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ANALYSING SMART SECURITY AND MONITORING DEVICE USING IOT AND MANUAL METHOD FOR AGRICULTURE

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Abstract:

Agriculture is a process of harvesting any raw materials by cultivating plants, livestock farming is an activity associated with growing up domestic animals for human needs. The agriculture sector being the backbone of Indian economy, we have to consider some challenges such as security and maintenance. The need for smart technology now a days in real time problem sensing security system is in its peak demand. Technologies like Internet of Things (IOT) and wireless sensor networks can be integrated with traditional methods of agriculture to invade modernization. This necessity in current situation brings the invention of IOT based machines to sense, analyze and transmit the real time data to its user. It can be installed in agricultural fields, and easily monitored or controlled from any remote locations. This article is oriented to emphasize the methods measure the temperature, water level, moisture such problems. The scripting language used for the functioning of sensors and electronic device is python. The device can be used to deliver the live notification based on the processing and information analysis in the absence of human efforts and also without using manual methods. For example, lifting water by different manual method is physically strenuous.

Keywords: - IoT, Wireless sensor network, Agriculture modernization, Wifi module.

Introduction:-

In countries like India, Agriculture is the main occupation and the farmers involved in the agricultural productivity are the backbone. About 22% of total country's Gross Domestic Product GDP value includes agricultural production. The net cultivated area is around 142.5 million ha, in a total of 329 million ha of land cover. Nearly 70% of countries resident belongs to its villages or rural areas, and the majority of them having agriculture as their livelihood activities. Providing solutions to their problems associated in the farming is the responsibility of each individual, IOT the latest emerging internet technology is one of the best technologies which can be used for the above needs. Over the past years information and production and transportation. Wireless sensor networks(WSNs) can be defined as self configured infrastructure less wireless networks to monitor physical and environmental condition such as temperature, moisture, humidity, rainfall, nutrient content .To monitor the farms in the field using the concept of IoT. In existing method we use technology of GSM to monitor the farms through the messages. Here all the farms are noted by the sensors and notifications are sent through the GSM which cost more. Here message charge also has been calculated and its problem when there is no signal in that area. In this method that obtainable to involve in monitoring the crop growth and agricultural field and has to be debate. The application of technological tools in common content areas like school and college education is to allow students to learn technology integration and to apply their problem-solving skills. Technologies like Internet of Things (IOT) and wireless sensor networks can be integrated with traditional methods can lead to agricultural remodeling. The

basic building blocks of an IoT systems are Sensors, processors and applications. The sensors confederated with micro controller ,data from the sensor is displayed on the mobile app of the user.

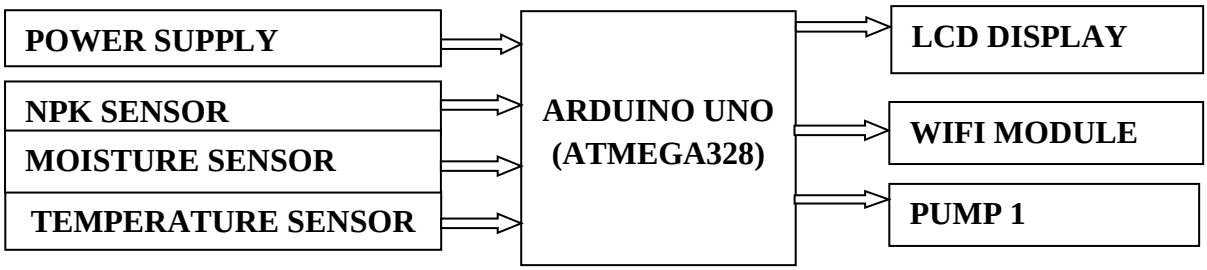
METHODOLOGY

Generally, traditional methods are said to be any culture, or a tradition followed for a while, which are transferred from one generation to another. This transfer of knowledge periodically invaded by small advancement and modernization to form a modified new technology. In this term of security characteristic sensor is used to temperature, moisture, rainfall, humidity ,nutrient content of the soil here the Temperature sensor used to monitor the temperature of the soil. Moisture sensor which is used to measure the moisturizing level of the soil. Rain switch or Rain sensor is a sensor which gets activated by rainfall and it is a water conservation tool attached to the automatic irrigation system. NPK sensor is used to judge the fertility of a soil by measuring the percentage of Nitrogen, Phosphorous, Potassium present in the soil.

