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Smart Farming

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Abstract— *Smart farming is an emerging concept, because it reduces man power and to increase yield . The paper aims making use of evolving technology i.e. smart agriculture using automation and manual control using Android application. Monitoring environmental factors is the major factor to improve the yield of the efficient crops. The GSM module has been used to establish a communication between the farmer and the field. The feature of this paper includes monitoring temperature and soil moisture in agricultural field through sensors using Arduino UNO. The farmer can control the system from anywhere in the world using an Android application thereby reducing the man power and time.*

I. INTRODUCTION

Agriculture is the backbone of all developed countries. It uses 85% of available fresh water resources worldwide and this percentage continues to be dominant in water consumption because of population growth and increased food demand. Due to this the major concern in arid and semi-arid areas. An automated system is needed to optimize water use and man power for agriculture crops. The need of automated system is to overcome over irrigation and under irrigation. Over irrigation occurs because of poor distribution or management of waste water, chemical which leads to water pollution. Under irrigation leads to increased soil salinity with consequent buildup of toxic salts on the soil surface in areas with high evaporation. To overcome these problems and to reduce the man power smart farming system has been used.

II. LITERATURE REVIEW

Archana and Priya (2016) proposed a paper in which the humidity and soil moisture sensors are placed in the root zone of the plant. Based on the sensed values the microcontroller is used to control the supply of water to the field. the field status.

Sonali D.Gainwar and Dinesh V. Rojatkar (2015) proposed a paper in which soil parameters such as pH, humidity, moisture and temperature are measured for getting high yield from soil. This system is fully automated which turns the motor pump ON/OFF as per the level of moisture in the soil. The current field status is not intimated to the farmer.

V. R. Balaji and M. Sudha (2016) proposed a paper in which the system derives power from sunlight though photo-voltaic cells soil moisture sensor has been used and based on the sensed values PIC microcontroller is used to ON/OFF the motor pump. Weather forecasting is not included in this system .

R.Subalakshmi (2016) proposed a paper to make irrigation system simpler, the complexities involved in irrigation is tackled with automation system using microcontroller and GSM. Based on the sensed values from soil moisture, temperature and humidity sensors, the GSM sends message to the farmer when these parameters exceed the threshold value set in the program. The nutrient content in the soil is not

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determined by this system .

Karan kansara (2015) proposed an automated irrigation system where the humidity and temperature sensors are used to sense the soil conditions and based on that microcontroller will control the water flow. Farmer will be monitor the nutrient content in the soil .

Prof C.H.Chavan and P.V.Karnade (2014) proposed a smart wireless sensor network for monitoring environmental parameters using Zigbee. These nodes send data wirelessly to a central server, which collects data, stores it and allows it to be analyzed then displayed as needed and also be sent to the client mobile. Weather forecasting and nutrient content is not determined in this system .

G.Parameswaran and K.Sivaprasath (2016) proposed a smart drip irrigation system using IOT in which humidity, temperature and pH sensors are used. Irrigation status is updated to the server or local host using personal field condition without internet .

S.Reshma and B.A.Sarath (2016) proposed an IOT based automatic irrigation system using wireless sensor networks in which various sensors are used to measure the soil parameters. This system provides a web interface to the user to monitor and control the system remotely. Weather monitoring is not done in this system .

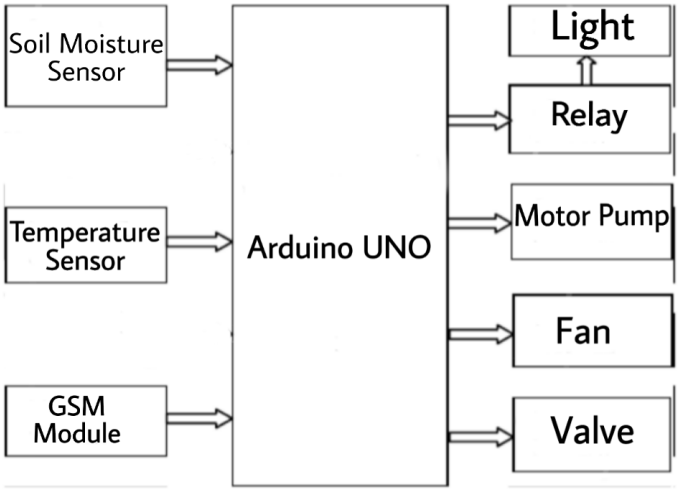
Joaquin Gutierrez (2013) proposed a gateway unit which handles sensor information, triggers actuators, and transmits data to web application. It is powered by photovoltaic panels and has duplex communication link based on cellular internet interface that allows for data inspection and irrigation scheduling to be programmed through web page .

