

Agriculture Based On Hydroponic Polyhouse

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ABSTRACT:-

IOT is a shared system where the objects interact with one another through internet. The science of soilless gardening is Hydroponics. The main objective of gardening is to control the whole system automatically to get the maximum benefits using hydroponic system instead of old traditional method of growing plants.

In this project we have mainly included the usage of led lights, many wireless sensors to monitor the whole system and raspberry pi to automatically monitor the system and to store the data in cloud. Here we have included many technologies like GSM module, raspberry pi to implement. In this paper we evaluate the usage of LED grow lights and its advantages in growing crops. In this agriculture based on hydroponics using many WSN devices we can operate this without the physical interferences of human.

Keywords – Hydroponic crop, LED grow lights, sensors, arduino, raspberry pi, GSM module.

I. INTRODUCTION:-

Internet of Things (IOT) is a network of physical things interconnected with sensors, software to provide better exchange of information with other devices which are connected.

The science of soilless gardening is Hydroponics. This system is the most emerging idea, because these sensors provide data of their agriculture fields and enable the farmers to reduce water waste and increase the yield.

This hydroponics system provides 50% growth of plants faster compared to traditional way of cropping. Also, fresh produce can be harvested from a hydroponic garden throughout the year.

According to the World's Population India ranks 2nd position. This population is growing at the rate of 1.2% every year. The major necessity of every human being is food. In order to fulfill the

demands, it is necessary to implement vertical gardening, which will give optimum produce in a limited space.

II. Objective

The project objective is to build agriculture system for monitoring the crop field and automating the irrigation system. Most importantly involves growing healthy plants yield with good quality and quantity by utilizing the benefits of hydroponics system instead of traditional soil system. In this coconut husk will be used to grow plants. In this fresh produce can be harvested from a hydroponic garden throughout the year. A LED light also helps in growth of plants much faster as we are also implementing poly-house system. This provides more production as the nutrients and water are directly added to the plants root.

III. LITERATURE SURVEY:-

Mrs.T.Vineela,J. NagaHarini et.al[1] proposed an automatic Monitoring of Irrigation using Raspberry Pi. In traditional system the flow of water gets wasted. To control the flow of water, moisture sensor is used. This monitors the wetness of the growing plants. This sensed information is send to raspberry pi and data is stored in cloud. A minimum value of threshold is set to plant. If the received data value is less than the fixed threshold value, then the relay switch on the motor automatically. These water gets flow through pipes and when the moisture level increase and reaches the threshold value the motor gets off. By this implementation we can avoid over flow of water.

k.Lakshmisudha, SwathiHegde, Neha Kale et.al [2] proposed Smart Precision based Agriculture using sensor. In this moisture sensor is used to read the soil moisture level. User can make use of the smart phone to receive the notification. If the value is below the mentioned threshold then the

automatic message is generated and sends the notification to the user. The motor gets switched off automatically once it reaches the value and sends back the message to the user. This reduces the human effort and helps in ideal growth of crops.

Dr.SreeKanth et.al [3] proposed “Agriculture crop monitoring using IOT”. In this many wireless sensors and microcontrollers are used to monitor and sense the current condition of a plant. Flow of water can be done automatically. During the harvest time the user can control the flow of water from anywhere connecting to internet. He can control the required sunlight and temperature using greenhouse. In this nutrients can be mixed with water to get the best yield crop.

Dimitrios Savvas et.al [9] published hydroponics applications in greenhouse that says the benefits of switching from soil culture to soilless culture. By adopting the hydroponic system in agriculture we can get ride from the problems like soil borne diseases. We can totally avoid the usage of pesticides and other chemicals as there is no soil. The nutrients would be passed to the plants by mixing the nutrient solution in water and irrigate that water into plants. Also he has considered the water flow in a balanced way that means the water pipe should use with large and small pores as needed to balance the water provident. So that the plant would not get overfeed of water and the oxygen can reach the root of plant easily.