MATERIALS

Arduino uno board, NPK Sensor, Moisture Sensor, Temprature Sensor, LCD Display, WIFI Module, pump 1.

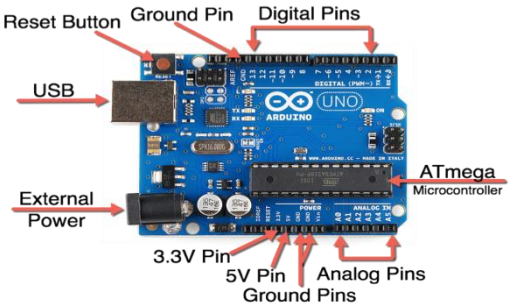
BLOCK DIAGRAM



Block Diagram

ARDUINO UNO

Arduino Open-Source Single Board Computer Board, It can be used to supply the power supply to the board and can act as a serial device to connect the board to a computer system. Arduino UNO is a flexible, open source, easy-to-programmable and low-cost microcontroller board that can be incorporated into a range of electronic design.



Arduino UNO board

POWER SUPPLY

The Arduino UNO board can be powered via USB connection or with an external power supply. The power source is selected automatically.

REGULATED POWER SUPPLY

An electronic circuit that is designed to regulated power supply by providing a constant DC voltage of fixed rate throughout the load depots irrespective of AC mains load variations or fluctuations.

TEMPERATURE SENSOR

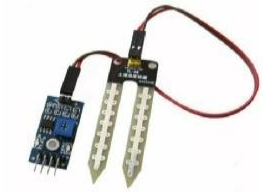
A temperature sensor is used to measure the real time temperature of the device through electrical signals. The sensor consists of two metals, which generate an internal resistance or drop in electrical voltage once it notices any change in the system temperature.

8 DHT11 Humidity and Temperature Sensor Module

SOIL MOISTURE SENSOR

Soil Moisture Sensor (SMS) is used to determine the moisture content in soil near to active root zone in an

irrigation system before each scheduled event and cancel the irrigation cycle if the moisture is above field capacity (depends on type of soil and crop). The sensor with two electrodes is set at point A and B, a small charge is passed on one electrode of the sensor and electrical resistance between the electrodes are measured. As the soil moisture or water used by plants decreases, water is drawn from the sensor and resistance increases. On the other hand, as the soil moisture increases, the resistance decreases.



SOIL MOISTURE SENSOR

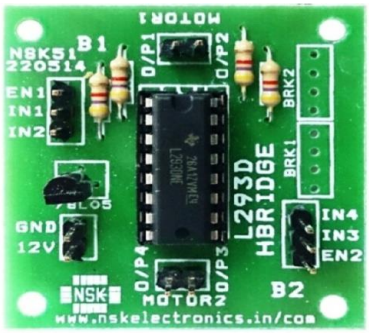
NPK SENSOR:

The soil NPK sensor is used to determine the fertility of a given soil sample by measuring the percentage of Nitrogen, Phosphorous, Potassium present in the soil. Apply NPK fertilizers @40:20:40 Kg/acre. Apply 1/3 of N, entire P and 60% of K as basal does at the time of planting.

NPK SENSOR

MOTOR DRIVE:

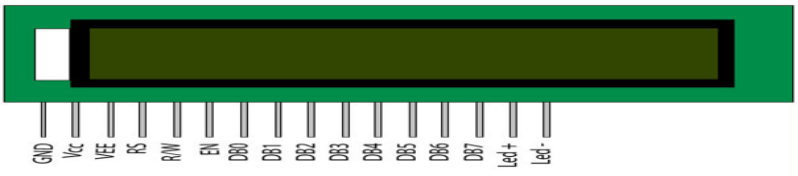
The working speed and direction of motors are controlled by a module called motor drive. In this project a motor driver is developed based on L293D IC. Which consists of 16 pins, 8 for 1 motor and capable of controlling two motors simultaneously. L293D is designed to offer bidirectional drive currents at voltages varying from 5 V to 36 V.



