IOT BASED MULTIMODE COMMUNICATION MODEL FOR AGRICULTURE & AGRO INDUSTRIES

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***Abstract*: Currently hydroponic cultivation is gaining popularity all over the world because of efficient resources management and quality food production. Soil based agriculture is now facing various challenges such as urbanization, natural disaster, climate change, indiscriminate use of chemicals and pesticides which is depleting the land fertility. In this article various hydroponic structuresviz. wick, ebb and flow, drip, deep water culture andNutrient Film Technique (NFT) system; their operations; benefits and limitations; performance ofdifferent crops like tomato, cucumber, pepper and leafy greens and water conservation by this technique have been discussed. Several benefits of this technique are less growing time of crops than conventional growing; round the year production; minimal disease and pest incidence and weeding, spraying, watering etc can be eliminated. Commercially NFT technique has been used throughout the world for successful production of leafy as well as other vegetables with 70 to 90% savings of water. Leading countries in hydroponic technology are Netherland, Australia, France, England, Israel, Canada and USA. For successful implementation of commercial hydroponic technology, it is important to develop low cost techniques which are easy to operate and maintain; requires less labour and lower overall setup andoperational cost.**

***Keywords*: Nutrient Film Technique (NFT),water conservation, nutrient management, Hydroponic market**

INTRODUCTION

Hydroponics is a technique of growing plants in nutrient solutions with or without the use of an inert medium such as gravel, vermiculite, Rockwool, peat moss, saw dust, coir dust, coconut fiber, etc. to provide mechanical support. The term Hydroponics was derived from the Greek words hydro' means water and ponos' means labour and literally means water work. The word hydroponics was coined by Professor William Gericke in the early 1930s; describe the growing of plants withtheir roots suspended in water containing mineral nutrients. Researchers at Purdue University developed the nutriculture system in 1940. During 1960s and 70s, commercial hydroponics farms were developed in Arizona, Abu Dhabi, Belgium, California, Denmark, German, Holland, Iran, Italy, Japan, Russian Federation and other countries. Most hydroponic systems operate automatically to control the amount of water, nutrients and photoperiod based on the requirements of different plants.

Recent demographics the world population estimation to reach 2050 by 10 billion and 16.4 billion reached by 2100. Agriculture production needs to increase by 70% to sustain thispopulation growth] currently agriculture produces 80-85% of food globally. But only 5% of the world population works in agriculture. Food and meet consumption from 36.4 kg to 45.3 kg per person. The main objective of this projects this soilless supply an ideal nutrition environment for optimum planet performance. The project is based on the temperature sensor and water level sensor through the IOT module.

MATERIALSANDMETHODOLOGY

This paper is related to applying IOT (Internet of things) inthe agricultural environment. Thisproposed methodology consist of the first step of conducting thisexperiment is to choose the plants type. The selected plants arevegetables, and they are cucumber and Armenian cucumber. These were chosen because they germinate quickly to expeditethe experiment. A total of eight seeds will be used for this experiment, four cucumber seeds and four Armenian cucumberseeds. The materials needed for creating the hydroponic systemare the following: 1. big plastic containers, (yogurt containers are used for recycling reason) included water with a big hole for the small plastic container to fix it in the middle of the big container. 2. Small plastic container with small holes thatallows water enters inside it. 3. Small hydro stones to hold the plant. 4. Nutrient solution A, which consists of calcium and ironchelate. 5. Air pump device, which contains air hose end by anair stone. 6. Nutrient solution B, which consist of magnesium sulfate, potassium, copper sulfide, zinc sulfide and manganesesulfide. 7. Water. For the traditional soil planting the followingmaterials are used

Water level sensor:

The working principle of the water level sensor is that whenit is put into a certain depth in the liquid to be measured, the pressure on the sensor's front surface is converted into the liquid level height. The calculation formula is P=ρ.

Figure 2.water level sensor

Air Temperature & humidity sensor:

A temperature sensor is a device used to measure temperature. This can be air temperature, liquid temperature orthe temperature of solid matter. There are different types of temperature sensors available and they each use different technologies and principles to take the temperature measurement.

