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Intelligent Model for Agriculture Monitoring Using IOT

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Abstract: Agriculture is becoming a crucial growing sector throughout the planet thanks to increasing population. Major challenge in agriculture sector is to reinforce farm productivity and quality of farming without continuous manual monitoring to satisfy the rapidly growing demand for food. Apart from increasing population, the worldwide global climate change is additionally a huge concern in agricultural sector. The purpose of this research work is to propose a sensible farming method supported Internet of Things (IOT) to affect the adverse situations. The smart farming are often adopted which supply high precision crop control, collection of useful data and automatic farming technique. This work presents an intelligent agriculture field monitoring system which monitors soil humidity and temperature. After processing the sensed it takes necessary action supported these values without human intervention. The project presents the utilization of correct soil moisture sensors which helps to ease out the pain to watch and keep records about the changes in soil moisture. Using the Raspberry pi micro controller moisture sensor and temperature sensor, temperature is measured and analyzed. The soil for a particular duration, provides information associated with the moisture status of the soil. The Raspberry pi will collect and process the data received from the Sensors. When a threshold moisture level of the soil is reached, the water will supply accordingly. This is essential because water must be provided to the plant at a specific time for an honest yield. This project is very use for farmers, Nursery professionals by eradicating traditional or manual method of irrigation system.

KEYWORD - Raspberry pi, Camera, PIR Sensor, Temperature Sensor, Water pump, Resistor, Breadboard, Jumper Wires.

I. Introduction:-

The INDIA is an agricultural country. Nowadays, at regular intervals the lands are manually irrigated by the farmers. In this process there is possibility in which the water consumption may be more or time taken by the water to reach the time may also exceed which leads to dryness of the crops. Real-time monitoring of temperature and humidity plays a vital role in many fields of agriculture. However, the normal way of wired Detection control features a poor flexibility, which results in tons limitation within the applications. As a key solution to the present issue, automation in irrigation is achieved through this project. This is done with the help of raspberry pi which in turn control the moisture sensor, temperature sensor and water level sensor based on the input given. For this purpose, automatic plant irrigation system is designed using moisture sensor and solar energy. The main aim of our project is to reduce the complexity of supervision and to avoid the continuous monitoring. Through our system, we can achieve a smart agriculture. In this system consists of IOT bases agriculture monitoring. The Internet of Things (IOT) is converting the agriculture industry and solving the immense problems or the major challenges faced by the farmer's today's in the field. The circuit comprises of soil moisture sensor are inserted in the soil to sense whether the soil is wet or dry and a pi camera which allow to watch the field activity from the place where we are. There must be periodic monitor of the soil condition if the moisturizing level in the soil is low and it is indicated to the relay unit which is connected to the motor switch. It will be ON in dry condition and switch off the motor when the soil is in wet condition [6-11].The moisture level of the soil is sensed by the sensor inserted into the soil which gives signal to the raspberry pi circuit whether the land needs water or not. As well as in which we can try to check the soil testing that means in which we can insert some soil test report that can gives information about the soil, which soil is applicable for the which crop exactly. After that we can use the pi camera on leaf of the crop that means by using that we can check that if any disease are not in crop for that purpose we can take some crop disease that can be in build in the data that why system can easily check that

The proposed idea has various features in it which are meant to monitor the agricultural field and aims at the following:-

(i) Precision agriculture for accurate measuring and monitoring.

(ii) Monitoring the Crop Growth and proper selection of the Crop.

(iii) Analyzing the weather conditions

(iv) IOT enables PA with cloud computing to collect the relevant data is posted on the cloud

(v) IR Fencing for the animal and unauthorized human intervention with the appropriate knowledge

(vi) It is monitored using a web application

(vii) Ease of access to the field

(viii) Farmer friendly product

II. LITERATURE REVIEW:-

IOT Based Monitoring System in Smart Agriculture [16]

'Internet of Things' is way and wide castoff in relating devices and gathering statistics. This agriculture monitoring system is a reliable and efficient system and corrective action is taken. Wireless monitoring of field reduces the human power and it also allows user to work out accurate changes in crop yield. It's cheaper in cost and consumes less power. The smart agriculture system has been designed and synthesized. The developed system is more efficient and beneficial for farmers. It gives the knowledge about the temperature, humidity of the air in agricultural field through MMS to the farmer, if it fallout from optimal range. The system is employed in green house and temperature dependant plants. The appliance of such system within the field can definitely help to advance the harvest of the crops and global production. In future this method is often improved by adding several modern techniques like irrigation method, alternative energy source usage.

