IOT Based Smart Hydrophonic Farming System

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***Abstract*— Hydroponic is a practice of growing plants without soil, which is useful in areas with limited space and unsuitable climate.**

The primary focus of this paper is on the cost of effective implementation of hydroponic for Indian farmers as it produces higher yield that traditional method. Agriculture is the bank bone of a country India many people face problem due to small land holding therefore this is one of the types of agriculture can be more effective and productive if monitored and control efficiently. Also useful for home growers as well commercial growers

In this study and automatic computer control climate and the nutrients manipulation systems will be proposed does, a large number of plants and crops or vegetables can improve by hydroponic culture the quality of taste and nutrient value of end products will be higher the cultivation with also be cost effective, disease free and eco friendly

The prospect, success, method of hydroponic are described below

Keywords—Hydroponic, Water level sensor, water flow sensor; LED light ,LN35,pH sensor, NodeMCU, DHT 11,Blynk app;

I. INTRODUCTION

With the infusion of smart technologies in agriculture, alternate urban farming techniques like hydroponic have evolved. Hydroponic culture method is an environmentally friendly technique of growing crops.
In future day there is a trend of smart lifestyle will become popular with help of development of sensors, internet and communication and computer technology. Many systems are devised to control and monitor the real time environment system and to give the stable way and to transmit the real time data within which is temperature, humidity, light intensity, ph. level etc.

Hydroponics plans need the proper environment setup to get higher yield and plants the nutrients solution, air, water and light resource.

Its have been found that the earth soil is rapidly loosing its nutrients value and soon after some years it may degrade some more .There is only 0.5%organic soil left for planting and organic crop for us to get sufficient organic crop the organic value of soil should be at least 5% now a day excess use of chemicals and fertilize have destroyed the soil over cultivation over grazing over deforestation and also NASA is being practicing and researching in the field of hydroponic because the soil suitable for growing crops is not found yet in space. In space the soil is very complex, and some unknown material is present so hydroponics is the best alternative solution for them. They can get nutritious food and fruits because it requires less space for installation and less time to grow and the yield is very high and cost effective.

II.DIFFERENT TYPE OF SENSOR USED .

To help in the research that we did in this study using NodeMCU as a microcontroller and some sensors that were used during the project are water level, water flow , LM35, DHT11(humidity and temperature sensors),PH sensor.

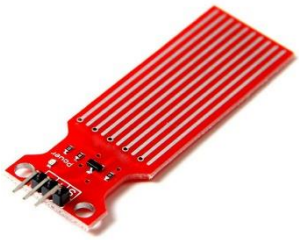


Fig 1: Water level sensor

A. Water level sensor

In an storage container to measure to measure a water level is pretty easy using modern technologies and tools such as water level. Water level sensor itself is a set of tools used to measure water levels in a containers or place. So that we can find out how much is actually present in the storage container and to provide actual monitoring report to avoid empty water container which will result in hydroponic plants that will lack water.

Fig 2: Water flow sensor

B. Water flow sensor

Water flow sensor is modernized tool which detect the flow rate of water in a vertical closed pipe. The water flow sensor is connected between two vertical pipe so that the sensor can detect the flow rate of water and continuously monitor the speed of water flow through it . If the speed of the water flow is too high then in output it will show high and if there is no water flowing into the vertical pipe through the sensor then it will show 0 flow rate .We use this sensor to monitor the flow rate of water in the hydroponic

system and to maintain the efficiency of growing plant at a high rate.

C. pH Sensor

Fig 3: pH sensor

pH meter sensor is modernized electronic device that measure the pH value of water ,pH sensor check the acidity and basicity of liquid .PH sensor contain an electrode which is connected to electronic device that display and measure the pH values and it is really very useful in industries, drinking water etc. In general pH scale ranging starts from 0-14.7 is the neutral value for pH scale.

D. DHT11

DHT11 sensor is used to measure the temperature and humidity of the environment .This sensor is used in the hydroponic system because it help to monitor weather the temperature and humidity is ok in the system by displaying the reading and if not then we can make the required changes .

Specification of DHT11

- Range of DHT11:0C to 50C
- Both Humidity and the temperature sensors have 16bit resolution
- Operating voltage: 3.5v to 5.5v.
- Operating current: 0.3mA(measuring) 60uA(standby)
- Output: serial data

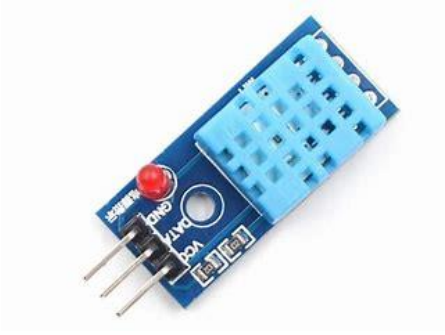


Fig 4: DHT11

E. LM35

LM35 is an integrated-circuit temperature sensor. LM35 has 3 pins which are Vcc ,Gnd, analog output. This sensor is commonly used to measure temperature with an electrical o/p comparative to the temperature, it is reading through electrical signal. It normally operates at the rate of -55degree Celsius to 150degree Celsius

Fig 5:LM35

F. Leds

These are the small circular tube like bulb that glows in different colours ,in this project we have used some Leds to indicate different action for example if we start the water flow in vertical pipes it will glow green hence indicating that the process has been started.

