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Protection of Crops and Proper Usage of Rain Water Using IOT

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ABSTRACT: Agriculture is a backbone of our country. About 70% of India's revenue comes from agriculture. In this paper we are proposing the model which prevents spoilage of crops due to heavy and uneven rainfall.This objective is achieved with Embedded System design using IOT technology.The Embedded Technology is now in its prime and the wealth of Knowledge available is mind-blowing. Embedded technology plays a major role in integrating the various functions associated with it. This needs to tie up the various sources of the Department in a closed loop system. This proposal greatly reduces the manpower, saves time and operates efficiently without human interference. This paper puts forth the first step in achieving the desired target. With the advent in technology, the existing systems are developed to have in built intelligence.The actual concept of this paper is protecting the crops from heavy rainfall by covering the field automatically and also to save the collected rain water.The saved water can be used for other purposes such as feeding animals, washing, drinking, cooking etc.To achieve this we are interfacing bidirectional dc motor and WIFI module with ARM7 LPC2148.

KEYWORDS: IOT technology, embedded technology,WIFI module,ARM7 LPC2148.

I.INTRODUCTION

In the Current system there is no protection for crops against natural disasters such as Floods, Rains and as well as from over Sun heat. Which are in turn Reduces the plant growth in turn reduces yield. The farmers Commit Suicides After their crops got destroyed due to natural weather Calamities. Only Weather Updates or alert are given to formers through Media. But there is no exact time alert or there is no system which can protect farmer Crops.An Intelligent System is designed to protect farmer crops from natural disasters such as over rains, floods and even from Over Sun heat. A movable Panel is designed to protect agriculture field. During rains and other sudden weather changes the sensor connected in the land detects and intimation will be sent to Farmer Using IOT technology. Farmer can move panel According to his crop requirement. If the Farmer doesn't reply the system Works in automatic Mode Such that the moisture Sensor Connected in Land Detects the Moisture Levels in Land and Initiates the appropriate Action required increasing the yield. The water fallingon panel will be falling on other side of the land due to the mechanism and by using the water pump the water can be stored (Rain water Harvesting) and farmer can use it when there is requirement.

II.SYSTEM MODEL AND ASSUMPTIONS

The major technique we are approaching in this paper is "Internet of Things" (IOT) technology mainly contains 4 layers:

1. Applicationlayer
2. Gateway and the network layer
3. Management Service layer
4. Sensor layer

1. Application layer: It has Lowest AbstractionLayer, with sensors we are creating digital nervoussystemwhich is incorporated tomeasure physicalquantities and interconnectsthe physical and digital world to Collect and process the realtimeinformation.

2. Gateway and the network layer: It has Robust and High performance network infrastructure that Supports the

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communication requirements for latency, bandwidth or security and allows multiple organizations to share and use the same network independently.

3. **Management Service layer:** Capturing of periodic sensorydata,Data Analytics (Extracts relevant information from massive amount of raw data), Streaming Analytics (Process real timedata) and Ensures security and privacy ofdata.

4. Sensorlayer: It providesa user interface for usingIOT, it hasdifferent applications for various sectors likeTransportation, Healthcare, Agriculture, Supply chains, Government, Retailetc.

