AGRO SENSOR

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ABSTRACT:

In the present era agriculture is the essential and basic need of human beings. Even agricultural fields also have advanced nowadays. With an increase in the population so as to avoid the scarcity of food modern technology is needed in agriculture. However, monitoring is essential to every farmer. A little help from the advanced technology in agriculture makes the work of farmers easier. The massive problem for the farmer is removing the weed from the field and also monitoring the field. To avoid these situations smart crop monitoring and weed removal are done with advanced technologies. Automatic irrigation system is also included. Weed removal is done after the weed detection and it is plucked automatically with weed pulling by a moving drone and the crop can be monitored. We monitor humidity, temperature, soil moisture, and color of the plant. It will be more useful to farmers what the crop requires. The sensors will notify the registered mobile phone. It will be more helpful for the farmers to know more about the crop. By using a color monitoring sensor, we can know whether the plant is affected by pests or any other diseases. Arduino and raspberry pi are used for controlling the sensors. By implementing automatic weed cutting and smart monitoring of crops it will be more effective for farmers for commercial production. Crop cutting is done by using a moving robot as while moving the blade will automatically cut the weeds.

KEYWORDS:

HUMIDITY SENSOR, TEMPERATURE SENSOR, SOIL MOISTURE, COLOR MONITORING SENSOR, IMAGE PROCESSING SENSOR, SOLAR WEED-CUTTING ROBOT.

INTRODUCTION

Agriculture is the backbone of our country's economy. It is one of the basic needs and most of all it is the art of cultivating the soil and growing crops. In the present era, as the population increases every year the need for food is also increased. It is the main traditional occupation of our country. To manage the situation modern technology is needed for the farmers to cultivate a variety of crops as climate change is not accurate. Planting a crop requires a correct amount of soil's fertility, moisture, and humidity. Nowadays, it is slightly not possible to predict the accurate need

For food scarcity and water scarcity occur due to the increasing population. So, to avoid the problem we have to promote the agriculture sector. But water wastage is more in the sector in the form of water logging while watering the agriculture fields through watering. Therefore, an automatic plant watering system has to be designed for the proper water supply in the fields. This project deals with an automatic plant watering system that automatically senses the moisture content of the soil and decides whether watering is needed or not and how much water is needed for the soil. This system uses an Arduino microcontroller. It is programmed to sense the moisture content of the soil time by time. When the moisture content is less than the limit which is predefined, it will start supplying the desired amount of water by using controller. We use sensors to sense the humidity, temperature, soil moisture, and color monitoring sensor.

Weed is one of the main problem's farmers face nowadays. The more the weed is removed the more it grows. The farmers will remove the weeds repeatedly as the weeds absorb the nutrient given to the crop. The weed can be removed by cutting it off. Weeds are the main reason which destroys the plant and it will absorb more nutrients

than the normal plant that we gown. So the weed has to be removed at the instant of time. some of the commonly grown weed plants are common chickweed, common ragweed, plantain, and crabgrass. Weeds are grown in most areas like wet portions of field-shaded regions, compact soil, and paddy fields some weeds are grown with beneficial of the organism, nutrients foods, and fodder. Some weeds contribute essential biological control of insect pests.

EXISTING SYSTEM

In the existing system, the crops can only be monitored by sensing elements. In smart crop monitoring, raspberry pi is used as the supercomputer. It is a hardware device that is used for simple coding. The purpose of this raspberry pi is for communication of the sensors. It can connect more sensors but the system cannot detect the accuracy of the climatic condition. And also, the existing system works as a semi-automatic cutter.

PROPOSED SYSTEM

In the existing system, the Raspberry works for only around 5 volts to rectify this problem the Arduino board is used because it can work around 25-30 volts. Arduino board has quick programming software+ Arduino is often used for interfacing with sensors because it is a microcontroller-based platform that is specifically designed for low-level hardware control and interfacing with external devices, including sensors. Arduino supports a wide range of sensors, including temperature, humidity, and moisture. This makes it a versatile platform for various applications.

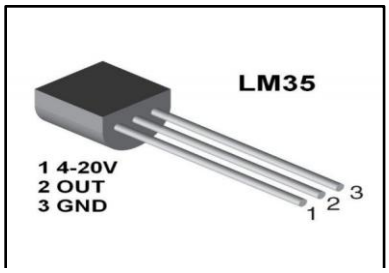
Automatic irrigation can be done by interfacing an Arduino board with a soil moisture sensor. Here are the steps to set up an automatic irrigation system. Automatic irrigation can be very useful for farmers by saving time and labor, conserving water, increasing cropping, and improving plant health. In this proposed system automatic weed-cutting system uses renewable energy (solar energy) as its main supply. Automatic weed cutting can be very useful for farmers as it helps to reduce the amount of manual labor required for weed control, saving time and reducing the use of herbicides and other chemicals, promoting a more sustainable and eco-friendly approach to farming.

