MONITORING PROLIFERATION CONDITIONS FOR CROP HARVESTING USING IOT

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ABSTRACT

The Internet of things (IOT) is remodeling the agriculture, permitting the farmers with the wide variety of techniques like accuracy and chattels agriculture to face challenges in the field. IOT technology helps in grouping information regarding conditions like weather, moisture, temperature and nutrition of the soil. Crop on-line observance permits detection of weed, level of water, tormenter detection, and animal intrusion into the irrigated land and crop growth. IOT support farmers to urge connected to his farm from anywhere and anytime. Wireless sensor networks are used for monitoring the farm conditions and micro controllers are used to control and automate the farm processes. To see remotely the conditions as picture and video, remote cameras have been utilized. IOT technology empowers farmers to remain updated with the continued conditions of his agricultural land at any time and any a region of the world. IOT technology can deflate the worth and enhance the productivity of ancient farming.

KEYWORDS: *Internet of Things, Crop monitoring, Controller, Sensors.*

1. INTRODUCTION

The Internet of things (IoT) is that the network of physical devices, vehicles, home appliances and alternative things embedded with electronics, software, sensors, actuators and property that allow these objects to attach and exchange knowledge. Every issue is unambiguously specifiable through its embedded automatic data processing system however is in a position to interoperate at intervals the prevailing web infrastructure. The IoT permits objects to be perceived or controlled remotely across existing network infrastructure, making opportunities for additional direct integration of the physical world into computer-based systems and leading to improved potency, accuracy and economic profit additionally to reduced human intervention. “Things”, within the IoT sense, will ask a good style of devices like heart monitoring implants, cameras streaming live feeds of untamed animals in coastal waters, vehicles with constitutional sensors, DNA analysis devices for environmental/food/pathogen monitoring, or field operation devices that assist firefighters in search and rescue operations. These devices collect helpful knowledge with the assistance of assorted existing technologies and so autonomously flow the information between alternative devices.

2. PROBLEM DEFINITION

In agriculture management system, there is no system to monitor the field when the farmers are away from their field. In changing weather conditions it is necessary to monitor the field every time. With the help of Internet of Things (IoT) we can monitor the field. IoT allows the objects to be perceived and/or controlled remotely across existing network model. IoT in environmental monitoring helps to gather information about the air, water quality, temperature and conditions of the soil, and additionally monitor the intrusion of animals in to the sector.

3. PROPOSED SYSTEM

In the proposed system, the various sensors are used to monitor different conditions of environment like water level, soil nutrition, humidity, temperature etc. But the existing system has the potential to be used to estimate only nitrate concentrations in ground and surface water. The information obtained from the various sensors is transmitted to farmers via Internet of Things (IoT) which enables the agriculture crop monitoring easy.

ADVANTAGES OF PROPOSED SYSTEM

1. The system is used to determine the proper frequency and time of watering for crops.
2. The system has the intelligence to avoid flooding in the field.
3. The system helps to know about the soil nutrition condition of the crops.
4. The proposed system helps to enhance the productivity of the farm.

4. WORKING PRINCIPLE

Arduino UNO controller is used to monitor the field. Temperature sensor, humidity sensor, water level sensor is used to monitor the field environment and flooding of the fields. Nutrition sensor used to identify the nutrition level in the soil. Controller status and everything is displayed in LCD. The whole process is controlled by microcontroller and all data's are transmitted through IoT.

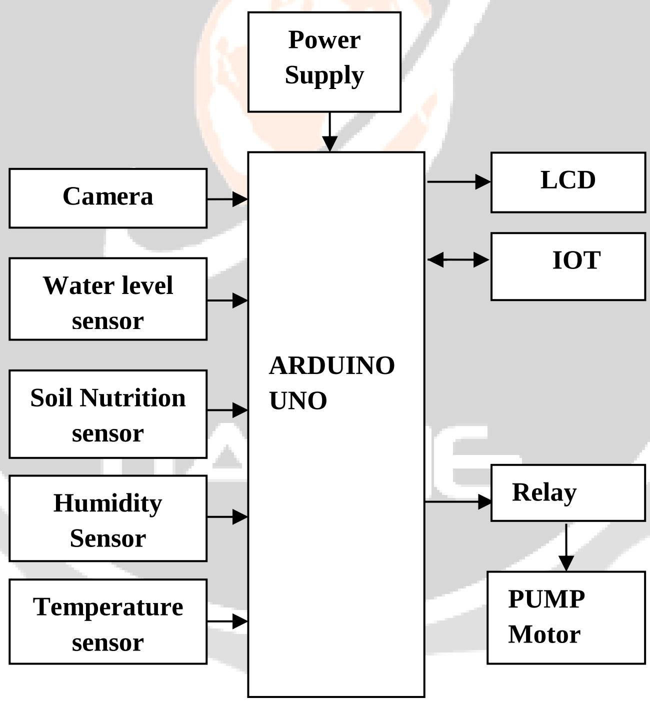

Fig 1: Block diagram

5. BLOCK DIAGRAM DESCRIPTION

5.1 ARDUINO UNO MICROCONTROLLER

Arduino/Genuino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, 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 an AC-to-DC adapter or battery to get started. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.