MOTOR DRIVE

LCD DISPLAY

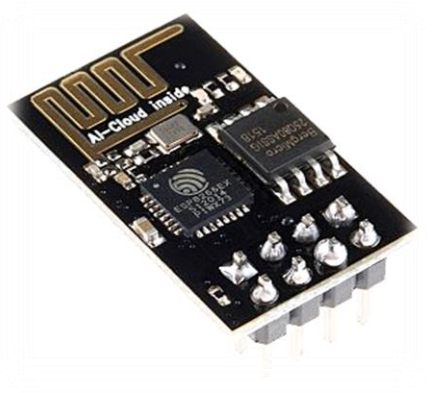
Liquid Crystal Displays (LCDs) are used to display the readings, having advantage of thinner display and less power consumption comparing to Cathode Ray Tubes (CRT). LCD takes over the display industry replacing CRT and being used in very common applications like digital watches, computers, DVD and CD players.



LCD DISPLAY

WI-FI MODULE

Wi-Fi Module (ESP8266) is a self-controlled SOC with unified TCP/IP protocol chip that can allow any microcontroller unit to access your Wi-Fi network. The ESP8266 can either host a Wi-Fi signal or offload any Wi-Fi networking functions from another module within the range. This module is used to perform heavy on-board processing and storage ability that allows it to be included with the sensors and other function oriented gadgets through its GPIOs with minimal runtime loading and minimal up-front development. Its high level of on-chip assimilation permits for very low outside circuitry, with the front-end module to occupy negligible PCB area. The Wi-Fi Module supports Bluetooth co-existence interfaces and APSD for VoIP applications, it also contains a self-calibrated RF permitting it to run in all operating conditions without any external RF parts. ESP8266 are applied in Wi-Fi location-aware devices, Smart power plugs, Industrial wireless control, home automation, and Security ID tags.



WIFI Module

WATER PUMP MOTOR:

A water pump is used to increase the water pressure in order to pump it from one place to another.

DC PUMPING MOTOR

EXPERIMENTAL PROCEDURE

we use the concept of IoT (Internet of Things) to monitor all the sensors in the farm. Here we use internet for monitoring all the sensors. By this process we are able to monitor all sensors and motor condition continuously through the internet. Here we get the response back from the internet weather device has switched on or switched off and also the status of the device is continuously noted in the server and it can be utilized through the internet

ANALYZING

Onions are a much-loved bulb of the Indian subcontinent. Eaten raw, cooked in gravies, stews and soups, it is hard to imagine a dining table spread without this versatile vegetable. Onions are easy to grow and do not need a lot of space. But before we get into the process, here are some pointers for you to keep in mind, Onions need cool and pleasant weather without humidity and rain. Thus, the best time to grow onions is between November and February. Any open space or even a container can be used for growing the bulb. But ensure that the soil is fertile and porous.

Method of cultivation 1 – Growing onions in your field

Onion seeds: source them from a nursery or buy them online.

Tray

Grow bags

Organic fertilizers

Cow dung

Water

Step 1: Prepare the Seeds Soak the onion seeds in water for one day. Drain and keep them in the open for the next 2-3 days. Later, sow the seeds in the soil in a tray.

Step 2: Demarcate Space to Grow the Plant & get the Soil Ready The seeds take about 6-8 weeks to sprout. In the meanwhile, prepare the place where you intend to sow the saplings. It could be your balcony, backyard or a grow bag. You will need fertilizers to nourish the plant. While farmers use cow dung, urea, 'Rajphos' and potash, you can avoid going down the chemical route and use organic fertilizer instead. Buy them here.

Step 3: Keep an Eye on the Tray demarcate space to grow the plant & get the soil ready Monitor the saplings on the tray. Water regularly to ensure the soil is moist to facilitate growth. Once the saplings in your tray sprout, plant them in the demarcated space.

Step 4: Ensure the Saplings Are Sown in Rows These have to be 15 cm apart. So the bulbs have enough space to grow and not hinder each other's growth.

