Smart Green-House using IOT

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Abstract:- **Indian population rely on the agriculture area. In India the water administration framework utilized as a part of farming is out of date which is causing poor utilization of water assets. In a few spots broken methods are utilized which brings about under-usage or over-use of water which impacts on the creation of harvests and reduces the yield. Not just this, legitimate instruction or learning isn't spread to the agriculturists which will enable them to build their creation and business by knowing data with respect to the dirt kind and dampness content which is required for a specific harvest. Giving current touch to the agribusiness strategies is of most extreme significance on account of the need in agriculture and sustenance for the general population to survive. Utilization of expansive and significant innovations, for example, IoT and distributed computing for modernizing and enhancing the customary/since quite a while ago settled/traditional agricultural techniques can control the cost, support and give more noteworthy skill with respect to generation, nature of seeds, manures, weed, bug control and water system. The most recent innovation like configurable remote systems, sensors, and other distributed computing assets can be utilized to assemble and set up reasonable cloud administrations for advancement of agriculture.**

I. INTRODUCTION

Agriculture is the foundation of India's financial activity and our experience in this last 50 years has introduced us to a strong correlation between agricultural growth and economic prosperity. India is an emerging economic power in the world but the advancement of our agricultural system does not meet the requirement as of those other developing countries. There are need of new and efficient technologies in our agricultural system which will help us to improve the production, sustainability, and benefit the Indian economy. One of the technologies is the Greenhouse, which is coming in the limelight of the agricultural system of India.

A. Greenhouse

Greenhouse is a structure with walls and roof made mainly of transparent material, such as glass, in which plants requiring regulated climate condition are grown. A modern greenhouse operates as a system, therefore, it is also referred as Controlled Environment Agriculture (CEA) or Controlled Environment Plant Production System (CEPPS). A greenhouse is equipped with hardware including screening establishment, heating, cooling, lighting and perhaps controlled by a computer to enhance conditions for plant growth. Distinctive strategies are then used to assess optimality-degree and comfort ratio of the greenhouse micro-climate (air temperature, humidity and vapor pressure) to diminish the production risk prior to cultivation of specific crops.

B. Smart Greenhouse

The introduction of IoT to greenhouse has made a difference for many researchers to focus on the automation of the monitoring system for smart greenhouse. Smart greenhouse helps in making a self-regulating, small atmosphere appropriate for plant growth using sensors, actuators, observation and controlling the frameworks that streamline growth conditions and automate the growth process. This will help the farmers to improve crop growth, reduce cost & manpower and incorporate with other internet and messaging services (WAP, SMS) to provide communication for the farmers.

C. Internet of Things(IoT)

Internet of Things is a network of physical devices, vehicles, home appliances & other items embedded with electronics, software sensors, actuators and connectivity which enables these objects to connect and exchange data. IoT enables objects to be controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based system and resulting in improved efficiency, accuracy and economic benefit in addition to reduce human intervention. These devices gather valuable information with the assistance of different existing technologies and then autonomously stream the information between other devices.

II. SMART GREEN HOUSE AUTOMATION

The system illustrated in this methodology allows to control and monitor the environment parameters inside a greenhouse. It is based to monitor the system and control the system from remote places that controls the climate inside the greenhouse by performing either water spray on/off or open rooftop. This system contains an 8051 microcontroller, computer server, an android phone, sensors (temperature, humidity, light) and Internet to overcome the need of human effort and control the plant growth by providing a controlled environment. Implementing this system helped the farmers to take proper decisions with the accurate information generated by the sensors setup in the greenhouse. The proposed system in this methodology helped the farmers to- Remotely monitor and control the environment of the greenhouse as per the requirement. This helped the farmers to take appropriate actions at the time of need which resulted to the increase in the plant growth and deduction in the wastage of resources. Self-regulating system which monitors the environment and performs appropriate action when required to maintain the plant growth and informing the farmers about the changes made during the time of his

absence. This will help the farmer to have a better understanding of the system and plant growth.