POWER SUPPLY

The Arduino/Genuino Uno board can be powered via the USB connection or with an external power supply. The power source is selected automatically. External (non-USB) power can come either from an AC-to- DC adapter (wall-wart) or battery. The adapter can be connected by plugging a 2.1mm center-positive plug into the board's power jack. Leads from a battery can be inserted in the GND and Vin pin headers of the POWER connector. The board can operate on an external supply from 6 to 20 volts.

Microcontroller	ATmega328P
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
PWM Digital I/O Pins	6
Analog Input Pins	6
DC Current per I/O Pin	20 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328P) of which 0.5 KB used by boot loader
SRAM	2 KB (ATmega328P)
EEPROM	1 KB (ATmega328P)
Clock Speed	16 MHz
LED_BUILTIN	13
Length	68.6 mm
Width	53.4 mm
Weight	25g

Fig 2: Technical Specifications

5.2 LEVEL SENSOR

Level sensor detects the level of substances that flow, including liquids, slurries, granular materials, and powders. All such substances flow to become essentially level in their containers (or other physical boundaries) because of gravity. The substance to be measured can be inside a container or can be in its natural form (e.g. a river or a lake). The level measurement can be either continuous or point values. Continuous level sensors measure level within a specified range and determine the exact amount of substance in a certain place, while point-level sensors only indicate whether the substance is above or below the sensing point. Generally the latter detect levels that are excessively high or low.

5.3 HUMIDITY SENSOR

This DHT11 Temperature & Humidity Sensor features a temperature & humidity sensor complex with a calibrated digital signal output. By using the exclusive digital-signal-acquisition technique and temperature & humidity sensing technology, it ensures high reliability and excellent long-term stability. This sensor includes a resistive-type humidity measurement component and an NTC temperature measurement component, and connects to a high-performance 8-bit microcontroller, offering excellent quality, fast response, anti-interference ability and cost-effectiveness. Each DHT11 element is strictly calibrated in the laboratory that is extremely accurate on humidity calibration. The single-wire serial interface makes system integration quick and easy.

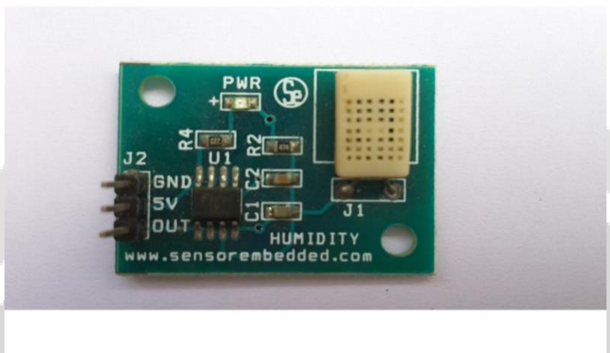

Fig 3: Humidity Sensor

5.4 TEMPERATURE SENSOR

The LM35 is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature (in ^{o}C). The sensor circuitry is sealed and not subject to oxidation. The LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified.

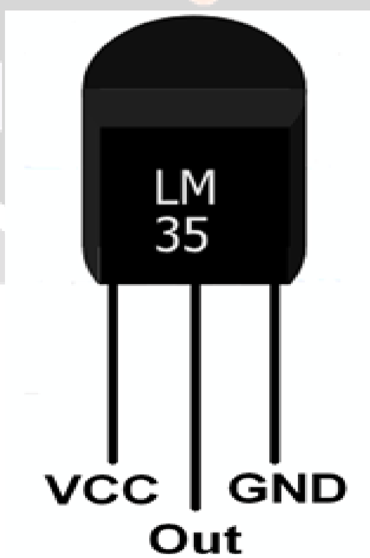

Fig 4: Temperature Sensor

6. EXPERIMENTAL RESULTS

By monitoring and observing the crop fields using controller and various sensors, the required informations are displayed in the LCD board. In addition to this, those informations are transmitted to farmers via Internet of Things (IoT) which enables the agriculture crop monitoring easy.

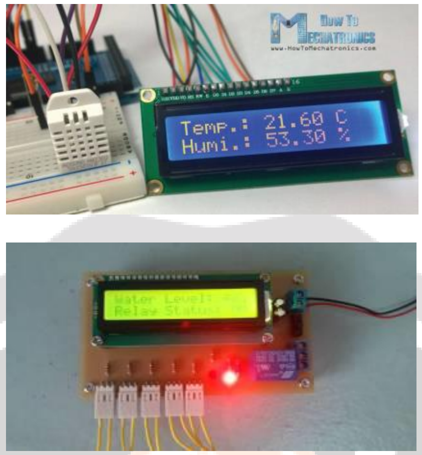

Fig 5: Various Sensor Values

7. CONCLUSION

Internet of Things (IoT) has permits the agriculture crop observance easy and economical to reinforce the productivity of the crop and thus profits for the farmers. Farmers are connected and responsive to the conditions of the agricultural field at any time and any place within the world. Some disadvantages in communication should be overcome by advancing the technology to consume less energy and conjointly by creating interface easy use.

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