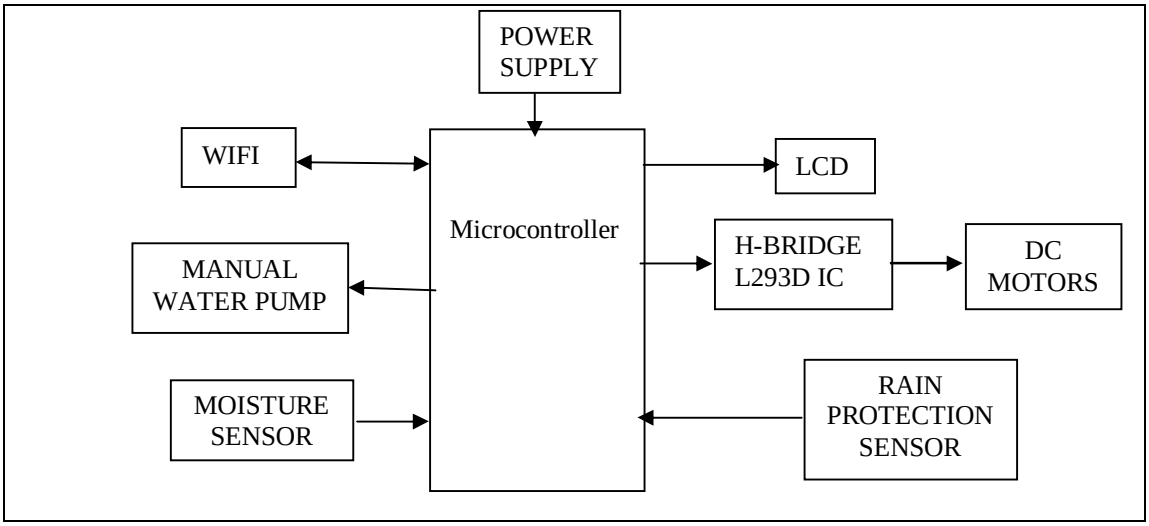

Fig.1: Basic Block Diagram

System works in automated mode.In case of heavy rainfall the rain sensor is activated and acts as a switching device to enable the microcontroller ARM7 LPC 2148.The first operation of microcontroller is to activate the DC motor in such a way that it starts rotating in clockwise direction to cover the double coated polythene sheet over the crops.Hence the crop is covered by the double coated polythene sheet over the agriculture land and crop is protected.The required protection is fabricated by four adjustable poles which enables the adjustment of height.

Liquid crystal display: 16x2 LCD display is very basic modeland is very commonly used in various devices and circuits. It can display 16 characters per line and there are 2 such lines.LCD each character is displayed in 5x7 pixel matrix.This LCD has 2 registers namely Command and Data.

Rain sensor: Suitable for all kinds of weather monitoring and can be converted to digital signal and then output by OA,Working voltage: 3.3-5V, VCC: 3-5V, GND: Negative electrode, DO: TTL switch signal output, AO: Analog signal output.

Soil moisture sensor: A soil moisture probe is made up of multiple soil moisture sensors. Get Analogue Output variations from 0.60volts - 12volts. The neutron moisture gauge, utilizes the moderator properties of water for neutrons.

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D.C motors: Movement is produced by the physical behaviour of electromagnetism.A motor is an electrical machine which converts electrical energy into mechanical energy.

Whenever a current carrying conductor is placed in a magnetic field, it experiences a mechanical force.

H-Bridge:L298 has 2 h-bridges on board, can handle 1amp and peak current draws to about 3amps. H-Bridge chip canusually handle an average motor about the size of a coke.

III.EFFICIENT COMMUNICATION

1. Internet of Boffins: This was the era when ARPAN ET (Advanced Research Project Agency Network) carried its first data packet in 1969. It was the first network to use TCP/IP. This was followed by the Mark I Network in 1970, which was built by Davis. This network was a packet switched network to serve NPL in UK. It was soon replaced by Mark II in 1973. The other major inventions such as Telnet in 1974, Ethernet in 1980, GOSIP in 1190 and a full textweb search engine in 1994 followed the trend. This era is called 'Internet of Boffins'.since in this era internet was in a stage of early evolution andresearch.

2. Internet of Geeks:'Internet of Geeks' era started with the proposal of IPv6. It was the latest revision of the internet protocol. The communication protocol provides identification and location system for computers on networks and routes traffic across internet. The popular internet services started taking roots in this era. Amazon.com started its first online retail service in 1995, followed by eBay providing customers with online auction and shopping services. Hotmail started its free web based email service in 1996, followed by Google search in 1998. PayPal started its first internet payment service in 1998. Internet penetration was low in the market until2000.

3. Internet of masses:'Internet of masses' era started with the Dot-com bubble burst in 2000. In the starting of this era Dot-com bubble burst led to high growth in stock markets due to increasing use of internet in the industrial sector. In this era many people across the globe started using internet. Social networking sites came into existence. In 2001 Wikipedia came into existence followed by Facebook in 2004, further followed by YouTube, Twitter and Wiki Leaks in the consecutive years.

4. Mobile Internet:'Mobile Internet' era refers to access to the Internet via cellular phone service provider. The era got a boost with introduction of smartphones which gave a fast working internet on phones. This was the era from 2007-2011. There was steep rise in the use of internet by the people round the globe due to the mobile internet.

5. Internet of Things:'Internet of Things' refers to an era where things can be connected to each other using internet.

Fig.2: Evolution of Internet

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IOT COMMUNICATOR:

The ESP8266 Wi-Fi module is a self-contained SOC with integrated TCP/IP
Protocol stack that can give any microcontroller access to our Wi-Fi network.
The ESP8266 is capable of either hosting an application or offloading Wi-Fi network function from another application processor. The ESP8266 module is an extremely cost effective board with a huge, and ever growing and community.

