and those that change their electrical properties in some way, such as photoresist or Photo-conductors. This leads to the following classification of device.

### 3.7 DHT 11 SENSOR

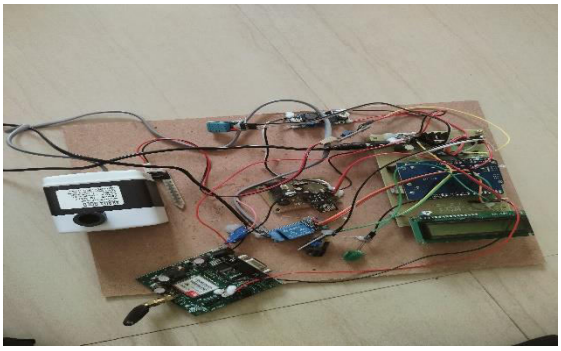


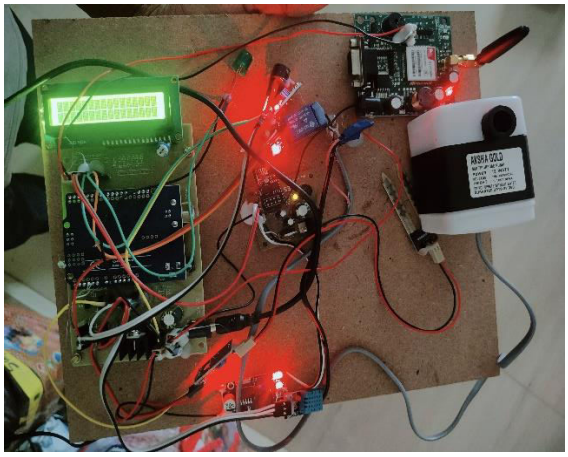

DHT11, shown in Figure 4, is a temperature and humidity sensor has four pins- VCC, GND, Data Pin and a not connected pin. A pull-up resistor of 5k to 10k ohms is probed for communication between sensor and micro-controller. DHT11 sensor consists of a capacitive humidity sensing element and a thermistor for sensing temperature. The humidity sensing capacitor has two electrodes with a moisture holding substrate as a dielectric between them. Change in the capacitance value occurs with the change in humidity levels. The IC measure, process this changed resistance values and change them into digital form [15,16,17]. For measuring temperature this sensor uses a Negative Temperature coefficient thermistor, which causes a decrease in its resistance value with increase in temperature.

### 3.8 DC PUMP

This device is very useful for many purposes. It is used in building science projects, fire extinguishing robots, fire fighting robots, fountain systems, and other things. This motor is small, compact and light. It is made to spray wiper water, hence its durability is high. It can be controlled by a microcontroller or Arduino using our DC Motor Drivers. You can also control it using our relay boards. You can also use our 12V SM PS power supply adapter to run this pump.

## 4. Output results





## 5. CONCLUSION

Smart Village‟ that aims to empower villages with through web service, measurement of environment factors like Soil moisture, LDR sensor, waste management sensor and implementation of cloud computing along with real time monitoring using GSM system. Internet of Things serves as powerful, reliable and cost-effective technology to implement the idea of „Smart Village‟ that aims to empower villages with advance rural connectivity through web service, measurement of environment factors like Soil moisture, temperature, humidity and implementation of cloud computing along with real time monitoring using GSM system. Though the investment cost for the project to be implemented in villages is pretty much, it helps reducing manpower for the same. One should also admit the fact that project will result in an environmentally friendly, quick responding, disciplined and tidy atmosphere all around the village. LDR is used for automatic street light monitoring. Street lights are ON during night time and lights are OFF at day time with the help of LDR. Using the proposed system, the model can be made completely automated and hence the objective of is to keep rural/urban area clean and avoid from environmental pollution by garbage monitoring system, and through automatic street light control the manpower and energy can be saved and from automatic water supply the power can be saved. Thus, it can be concluded with respect to the result obtained that the proposed prototype can be a better and play a vital role in projects like “swatch bharat” and in making Indian smart and clean. The proposed system can be further modified on different levels of designing and implementation. Many more facilities can be added. Through this model the India can be made smarter like aspects of any village such as Digital Display of the Government Subsidies and offers to farmers, Elearning for the students in schools to digitize the India.

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