Yunseop kim (2008) proposed a paper in which the field conditions were site-specifically monitored by six in-field sensor stations distributed across the field. The GPS and wireless communication has been used to intimate the farmer. Without internet the farmer cannot access the information about the current field status .

III. PROPOSED METHOD

In our proposed system, we had done five process using the relays and Tip120 thyristor for each process. Here we use Arduino UNO, the battery is given as an input supply. Solar panels are used for producing the power. The field was completely covered with glasses so that the pests cannot intrude into the field, hence reducing the use of pesticides. When the soil becomes dry the motor starts pumping water into the field. The soil moisture sensor is used to measure the soil moisture. When the temperature of the field becomes high, the fan operates and reduces the temperature. The temperature sensor is used to sense the temperature of the field. Side by side it provides the good quality fertilizers. The over usage of fertilizers are also leads to the plants death. To prevent the plants from over fertilizers, the time delays are set using the relays. It also provides the special functions. During rainy season the exposure of plants to the sunlight will be less. To avoid this difficulty, a monochromatic light is used which provides the necessary light.

IV. BLOCK DIAGRAM



1. ARDUINO

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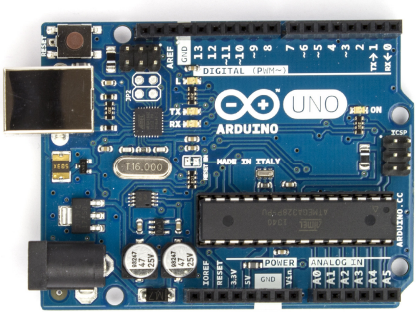
The *Arduino Uno is a microcontroller board. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform "Uno" means one in Italian and is named to mark the upcoming release of Arduino. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform "Uno" means one in Italian and is of USB Arduino board, and the reference model for the Arduino platform.*



2. BATTERY

Here is the circuit diagram of a simple and straight forward 12 V battery charger circuit with diagram. This circuit can be used to charge all type of 12V rechargeable batteries including car batteries. The circuit is nothing but a 12V DC power supply with an ammeter for monitoring the charging current. The two diodes forms a center tapped full wave rectifier. The capacitor filters the rectifier output to produce a clean 12V output.

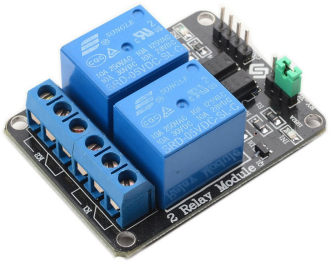
3. RELAY

Relay is a electrical operated switch. Relay is used to isolate electrical load.

Two configurations:

1. NO (normally open)
2. NC (normally close)

Relay have coil with is energize by 12V, When coil energized Switching action takes place.



4. MOTOR

DC motor is small in size, inexpensive and powerful. It is used in robotics for their small size and high energy out. A typical DC motor Operates at very Speeds. Gear reduces the speed of

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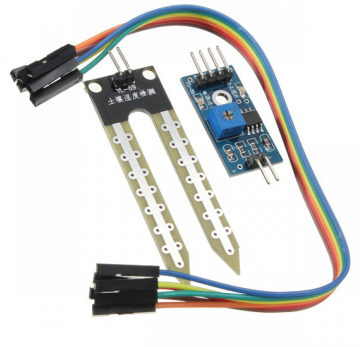
motor and increase the torque.