Fig. 3: Wi-Fi Module

APPLCATIONS OF IOT

1. Aerospace and aviation industry.
2. Automotive industry.
3. Telecommunication industry.
4. Medical and Healthcare industry.
5. Independent Living.
6. Environmental Monitoring.
7. Media, Entertainment Industry.
8. Insurance Industry.

IV.SECURITY

1. CONTINUITY TEST: In electronics, a continuity test is the checking of an electric circuit to see if current flows (that it is in fact a complete circuit). A continuity test is performed by placing a small voltage (wired in series with an LED or noise-producing component such as a piezoelectric speaker) across the chosen path. If electron flow is inhibited by broken conductors, damaged components, or excessive resistance, the circuit is "open".Devices that can be used to perform continuity tests include multi meters which measure current and specialized continuity testers which are cheaper, more basic devices, generally with a simple light bulb that lights up when current flows.An important application is the continuity test of a bundle of wires so as to find the two ends belonging to a particular one of these wires; there will be a negligible resistance between the "right" ends, and only between the "right" ends.This test is the performed just after the hardware soldering and configuration has been completed. This test aims at finding any electrical open paths in the circuit after the soldering. Many a times, the electrical continuity in the circuit is lost due to improper soldering, wrong and rough handling of the PCB, improper usage of the soldering iron, component failures and presence of bugs in the circuit diagram. We use a multi meter to perform this test. We keep the multi meter in buzzer mode and connect the ground terminal of the multi meter to the ground. We connect both the terminals across the path that needs to be checked. If there is continuation then you will hear the beep sound.

2. POWER ON TEST: This test is performed to check whether the voltage at different terminals is according to the requirement or not. We take a multi meter and put it in voltage mode. Remember that this test is performed without microcontroller. Firstly, we check the output of the transformer, whether we get the required 12 v AC voltage.Then we apply this voltage to the power supply circuit. Note that we do this test without microcontroller because if there is any excessive voltage, this may lead to damaging the controller. We check for the input to the voltage regulator i.e., are we getting an input of 12v and an output of 5v. This 5v output is given to the microcontrollers' 40^{th} pin. Hence we check for the voltage level at 40^{th} pin. Similarly, we check for the other terminals for the required voltage. In this way we can assure that the voltage at all the terminals is as per the requirement.

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V. RESULT AND DISCUSSION

1. Protection of crops against rains and floods
2. Protection against excess Solar energy
3. Intelligent Sensor based switching
4. Automatic intimation to farmers
5. Rain water harvesting

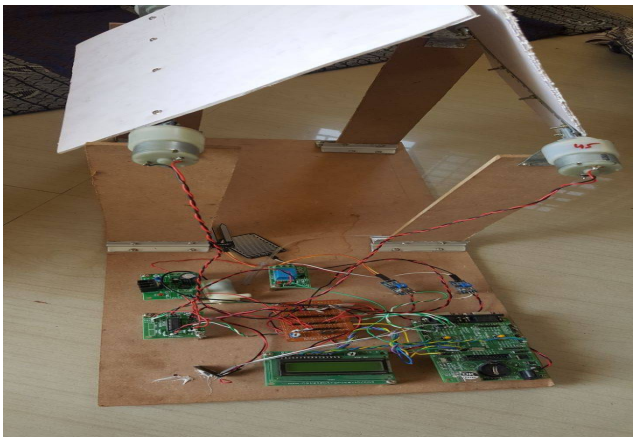

Fig.4: Front view of Experimental setup.

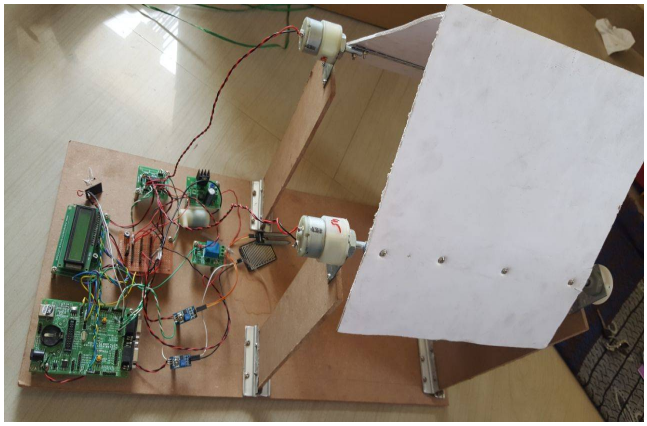

Fig.5: Side view of the module.

VI.CONCLUSION

By implementing this paper we can avoid crop damage against rains and floods and as well a good yield can be achieved in farming lands. By using solar roof tops instead of normal panels we can generate energy from it and same can be used for Agriculture activities.

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