Figure 3.Temperature sensor

PH sensor:-

The overall working principle of pH sensor and pH meter depends upon the exchange of ions from sample solutionto the inner solution (pH 7 buffer) of glass electrode through the glass membrane**.** The porosity of the glass membrane decreases with the continuous use that decreases the performance of the probe.

Figure1.pH sensor

Light sensor:

Light sensors measure illuminance, which can be used to measure more than the brightness of a light **source**. Because the illuminance decreases as the sensor moves away from a steady light, the light sensor can be used to gauge relative distance from the source.

Figure 4.Light sensor

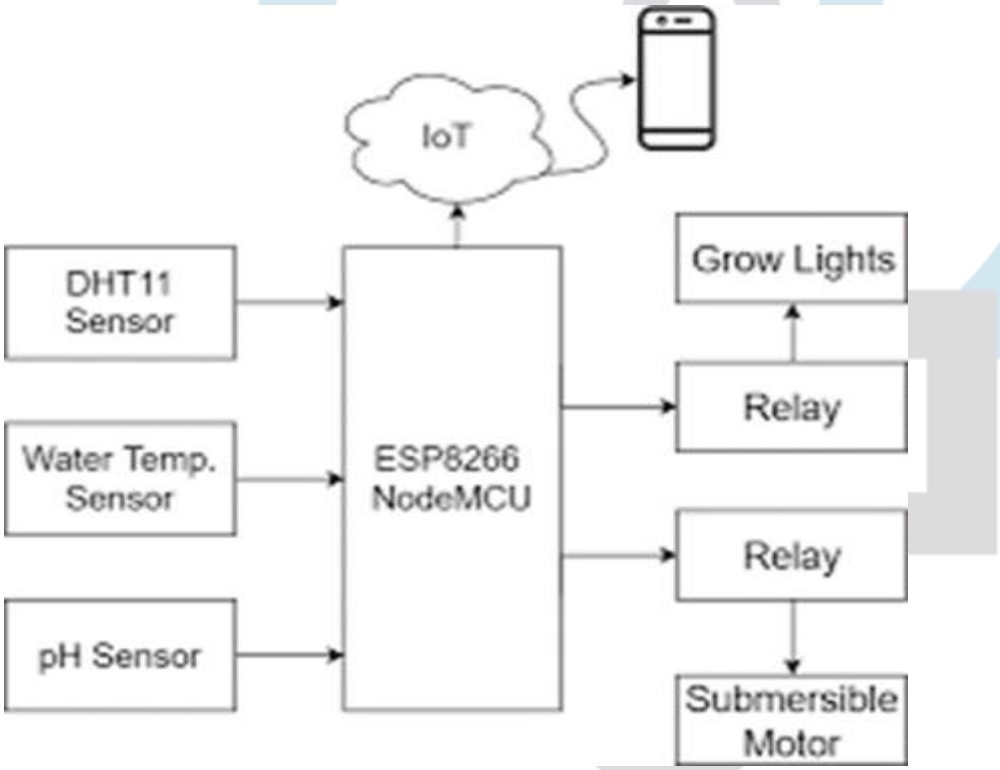
Microcontroller:
A microcontroller is embedded inside of a system to control a singular function in a device. It does this by interpreting data it receives from its I/O peripherals usingits central processor.

Figure 5.Microcontroller

Cloud stage:

Here we make use of "Microcontroller IOT cloud" cloud Platform to send the detected information to the cloud. This Information is plotted as a graphical representation to see the changes in the humidity, temperature. Based on the data .that is present in the graph we can determine the plant condition. And control the on/off device.

BLOCK DIAGRAM:



ADVANTAGES

- Maximizes Space. Hydroponics requires far less spacethan plants grown in soil.
- Conserves Water.
- Facilitates a Micro-Climate.
- Produces Higher Yields.
- Require Less Labor.
- Needs No Soil.
- Produces Higher Quality Food.
- Reduces Supply Chain.

CONCLUSION

The Green Revolution was directed towards sustainable development in the agricultural sector with the support of global policy-makers Modern farming practices that use artificial intelligent, big data analysis, robotics, and machine learning plays a vital role in the advancement of Agriculture 4.0 to increase the productivity and eco-efficiency of agricultural value creation We aim to develop an ad-hoc printed circuit board (PCB) of the Zone Controller for minimizing the total cost of deployment.

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