A Model for sensible Agriculture mistreatment IOT [17]

The analysis in agriculture space is increased in varied aspects to enhance the standard and amount of productivity of agriculture. PATIL K.A. are worked on many various comes on soil attributes, totally different atmospheric condition yet as reconnaissance crops. Some comes worked on actual farm fields and a few worked on POLYHOUSES. Researches of Carriage Mellon University worked on plant nursery mistreatment Wireless detector Technology [2]. Wireless detector Network primarily based POLYHOUSE observation system is explained in [3] that create use of atmosphere temperature, humidity, carbon dioxide level and adequate lightweight detection modules. This POLYHOUSE management technology provides automatic adjustment of POLYHOUSE. In [4] authors have projected development of WSN primarily based higher than mentioned parameters for agriculture mistreatment ZIG Bee protocol and GPS technology. In some comes like [5] authors have designed AND enforced an approach in development of crops observation system in real time to extend production of rice plants. this method has used motes with sensors to visualize leaf condition. soon use of IOT has been projected in [6-8]. IOT offers platform to researches to keep up real time information and send alerts directly to farmers. IOT implementation offers quick access to data that comes from detector nodes. IOT is additionally used for product provide chain business method. Cloud design offers extra support to IOT in maintaining massive information of agriculture data viz. history data, soil properties, fertilizers distribution, image cultivation through camera and knowledge collected through sensors, recording data etc. Authors have analyzed collected information for locating correlation between atmosphere, work and yield for normal work model construction. Observation for adverse signs and fault detection. In [9] authors have mentioned the appliance of information mining with the assistance of wood hen tool and analysis model mistreatment of machine learning algorithms. In [10] authors have targeting crop observation. Information of temperature and rain is collected as initial spatial information and analyzed to cut back the crop losses and to enhance the crop production. They need used optimization technique to indicate progressive refinement for spatial association analysis. though authors mentioned higher than have projected several models in agriculture domain, the effective model is required that uses new technologies And provides an integrated approach to watch environmental conditions sporadically and varied soil properties of farm field through IOT devices and store these details at the central place within the cloud storage which ends in massive –data over the time. It's additionally usable by multiple vendors or farmers World Health Organization enquire concerning crop yield maximization. Farmer will analyze this information for chemical necessities for current crop. It'll facilitate for sensible climate solutions and disaster interference.

IOT based mostly sensible Crop-Field observance And Automata ion Irrigation System [10]

A PA agriculture irrigation system is developed with low complicated electronic equipment. A 2 sensors area unit used with efficiency those area unit temperature and wetness of soil within the circuit to urge the mark info to the system. 2 sensors and Raspberry pi microcontrollers of all 3 Nodes area unit with success interfaced numerous Nodes. All observations and experimental tests proves that projected may be a complete answer to field activities, irrigation issues, Implementation of such a system within the field will undoubtedly facilitate to enhance the sector of the crops and overall production. With the assistance of this approach the irrigation system utterly machine-driven conjointly provides time period info regarding the lands and crops which will facilitate farmers build right selections. Cloud computing is "a new variety of computing during which dynamically scalable and often virtualized resources area unit provided as a service over the Internet". Here 2 sensors area unit accustomed management the irrigation system that the troubleshooting simply done whenever it necessary. Here projected related knowledge based mostly algorithmic rule scale back the hardware complexness compares to the opposite proposed systems [13]. The edge voltages area unit chosen for standardization of the sensors by considering past months of temperature and soil wetness values. Threshold values could also be variable depends on the crop and plantation. In future by introduce the machine learning algorithmic rule to be accustomed method the information and scale back the complexness of

the hardware. Hardware resources in agricultural info network area unit integrated into resource pool by victimization physiological condition technology, achieving dynamic distribution of resource and balance of load, considerably improve potency

Remote Sensing and dominant of Greenhouse Agriculture Parameters supported IOT [12]

IOT is wide employed in connecting devices and wont to gather info. The system is intended to remotely monitor the greenhouse parameters like CO2, soil wetness, temperature, and light, this info are often collected by the farmers with the assistance of cloud account and web association. there's conjointly dominant action taken mechanically that's greenhouse windows/ doors roll on/off supported the soil wetness levels. Thus, the system can facilitate the farmers to avoid physical visit to the sphere, and increase the yield with the upkeep of précised parameters like CO2, soil wetness, temperature, and lightweight within the greenhouse with the assistance of IOT. The project is administrated with the assistance of IOT kit and web association. The results are analyzed for the greenhouse parameters like CO2, soil wetness, temperature, and lightweight for bell pepper plant with the assistance of graphical illustration supported the sensible values taken by the IOT kit. The comparative result shows the effectiveness of the projected work.