Mark Griffiths et.al[10]proposed a hydroponic control system in 2014 the objective of that system was to deliver a working sensors used hydroponic system which is cost effective and simple. He considered the things needed for hydroponic growing and made that as inputs to the hardware requirements, those factors are pH, EC, water level. Some value range was initiated with sensors when the sensor readings exceeds the value defined an alarm would get on and make notify to the user. Also he made all the sensor connections as a shield to the arduino so that the circuit is stable.

Nelson Sales et.al [7] proposed interconnection of things with sensors, making a Wireless Sensor Network (WSN). This provides information about sensors such as temperature, soil moisture and

humidity. This information is used to apply in agriculture for reducing the water flow, and also provides more benefits. Cloud is used to store more data and processing as pay-per-use. This help researcher to identify the issues in the agriculture domain.

Rachel Cordell-Oliver et.al [8] proposed monitoring of soil moisture and checkout for the solution. When rain falls and the rapid change in soil moisture is, measured. The main objective is to get the sensed data, which can provide information about soil moisture during rain. When rainfalls the flow of water will be very less.

Vijay Kumar et.al [6] proposed rural farming technique that can be overcome by old farming techniques. Here many sensors are used to get the information about temperature, humidity, moisture etc. Using this moisture sensor the moisture level is checked based on that data the motor switches on and the water sprinkle and turn off after required water is sprinkled. This will reduce the flow of water and inform the user about the soil pH value via SMS using GSM-module. Using this data the farmer can limit the quantity of fertilizers. By implementing this will helps to automate sprinkling of water using WSN.

Lei Xiao et.al [13] Fiona Edwards Murphy, proposed using of many sensor to monitor the agriculture field. Here we can do the real time monitoring such as temperature intensity and moisture .This involves the software and hardware to build the module and network. This demonstrate about how the information is collected and transmitted between one another .This improve the agriculture production efficiently and automatically.

Ling-ling LI et.al [4] demonstrate the design of system using ZigBee module. This involves software network and hardware using many sensor devices. The proposed design can easily provide the information about humidity, temperature etc. This communicates between network nodes and implementation use this value in greenhouse environment monitoring.

Shreya Tembe et.al [11] proposed an IOT based automated hydroponics the motivation behind this is population growth and human requirements as the human population increases the food requirement also increases According to the

World Population Prospects, India ranks 2nd position. This population is growing at the rate of 1.2% every year. The major necessity of every human being is food. In order to fulfill the food demands, it is necessary to implement vertical gardening, which will give optimum produce in a limited space. They have given the information about different types of hydroponics such as wick system, drip, etc., they have used the sensors which gives the data of temperature, humidity, EC and PH level, light level etc., and connect to arduino controller then sending data from arduino to cloud, they have also used a equipment called RTC (real time clock) which senses the power and detects the power fails in that case sets the battery automatically.

Laxmi S. Shabadi and Hemavathi B. Biradar et.al [12] implemented an IOT based smart security and monitoring the farming which says the need of security and method of designing security. Till now security is given to the software systems like layers of IOT systems. Many problems like unauthorized access, spoofing, malicious act, Dos attack sniffing attack, etc. Providing security to different layer problems has been done.

To get protection from these kinds of problems. We need to get alter every time about everything. Even in agriculture system people use more costly hardware and fertilizers etc.. There should be an implementation of security system. Now it is the time to give security and protection to the agriculture fields. Different sensors will sense the current updates about the field and send it to raspberry pi which will analyze the data and make decision, which actuators can be activated based upon their respective sensor values. Then the values taken by the raspberry pi will be represented in graphical representation, so that user can access it and can get information about variations happened in the field.

IV. Proposed System

Here we are going to implement a polyhouse agriculture based on hydroponics system. In this project we have mainly included the usage of led lights as an artificial lightening for the hydroponics polyhouse system. These grow lights are used to supplement the scarcity of sunlight,

which enhances the photosynthesis capability of the plants also in absence of sunlight.