During the early detection of issues with crops such as pest, diseases, and weather-related issues can be detected much earlier than traditional methods. This allows farmers to make protective measures to solve their problems. To implement precision agriculture sensors and other advanced monitoring technology, farmers can analyze the need of crops including soil moisture, humidity, and temperature. Farmers can better manage the sources like water, fertilizer, and pesticides. Advanced technology can provide farmers with real-time data about their crops, allowing them to make more informed decisions. This includes the decisions related to planting, harvesting, and irrigation.

MATERIALS AND METHODS:

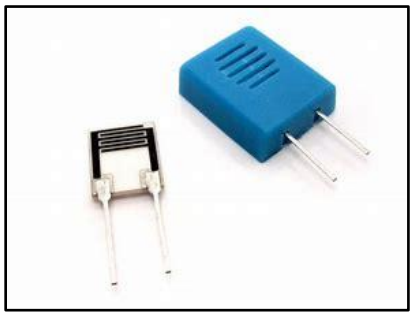
1. LM35

The LM35 is a popular sensor. It provides an analog voltage that is proportional to the temperature measured. It can measure the temperature around the range of -55degree Celsius to +150degree Celsius with an output of 10mv and it operates on low power for better battery-powered applications. It does not require any external calibration. It is easy to interface with a microcontroller and Arduino board. The output voltage is obtained from analog to digital converter. It comes in a small package and is easy to integrate into compact designs and projects.



2. HR202

HR202 is a humidity detecting sensor device. It is made from organic macromolecule materials. It is widely used in hospitals, workshop, textile industry, meteorology, etc. It has features like, external linearity, low power consumption, wide measurement range, high stability, high performance range price ratio. Its operating ranges 20-90% RH.

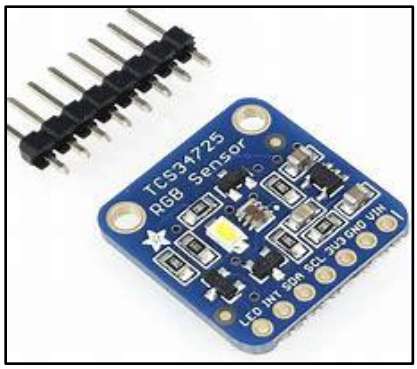


3. WATER LEVEL DEPTH SENSOR MODULE

Water level depth sensor module determines the water level. Its detection area is 40mmx16mm. It is very easy to monitor the water level as output to analog signal is directly proportional to the water level. It is cost effective.

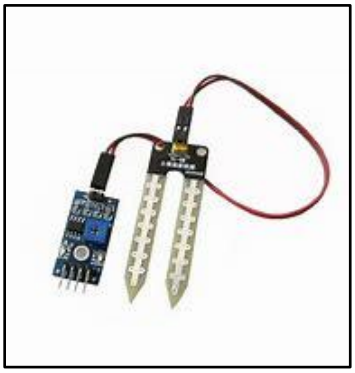
4. TCS34725 (COLOR MONITORING SENSOR)

The TCS34725 is a color monitoring sensor that uses a digital RGB color monitoring sensing technology. this sensor is equipped with an integrated infrared blocking filter, which helps to minimize the influence of IR light. It is a low-conception device.



5. SOIL MOISTURE SENSOR MODULE

The soil monitoring uses miniature radar sensor to detect and track the moisture content in the soil. It is most sensitive to the ambient, generally used to detect the moisture content in the soil. When the device cannot reach the threshold value the output value will be zero.



6. ARDUINO UNO

The Arduino Uno is based on the Atmega328P microcontroller, which has 32 KB of flash memory, 2 KB of SRAM, and 1KB of EEPROM. The Arduino Uno operates at 5 volts, but it can also be powered with an external power supply or a USB connection. It has a USB interface that allows it to connect to a computer for programming and communication. It also has a dedicated UART for serial communication.

RASPBERRY PI

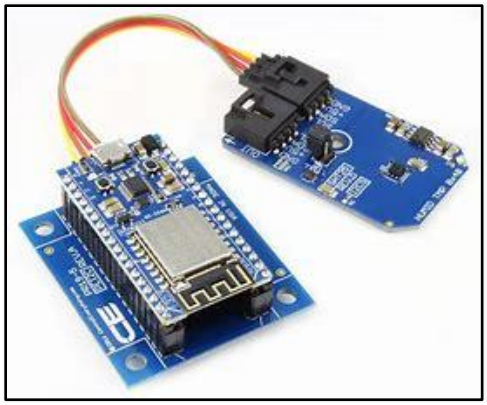
Raspberry pi is a series of small, affordable, single board computers. The Raspberry pi boards are about the size of a credit card and are equipped with a processor, RAM, storage, and input/output interfaces for connecting to peripherals and other devices. They run on a version of the Linux operating system and can be used for a wide range of applications, including education, home automation, media centers, robotics, and more.

