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Paddy Monitoring and Management System

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Abstract

Agriculture plays a vital role in our nation.80% of India's economy depends upon agriculture. But now the situation seems to be extinct because of drastic changes in climate and diseases in crops. This affects the economy and growth..Then plants don't grow efficiently due to some environmental problems. This comprises water content, fertilizers level, repellent which are the most important things that decrease growth of a plant .we have designed and developed a system which measures different environmental states and used to rescue the plant growth .The temperature, humidity and chlorophyll content can be measured in paddy as it is the staple food crop and finally everything is updated through the IOT webpage.

INTRODUCTION:

Agriculture is considered as the basis of life for the human species as it is the main source of food grains and other raw materials. It plays vital role in the growth of country's economy. It also provides large employment opportunities to the people. Growth in agricultural sector is necessary for the development of economic condition of the country. Unfortunately, many farmers still use the traditional methods of farming which results in low yielding of crops and fruits. But wherever automation had been implemented and human beings had been replaced by automatic machineries, the yield has been improved. Hence there is need to implement modern science and technology in the agriculture sector for increasing the yield. Most of the papers signifies the use of wireless sensor network which collects the data from different types of sensors and then send it to main server using wireless protocol. The collected data provides the information about different environmental factors which in turns helps to monitor the system. Monitoring environmental factors is not enough and complete solution to improve the yield of the crops. There are number of other factors that affect the productivity to great extent. These factors include attack of insects and pests which can be controlled by spraying the crop with proper insecticide and pesticides. Secondly, attack of wild animals and birds when the crop grows up. There is also possibility of thefts when crop is at the stage of harvesting. Even after harvesting, farmers also face problems in storage of harvested crop. So, in order to provide solutions to all such problems, it is necessary to develop integrated system which will take care of all factors affecting the productivity in every stages like; cultivation, harvesting and post harvesting storage.

LITERATURE SURVEY

EXISTING METHOD:

The existing method of this project have number of drawbacks .The main problem is water status (i.e.) when water in demand or when do not needed the information must be saved .temperature and humidity is an important factor. Fertilizer level(nitrogen incase of paddy) is not displayed in existing project. The chlorophyll determines the paddy growth and other crops as well. This is the main difference from the existing systems and they don't measure chlorophyll and predict the nitrogen content required for paddy and these are the problems that are not rectified in existing system.

DISADVANTAGES:

Fertilizer level is not indicated.(nitrogen incase of pady)

They do not have automatic status level indicating

Human monitor and stay near by the agricultural lands.

Every happening are manually conducted.

These are not updated in IOT

PROPOSED METHOD:

In this proposed method we have developed a new idea to rectify from the existing method of the agriculture based system. we have a number of sensors which is used to rectify the problems and IoT based embedded module is automatic and everything is done with real time sensors. Soil moisture sensor is used to measure the field of data for analyzing environmental status. when the water of the plant reaches the low level at the same time motor is on to avoid crop destruction. Insects destroy the plant growth so that repellent sensor is used to kill the insects. Then finally chlorophyll is main unit of the paddy growth which determines how much nitrogen is needed to feed the paddy crops. These overall system are monitored through the IOT.

ADVANTAGES: Everything will be sensed through the senor for plant growth.

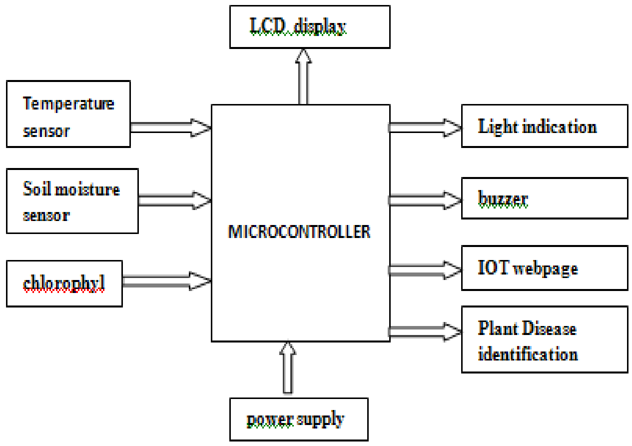
Every sensor data is automatically displayed.

Water and repellent insect problems are automatically identify and solved.

IoT is used hence we can see the status of agriculture system at any time.

Disease identification automatically identified to resolve with nutrition.

BLOCK DIAGRAM:



HARDWARE SPECIFICATION:

MICROCONTROLLER	:	PROMINI
HARD DISK CAPACITY	:	40 GB
INTERNAL MEMORY CAPACITY	:	250 MB
CPU CLOCK	:	1.08GHz

SOFTWARE SPECIFICATION:

OPERATING SYSTEM

WINDOWS XP / WINDOWS 7

MPLAB

Hi-tech C compile

MODULES:

POWER SUPPLY

MICRO CONTROLLER

LCD

SOIL MOISTURE

TEMPERATURE SENSOR

CHLOROPHYLL

RELAY

MODULES DESCRIPTION:

1. **POWER SUPPLY:**

Power supply unit is the main source for embedded modules for their working with real time systems. It has power unit for controller and other modules. This is main unit for hardware module.