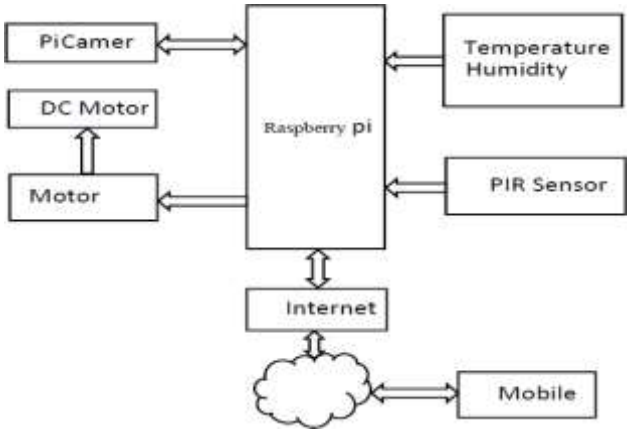
A Hybrid Wired/Wireless Networking Infrastructure for Greenhouse Management [15]

Mirabella .O. has conferred a communication system for the watching and management of greenhouses. this method is char-asterisked by some enticing options, for instance, the employment of a hybrid wired/wireless communication infrastructure that simplifies the readying of sensors and their localization on the bottom and makes the system extremely ascendible. Moreover, besides mistreatment 2 completely different networks (wired and wireless), the appliance Layer supported SDS provides a unified service set which may be employed by the appliance processes while not the requirement to tell apart if a tool belongs to the wired or wireless network. This way, all devices are managed as if they belong to one network. This needed the implementation of an acceptable bridge that's ready to hide the variations between the 2 protocols and create the system uniform. The system has conjointly been shortly tested in Associate in nursing alfresco field, still showing its flexibility and its ability to control in several environments.

Remote Sensing associate degreed management of an Irrigation System employing a Distributed Wireless sensing element Network [14]

An automated closed-loop irrigation system needs 3 major components: machine conversion, navigation, and mission progressing to support the solid communication protocol. This paper developed the machine conversion from a traditional irrigation system to associate degree electronically governable system for individual management of irrigation sprinklers and developed the navigation of the irrigation system that was unendingly monitored by a differential GPS and wirelessly transferred knowledge to a base station for site-specific irrigation management. This paper conjointly provided in depth details for the wireless communication interface of sensing elements from in-field sensor stations and for a programmable logic controller from a sway station to the pc at a base station. Bluetooth wireless technology employed in this paper offered a plug-and-play communication module and saved important time

III.PROPOSED SYSYTEM:-



IV. HARDWARE USE:-

Pi Camera:-

Wireless communication and mobile technologies are already well known in modern surveillance systems. Mobile based client applications provide the basic access to camera video streams and other system resource. High Definition camera module adaptable with all Raspberry Pi models. Provides lightweight design, high sensitivity, low crosstalk and low noise image can be captured. The camera module is interfaced to the Raspberry Pi board through the CSI connector. High data rate pixel transmission to the processor is possible through the CSI bus. The Pi camera shown in Fig. 2[7]

Fig 2:- Pi Camera

Temperature and Humidity Sensor:-

Humidity sensor shown in Fig.3. Refers to the amount of water vapor content in air or other gases. The technique used in DHT22 is digital-signal collecting and humidity sensing technology which gives the calibrated digital signal, assuring its reliability and stability. The 8-bit single-chip computer is connected to its sensing elements. Every sensor of this model depends on temperature and calibration is done in calibration chamber accurately when the sensor is detecting, it will cite coefficient from programmers OTP memory in which the calibration-coefficient is saved. The DHT22 is made adaptable in all kinds of tough application occasions as size is small, power consumption is less, long transmission distance (20m). The connection is convenient due to Single-row packaged with four pins [8].

Fig 3:- Temperature Sensor

PIR Sensor:-

PIR sensors is capable of sensing motion, it is used to detect whether a human has moved in or out of the sensors range. HC-SR501 is based on infrared technology, automatic control module, using Germany imported LHI778 probe design, High sensitivity, High reliability, Ultralow-voltage operating mode, widely used in various auto sensing electrical equipment, especially for battery-powered automatic controlled products. They are often mentioned as PIR, "Passive Infrared", "PYRO electric", or "IR motion “sensors. PIRs detect the levels of infrared radiation as it is made up of a PYRO electric sensor. Certain low –level radiation is produced by every substances and more radiation is produced in hotter condition. The motion detector is used to detect motion and so they are portioned into two categories, as we are looking to detect motion (change) not average IR levels. The wiring up of the two halves leads to cancellation of each other. If one half identifies more or less IR radiation than the other, the output will swing high or low.