Step 5: The Crop Will Be Ready for Harvest in Four to Five Months & demarcate space to grow the plant & get the soil ready You will know that the plant is ready when the tops of onions are visible above the soil. Once the leaves begin to shrivel, you can pull out the bulbs from the soil.

Step 6: Once Harvested, Pile the Harvested Onions with the Leaves Leave them for three days. Then, cut off the leaves one centi metre from the bulbs. The leaves too can be cooked. Once they are left under mild sunlight to dry.


Method 2: Sprout Brand New Onions From Old Bulbs

Step 1: Select a Container & demarcate space to grow the plant & get the soil ready Ensure it is six inches deep. The width can be decided based on how many onions you want to grow. Use a tub as a container if required.

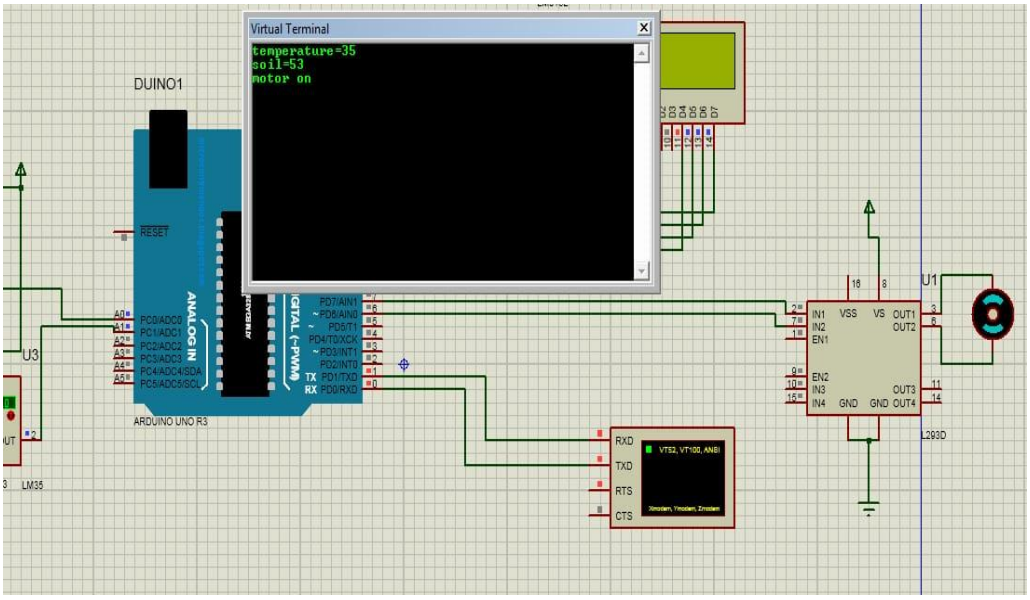
Step 2: Add Soil Fill the container with soil enriched with manure and compost. Leave about 1-inch space at the top.

Step 3: Use the Starter Onion Bulb From Leftover Cooking Scraps & demarcate space to grow the plant & get the soil ready This refers to the root part of the onion. Though discarded when cooking, save this part and and use it to grow onions.

Step 4: Plant the Onion Bulb About 2 Inches Deep Into the Soil Dig a 2-inch deep pit. Place the bulb inside. Then, cover the bulb with soil and add water till the soil is moist.

RESULTS AND DISCUSSION

The device is integrated with all the above sensors in the board. The hardware components include the microcontroller, DC motor, ADC converter, LCD, WIFI module, water pump and all the discussed sensors. A GSM SIM card is inserted, which is used to send the recorded values to the owner and receive the command. The figure shows the temperature, soil moisture condition and the intruder detection. The Android Application developed in the mobile phone sends the second result based on the output from these values. The system can define the humidity, temperature, moisture and the intruder detection. Here we showed the onion bulbs , using sensors we monitor the health& growth of the crop its comes well with high yield when compared to manual method.



CONCLUSION

This suggested work is aimed to help the farm workers and provides additional support economically during farm operations such as irrigation, harvesting, security of crops, etc., This phase of work can minimize the usage and wastage of irrigation water, and also the power consumed for its application in the motive of conservation for future needs. This system provides a very easy method of controlling the field, by the complete observation of sensors in the fields by ensuring the farm's security.

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