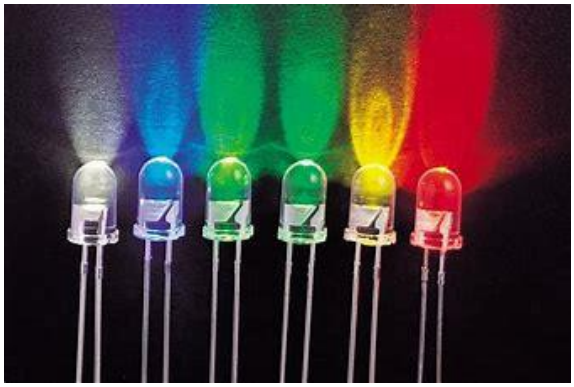


Fig 6: LEDS.

G. Buzzer

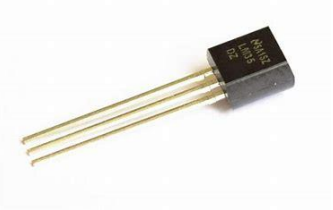
These are little speakers which give beep sound whenever we give command to it.

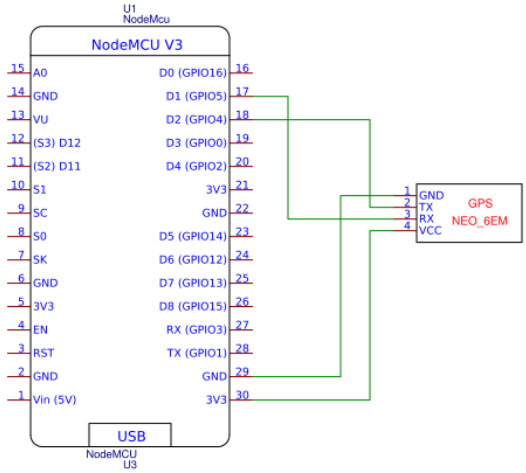
Fig 7: Buzzer.

III. COMPONENTS DESCRIPTION AND SOFTWARE USED.

ESP8266 NodeMCU:

Fig 8: NodeMCU





Structural view of NodeMCU

■Wi-fi Direct(P2P),soft-AP

■ +19.5dBm output power in 802.11b mode.

■ Integrated PLL, regulators and power management unit.

■ Supports antenna diversity

■ Power down leakage current of i10uA.

■ STBC, 11MIMO,21 MIMO

■ A-MPDU A-MSDU aggregation 0.4s guard

■ Operating Votlage:3.5V to 5.5V.

■ Operating current: 0.3mA 60uA(standby).

Blynk App

Blynk is an IOT based platform that is used by iOS or Android smart phone users to control Arduino, Raspberry Pi and NodeMCU through the internet.
In this project we will connect blynk app with NodeMCU and after connecting NodeMCU will send the data to the cloud and from there Blynk app will fetch the and display the order.

IV.PROBLEM STATEMENT

Hydroponic is a technique of growing plant where soil is not used because there are many areas in the world where the soil doesn't have enough nutrients to grow the plant due to soil erosion and use of excess of pesticides has really degraded the soil.

Only 0.5% of world organic soil is left and we require minimum 3% to 5 % of organic soil to grow healthy and nutritious plant.

So we use hydroponic technique. In this technique plant dissolved in water and take essential nutrition's from the water itself.

V.METHODOLOGY

■ Collection of equipment

■ Building outer Frames

■ Automation using various hardware components

■ The functionality of the controller into separate components

■Using some Bots to monitor everything when a person is not there

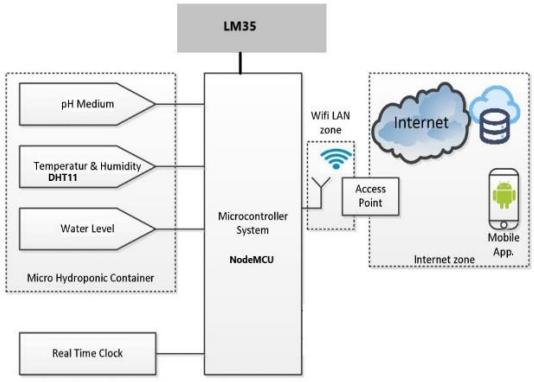


Fig 9: Block Diagram.

VI. ADVANTAGES

Water quantity used is less and it saves water. Higher yield with minimum nutrients and without wasting water, better use of land.

Can have full control over nutrients, and it takes up to 20% less space to grow.

Reducing human effort, time and most importantly, saving water and land.

VII. APPLICATION

Smart agriculture is a type of farming that uses a variety of programming and instruments to produce effective results.

With the help of sensors and IOT based farm has been developed to track crop yard. Farmer may monitor the status of their crop from anywhere.

VIII. CONCLUSION

By using IOT based hydroponic system, nutrients provided to the plants through less water.

All the sensor parameters are continuously monitored on mobile for better environmental control.

We can see the plants grow well by using the system.

The rate of growing plants in hydroponics is greater than in soil.

IX. REFERENCE

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