AT89C81 (MICROCONTROLLER)

The AT89c81 has 4 kilobytes of on-chip flash memory for program storage, 128 bytes of on-chip RAM, and 32 input/output (I/O) pins for interfacing with external devices. It also has a variety of on-chip peripherals, including, and 8-channel 10-bit analog-to-digital converter. The AT89C51 is commonly used in a variety of applications, including industrial automation, automotive system, consumer electronics and its more popularity is due is low cost.

IOT

IOT stands for the “Internet of Things”. IOT devices typically use a combination of sensors, wireless communication technologies, and cloud computing to transmit data and receive instructions from other devices or centralized systems. This allows for real-time monitoring and analysis of data, and the ability to automate tasks and make decisions based on that data.



SERVO MOTOR

These motors are commonly used in applications that require high accuracy and control, such as in robotics, industrial automation, and camera gimbals. Servo motors use a closed-loop control system to provide precise positioning and speed control. Servo motors are high-efficiency motors. It is low-cost motor.

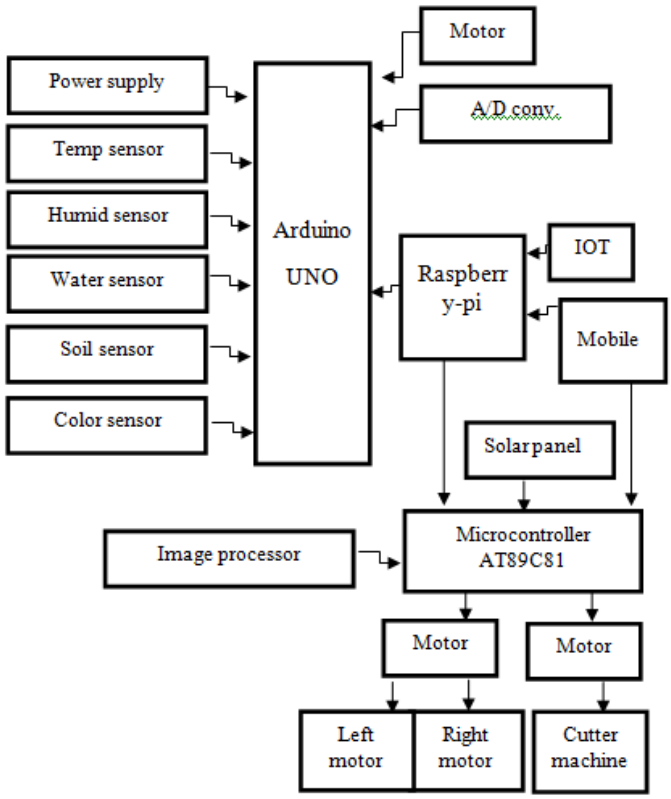
SOLAR PANELS

A solar panel, also known as a photovoltaic (PV) panel, is a device that converts sunlight into electrical energy. Solar panels are made up of several individual solar cells, which are made from semiconductor materials such as silicon.

When sunlight hits a solar panel, it excites the electrons in the semiconductor material, which generates a flow of direct current (DC) electricity. This electricity can be used to power devices directly or stored in batteries for later use.

Solar panels are used in a wide range of applications, from small portable chargers to large-scale solar power plants. They are often used in remote locations where access to electricity is limited or in grid-tied systems where excess energy can be fed back into the power grid.

BLOCK DIAGRAM



CONCLUSION:

From the above project, we can make an automatic cutter with irrigation and monitoring system, which is useful for cleaning the weeds in our area, and also uses solar energy which can reduce the electricity. Weeds can significantly reduce crop yields by suppressing the growth. Weeds can significantly reduce crop yields by suppressing the growth of cultivated plants. They can out compete crops for resources, shade them, or physically smother them, leading to decreased agricultural productivity and economic losses for farmers. Automatic irrigation system can be programmed so that right amount of waster can be provided with right time. Hence soil moisturing sensor will be very useful to know the moisture level in the soil. They deliver water evenly and uniformly. It helps conserve water by eliminating wastage of water. It improves environmental sustainability, especially in drought areas. Hence this system will minimize farmers'

work efficiently and effectively. With the help of a monitoring sensor, we can detect the temperature, color, humidity, soil moisturizing which is useful for observing the condition of the plant that we planted. By using this we can detect the dead plants and replace it.

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