2. **MICRO CONTROLLER:**

Microcontroller is heart of the system. It has number of features and it controls over all process .we can write code and load the controller for control real time application processes. **ARDUINO PRO MINI** board is one of application boards. Since it is an application board it does not have in-built programmer. USB port and other connectors are also removed. Because once it is placed in an application programmer and connectors are basically useless.

ARDUINO PRO MINI is of two types they are differentiated based on CONTROLLER working voltage. One is +3.3V and another is +5V. Choose the appropriate board based on application.

3. **LCD:**

LCD is liquid crystal display for display the current status of the details. This displays data and accesses details of the account information.

4. **SOIL MOISTURE SENSOR:**

The soil sensor is used to measure the moisture level for embedded automation purpose and plant growth. **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.

The relation between the measured property and soil moisture must be calibrated and may vary depending on environmental factors such as soil type, temperature, or electric conductivity. Reflected microwave radiation is affected by the soil moisture and is used for remote sensingin hydrology and agriculture. Portable probe instruments can be used by farmers or gardeners.

Soil moisture sensors typically refer to sensors that estimate volumetric water content. Another class of sensors measure another property of moisture in soils called water potential; these sensors are usually referred to as soil water potential sensors and include tensiometers and gypsum blocks.

5. **TEMPERATURE SENSOR**:

The temperature sensor is used to measure the temperature level of the environment with respect to the plant .This will help to measure the temperature. Temperature detection is the foundation for all advanced forms of temperature control and compensation. The temperature detection circuit itself monitors ambient temperature. It can then notify the system either of the actual temperature or, if the detection circuit is more intelligent, when a temperature control event occurs. When a specific high temperature threshold is exceeded, preventative action can be taken by the system to lower the temperature. An example of this is turning on a fan.

Similarly, a temperature detection circuit can serve as the core of a temperature compensation function. Consider a system such as liquid measuring equipment. Temperature, in this case, directly affects the volume measured. By taking temperature into account, the system can compensate for changing environment factors, enabling it to operate reliably and consistently.

There are four commonly used temperature sensor types:

1. Negative Temperature Coefficient (NTC) thermistor

A thermistor is a thermally sensitive resistor that exhibits a large, predictable, and precise change in resistance correlated to variations in temperature. An NTC thermistor provides a very high resistance at low temperatures. As temperature increases, the resistance drops quickly. Because an NTC thermistor experiences such a large change in resistance per °C, small changes in temperature are reflected very fast and with high accuracy (0.05 to 1.5 °C). Because of its exponential nature, the output of an NTC thermistor requires linearization. The effective operating range is -50 to 250 °C for glass encapsulated thermistors or 150°C for standard.

2. Resistance Temperature Detector (RTD)

An RTD, also known as a resistance thermometer, measures temperature by correlating the resistance of the RTD element with temperature. An RTD consists of a film or, for greater accuracy, a wire wrapped around a ceramic or glass core. The most accurate RTDs are made using platinum but lower-cost RTDs can be made from nickel or copper. However, nickle and copper are not as stable or repeatable. Platinum RTDs offer a fairly linear output that is highly accurate (0.1 to 1 °C) across -200 to 600 °C. While providing the greatest accuracy, RTDs also tend to be the most expensive of temperature sensors.

3. Thermocouple

This temperature sensor type consists of two wires of different metals connected at two points. The varying voltage between these two points reflects proportional changes in temperature. Thermocouples are nonlinear, requiring conversion when used for temperature control and compensation, typically accomplished using a lookup table. **Accuracy is low**, from 0.5 °C to 5 °C. However, they operate across the **widest temperature range**, from -200 °C to 1750 °C.

4. Semiconductor-based sensors

A semiconductor-based temperature sensor is placed on **integrated circuits** (ICs). These sensors are effectively two identical diodes with **temperature-sensitive voltage** vs current characteristics that can be used to monitor changes in temperature. They offer a linear response but have the lowest accuracy of the basic sensor types at 1 °C to 5 °C. They also have the slowest responsiveness (5 s to 60 s) across the narrowest temperature range (-70 °C to 150 °C).

6. **CHLOROPHYLL SENSOR:**

This sensor is used to measure the chlorophyll content in the leaf of paddy and to determine the nitrogen content to be added in the form of fertilizers. Recently, parameters of chlorophyll (Chl) fluorescence induction kinetics have often been used as characteristics of stress effect on plant photosynthesis. In these determinations, age of tested leaves and plants is only exceptionally taken into account. Nevertheless, photosynthetic activities markedly change during life span of leaves and plants, they even vary at individual places of the leaf blade that differ in relative age of cells and chloroplasts. These changes are reflected in Chl fluorescence kinetic, and the ontogenic differences in its parameters may be larger than those induced by stress. Comparison of values from the literature has shown that relatively independent of leaf age is the often used ratio of variable and maximum fluorescence F_v/F_m: it rapidly declines only at leaf senescence, when its value is related to the Chl content in leaves.

RESULT AND CONCLUSION:

The sensors and microcontrollers of all three Nodes are successfully interfaced and communication is achieved between various Nodes. All observations and experimental tests proves that project is a complete solution to field activities, irrigation problems, and smart irrigation system respectively. Implementation of such a system in the field can definitely help to improve the yield of the crops and overall production.

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