In this method we make use of coconut husk to grow plant. This way of growing plants reduce the usage of water and nutrients has the coconut husk holds the water for more period of time. As we directly add nutrients to plants root this increase the yield of crops.

Here many sensors are used to monitor the whole hydroponic polyhouse system like temperature, humidity, smoke sensor, pir sensor, moisture sensor, color sensor etc. Temperature and humidity sensors are used to get current weather details inside the polyhouse. Moisture sensor is used to get the current moisture level of a crop and we are going to reuse the water.

For security purpose we make use of pir sensor, keypad for door lock and smoke sensor.

This information will be collect by sensors and send to raspberry pi using arduino board and is going to be stored in cloud and retrieved from cloud when needed, the purpose of storing the sensed data in cloud is to do analytics on hydroponic system.

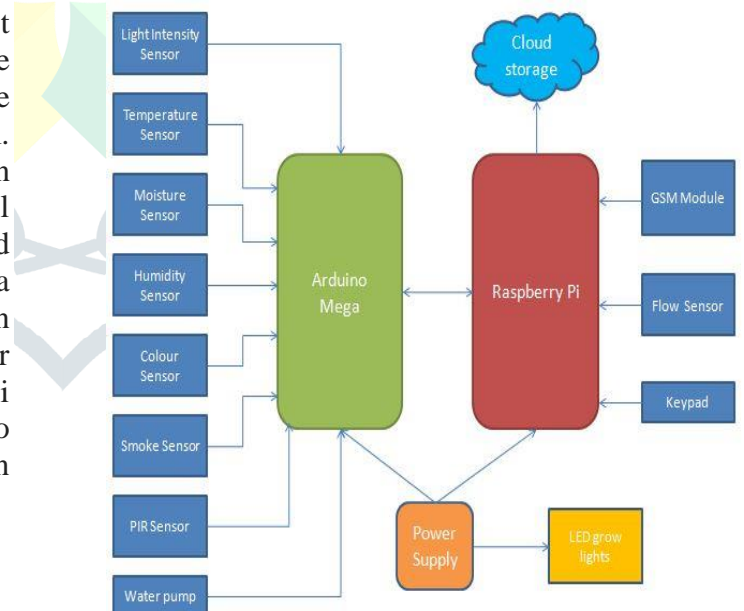


Fig.1 Block diagram

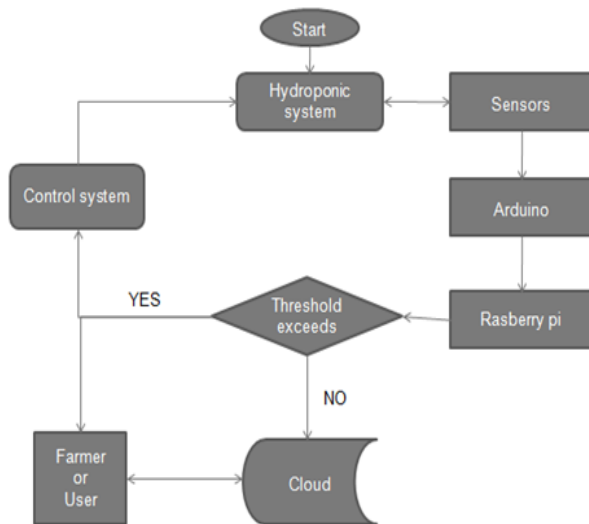


Fig.2 Flow chart of hydroponic polyhouse

V. CONCLUSION:

Internet of things connect devices through internet, and this makes automatic monitoring of field and increases the productivity in the growth of the plants and hence profit the farmer's. Many WSN are used to provide the data of plants condition. This information is transmitted to farmer using GSM modules anytime and anywhere in the world. This helps to automatically monitor the growth of crops and increase the yield.

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