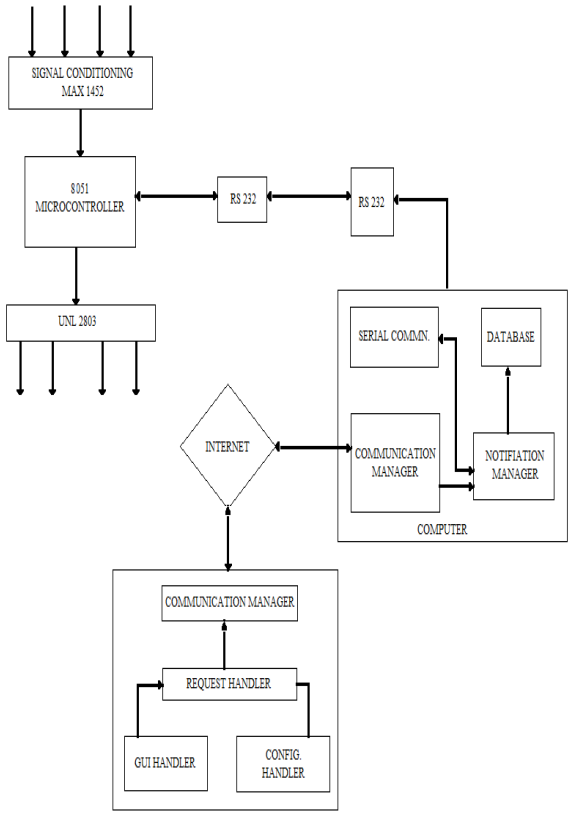

Fig 1:- System Diagram

III. USING CLOUD COMPUTING TECHNOLOGY IN AGRICULTURAL DEVELOPMENT

The objective of this methodology was to understand the concept of how Cloud Computing can be effectively used for the development of the agriculture sector. Cloud computing can be useful for the development of agriculture sector if used efficiently and effectively. By implementing Cloud Computing Technology in the field of agriculture, farmers can access the technical knowledge to understand and improve the utilization of existing resources and to grow without being all dependent on the natural climate. The system proposed in this method implements a model with two core parts: User-friendly approach, fast monitoring and user request operation- Cloud System: Cost efficient in terms of setting up and need of usage. Improved performance as cloud provides powerful computation. Maintenance and up gradation of cloud is the responsibility of the service provider. Relevant data to be stored at a centralized Location-Cloud: Resources are pooled to serve multiple consumers. Available data in the cloud helps to understand the approach and plan for the forthcoming. Resource sharing between customers minimizes the number of data centers and saves power.

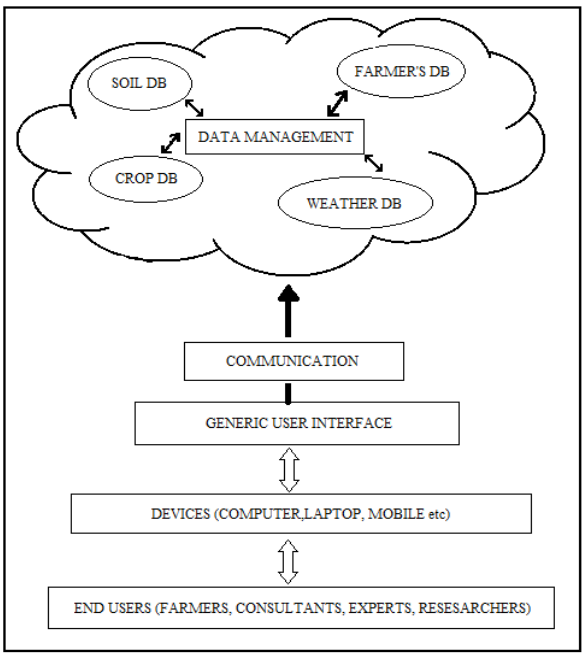

Fig 2:- System Design

- *Cloud Storage*

Cloud storage is a model of data storage in which the computerized information is stored in logical pools, the data storage spans multiple servers and the physical environment is typically owned and managed by a hosting company. These cloud storage providers are responsible for keeping the information accessible and available, and the physical environment secured and running.

IV. IOT SENSOR NETWORK BASED APPROACH FOR AGRICULTURAL FIELD MONITORING AND CONTROL

The proposed system implements a physical parameter monitoring, data display, data integration to the cloud, alert generation and predicting the future values with the help of MATLAB analysis to improve the agricultural growth. Sensors installed in the agriculture fields collect data and integrates it to the cloud which provides a real-time data visualization of the greenhouse environment to the farmers. With the help of MATLAB analysis, the farmers can predict the future parameter values which will allow the farmer to have control over the agriculture field. The system proposed in this method helps farmers by: The system is 4G compatible, it is not limited by the bandwidth and high latency, which is experienced for the GPRS based system. MQTT protocol used in this system is free, so the operating cost for controlling is null.The system is connected to physical sensory devices with the cloud and connects to the irrigation control mechanism with the cloud, which keeps an immense analysis and problem solving capability to the overall architecture by monitoring the irrigation level and proceeding as per the requirement.

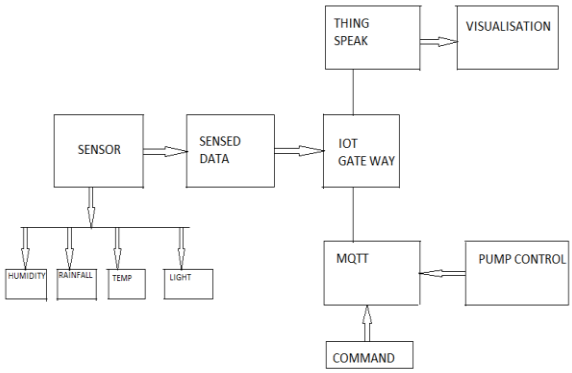

Fig 3:- System Diagram

V. IOT BASED GREENHOUSE MONITORING SYSTEM USING MICAZ MOTES

The system proposed, uses MicaZ node based greenhouse application, which provides a detailed data monitoring about the conditions of the greenhouse in a scheduled manner.This system uses MicaZ wireless motes programmed in nes C and data transferred to a central database over wireless network. X Serve serves as the primary gateway between the wireless networks and other applications. It provides services to route data to and from the mesh network with higher level services to parse, transform and process data as it flows between the mesh and the outside applications. The system proposed in this methodology allows precise position real time measurements and data transmission from the greenhouse to the farmer. Using MicaZ nodes, original routing protocol is designed and incorporated in an IoT based internet accessed agriculture application. Long term collected data can be used by agriculture specialists to create more specific timetables and directions for growing specific crops which will let the farmers to prosper by having a variety of yields in the whole year.