DC Motor:-

The connection of DC motor and motor driver is shown in Fig.4 Electrical motors convert electrical energy into mechanical energy. The pumps, compressors, fans, wheels, etc can be made to rotate with the help of motor as it rotates in the form of continuous angular rotation. As well as rotary motors, linear motors are also available. AC type motors, DC type motors and Stepper motors are the three types of conventional electrical motors. The AC Motors is used to control loads which require constant rotational torque and speed this is the major why they are being used in high power single or multiphase industrial applications. DC motors and Stepper motors which are used in many electronics, positional control, microprocessor, PIC and robotic circuits. Generally the DC motor consists of six parts axle, rotor, armature, stator, commentator, field magnet and brushes. The high strength permanent magnets in the DC motor produce the external magnetic field. Motor casting is enabled by using the stator is the stationary part of the motor and as well two or more permanent magnet pole pieces the rotor is

attached to axle and the commentator. It rotates with respect to stator. The rotor comprises of windings, which is electrically connected to the commentator. The polarities of the windings and the stator is misaligned, when power is applied, to the geometry of the brushes, commentator contacts and rotor windings and the rotation of the rotor will continue until it is almost aligned with the stator field magnets. On reaching the alignment the rotor containing brushes are moved to the next commentator energizing the windings.

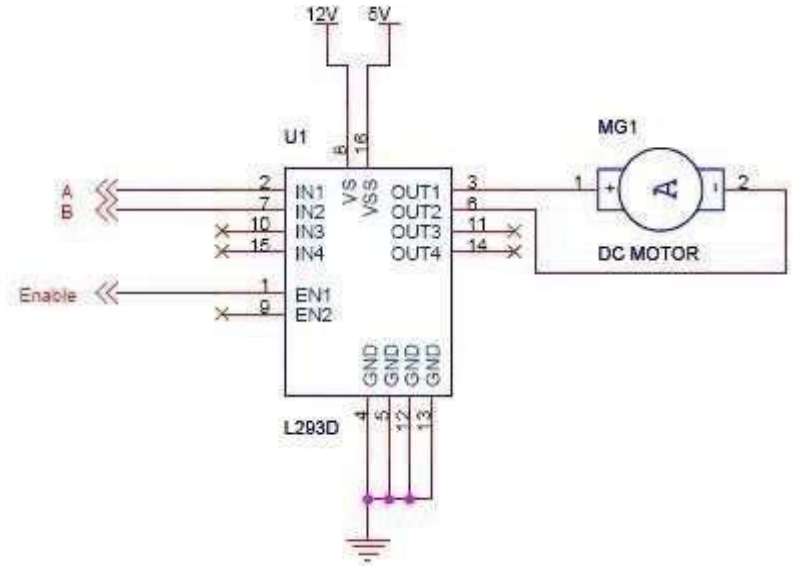


Fig 4:- DC MOTOR

V.SYSTEM ANALYSIS:-

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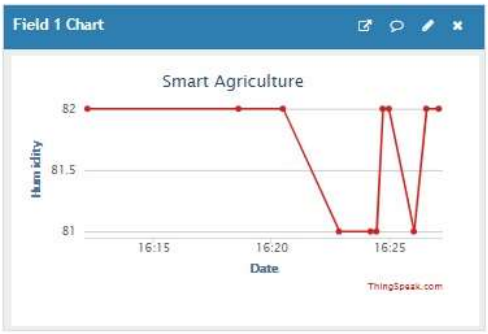

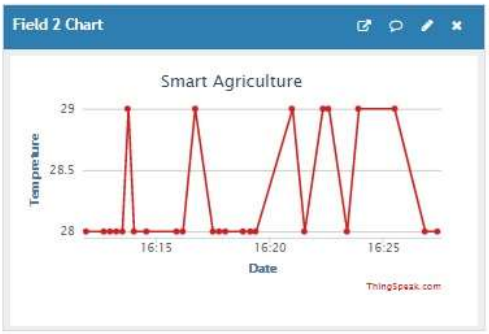

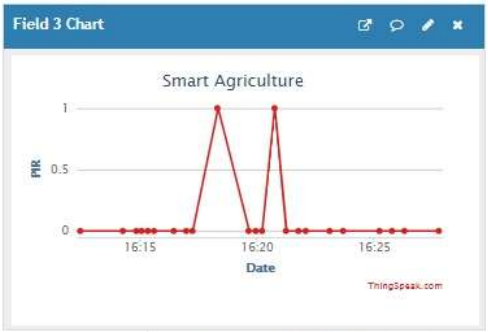

VI.CONCLUSION:-

In this research paper was propose the system for efficient crop monitoring for the agricultural fields. The system monitoring of soil moisture, temperature and water control has been proposed by using, PIR sensors, DC motor and Mobile. The proposed system was effective with growth rate, productivity and water saving, also farmer can monitoring and adjust some value in the system through the app. The proposed system is useful for a farmer who works on agriculture.

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