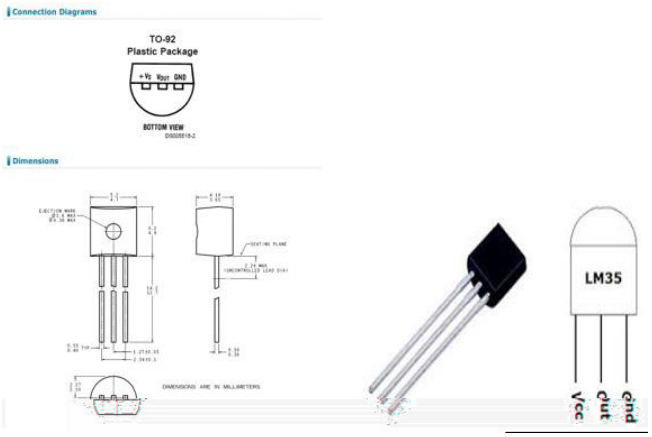
5. SOIL MOISTURE SENSOR

Soil moisture sensors measure the volumetric water content in soil. Since the direct gravimetric measurement of free soil moisture requires removing, drying, and weighting of a sample, soil moisture sensors measure the volumetric water content indirectly by using some other property of the soil, such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content.



6. TEMPERATURE SENSOR

The Temperature Sensor LM35 series are precision integrated-circuit temperature devices with an output voltage linearly proportional to the Centigrade temperature. The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient Centigrade scaling. The LM35 device does not require any external calibration or trimming to provide typical accuracies of ±¼°C at room temperature and ±¾°C over a full −55°C to 150°C temperature range



7. GSM MODULE

GSM (Global System for Mobile Communication) is a standard developed by the European Telecommunication Standards Institute (ETSI) to describe protocols for second-generations (2G) digital cellular networks used by mobile phones. GSM describes a digital, circuit-switched network optimized for full duplex voice telephony and also expanded to include data communications, packet data transport via GPRS (General Packet Radio Services). The longest distance the GSM specification supports in practical is 35 kilometers (22mi).

V. ADVANTAGES

- *Reducing the risk of electric shocks, deaths due to poisonous creatures in the fields.*

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- *Reducing the man power*
- *Watering depends on the moisture level present in the field.*
- *The system can be controlled using an Android application*
- *Efficient and low cost design.*
- *Fast response.*
- *User friendly*
- *Reducing the use of pesticides*

VI. CONCLUSION

The main objective of this smart farming system is to make it more innovative, user friendly, time saving and more efficient than the existing system. Measuring two parameters such as soil moisture and temperature. By using the Android application the farmer can control the system from anywhere .

VII. REFERENCE

[1] Sonali.D.Gainwar and Monitoring with Automatic Irrigation Journal of Science, Engineering and Technology Research(IJSETR),vol-04,Issue 11,Nov 2015.

[2] R.Subalakshmi and Anu Amal, Issue published in International Journal of Trend in Research and Development (IJTRD), March-2016

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[3] Karan Kansara and Vishal Zaweri, International Journal of Computer Science and Information Technologies, vol-06, 2015.

[4] Wireless Monitoring of Soil moisture, Temperature and Humidity using Zigbee International Journal of Engineering Trends and Technology (IJETT) ,vol-11, May-2014.

[5] G.Parameswaran and K.Sivaprasath, International Journal of Engineering Science and Computing (IJESC),May-2016.

[6] S.Reshma and B.A.Sarath Manohar Automatic Irrigation System using International Journal and Magazine of Engineering, Technology, Management and Research, vol-03, Issue-09, Sep-2016.

[7] Joaquin Gutierrez and Juan System using a Wireless sensor Network Transactions on Instrumentation and Measurement, 2013.

[8] Yunseop Kim and Robert of an Irrigation System using a Distributed Wireless Sensor Network" presented at IEEE Transactions on Instrumentation and Measurement, Vol-57, July-2008

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