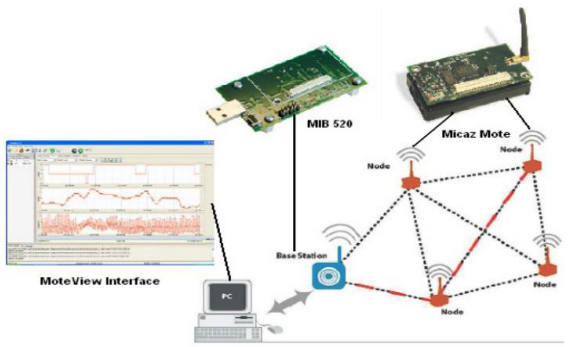

Fig 4:- Remote Monitoring System

- *MicaZ Mote*

The MicaZ is a 2.4 GHz, IEEE 802.15.4 compliant, bit module utilized for empowering low-control remote sensor systems.

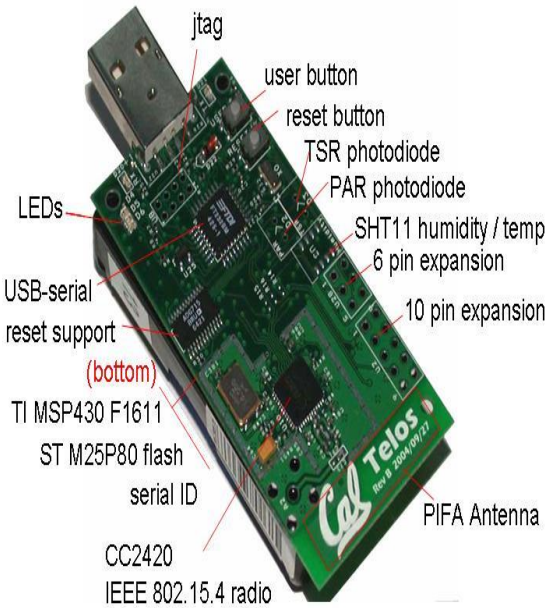

Fig 5:- Micaz Mote

VI. COMPARAITIVE STUDY

India is one of the best nations in agriculture yet in numerous districts techniques for cultivating. The farmers are not well-educated, in regards to the most recent market and techniques for enhancing the crop development. This is making farmers grow crops in inadequate conditions alongside wasteful utilization of water and pointless irritation control. In a few spots where crops require water there is poor/under-utilization of water which brings about dried field while there is wastage of water in numerous different areas. This is bringing about decrease of crop growth. By modernizing agriculture, cultivation and rural techniques can be enhanced and efficient utilization of resources can be made and furthermore get great profits of the yield. By following the water system framework, an extremely basic resource can be preserved. Likewise, farmers can be instructed in utilizing the data in regards to soil compose, stickiness, soil dampness substance, climate and appropriate kind of yield which can be developed and best way of water system can be utilized as a part of that specific condition. By utilizing a few sensors and databases, farmers know about the different encounters of cultivating and to develop more yield. Another touch in modernizing agriculture business is by utilizing most recent innovation like IoT, farmers can easily monitor their farms, control the water system framework and with a little training they can help other farmer groups by updating the database. Besides, this new innovation can enable farmers to contact and convey specialists and scientists for help and information easily.

 F

Fig 6:- Modern Green House System

VII. CONCLUSION

IOT can be executed in numerous fields of agriculture and the consequences of this area can be made more exact and effective. Right off the bat, energy and water are the prominent assets. These resources are very fundamental and the ascent or fall in cost of these information sources can affect on the business coherence. A considerable measure of water has been wasted by executing the wrong techniques where plants are developed at unseemly areas, inadmissible application strategies, defective water system frameworks, and so on. To maintain a strategic distance from these bottlenecks, different gadgets like pumps and sponsors are utilized and sensible strategies to figure the right span, area, trim choice, volume of water and so forth in an effective way. Taken after to that, the blend of IoT and Raspberry Pi and farming can outline an ideal engineering which gives great QoS, low value, better execution and finish use of the considerable number of assets. The additional preferred standpoint is that the advancements can be effectively comprehended by the ranchers and can convey them on the field with a tad of preparing on the framework. The last thought is the harvest perception or observing which determines the sort of crude materials utilized by the state of the dirt, stickiness, temperature and dampness state noticeable all around. An assortment of cameras and sensors are appended on the field which are associated with the Internet. The IoT choices made by the Internet are gathered, broke down and suitable moves are made on the yields by the farmers.

VIII. REFERENCES

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