SMART FARMING SYSTEM USING AI

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OVERVIEW:

Integrating web servers to these intelligent devices will aid in controlling them over the Internet and also in creating effective user interfaces in the form of web pages. Assigning multiple functionalities to a single button on an appliance help manufacturers economize user interfaces, but, this can easily create confusion for the users. Since the cost of web-based interfaces is considerably low, they can be used to provide the infrastructure for the design of simple and more user-friendly interfaces for Devices

PROBLEM STATEMENT:

Agriculture is one of the major sources of economy in the country. Precision Agriculture is already in implementation in other countries but there is a need to implement, improve and evolve IoT(Internet of Things) and cloud computing technologies for better production of the crop. There is a steady increase in demand with population growth. Modernization in agriculture reduces dependency on individual human labor and land

ABSTRACT:

The technology allows operational devising and accelerates verdict making on Farms. IoT allows us to accumulate surrounding data, stock it, concoct it and disseminate the information. The adoption of cloud computing has undergone a huge rise in need and would continue to grow in the coming future with improved cloud hosting and processing dexterities. AI(Artificial Intelligence) and IoT is a great lead as a solution to increased productivity. The data through IoT devices is made available publically for research purposes as data sets and is processed and examined for further prediction related to the crop being produced. The Traditional Technique of farming does not involve any process such as seed selection, soil analysis, weather analysis, vegetation analysis, Nutrient analysis if all these factors are taken in care, this all would bring a drastic change in the society. The System also has a block-chain based shipping system to ensure proper distribution without any wastage. Though the pen-paper tradition is hard to be replaced but minimizes a lot of work, moreover the analysis of manual work required can also be analyzed. A more intricate approach to IoT products in agriculture can be represented by the so-called farm productivity management systems. They usually include several agriculture IoT

devices and sensors, installed on the premises as well as a powerful dashboard with analytical capabilities and inbuilt accounting/reporting features. In addition to the listed IoT agriculture use cases, some prominent opportunities include vehicle tracking (or even automation), storage management, logistics, etc

INTRODUCTION

Agriculture is the primary occupation in India and is the backbone of Indian economic system. Agriculture provides employment opportunities to rural people on a large scale in underdeveloped and developing countries in addition to providing food. It is the process of producing food, fiber and many other desired products by the cultivation and raising of domestic animals. Agriculture is the primary source of livelihood for about more than 58% of India's population. Climate changes will have significant impact on agriculture by increasing water demand and limiting crop productivity in areas where irrigation is most needed. Irrigation system, rain fed agriculture, groundwater irrigation are some of the methods introduced to produce healthier crops which may not use water efficiently. In order to use water efficiently a smart system is designed. In the system farmer need not make the water flow into fields manually, but the system automatically does that efficiently. The traditional methods practiced by people may result inhuge wastage of water. Hence, the concept of robotized farming with mix of IoT has been developed [1]. The technological advancements began to increase the efficiency of production remarkably thus, making it a reliable system. The knowledge of properties of soil determines the water supply to be driven in a smart way. The practice of agriculture in a smart way helps to acquire knowledge of soil and temperature conditions. Developing the smart agriculture using IoT based systems not only increases the production but also avoids wastage of water [2]. The soil moisture sensor, humidity and temperature sensor continuously monitors the soil and environmental conditions, sends the live data to smartphone via cloud service. While raining, the moisture content may increase several times. A rain-drop detecting sensor intimates the controller if there is rainfall, making the water supply to reduce or stop depending upon the moisture content at the moment. The crop requirements such as amount of humidity, temperature and moisture content are to be studied and can be installed again in the controller to meet its circumstances. In this paper, the system uses few sensors which gives the amount of moisture in the soil, the humidity and temperature of the region, and a rain detecting sensor which and can be used in deciding whether the crop is suitable for growing. All these sensors along with NodeMCU are connected to the internet and a smartphone

LITERATURE REVIEW

IN "PRADYUMNA GOKHALE, OMKAR BHAT, SAGAR BHAT,"INTRODUCTION TO IOT", INTERNATIONAL ADVANCED RESEARCH JOURNAL IN SCIENCE, ENGINEERING AND TECHNOLOGY (IARJ SET), VOL. 5, ISSUE 1, JANUARY 2018."

The phrase Internet of Things (IoT) refers to connecting various physical devices and objects throughout the world via internet. The term IoT was firstly proposed by Kevin Ashton in 1999.The following section illustrates basics of IoT. It deals with various layers used in IoT and some basic terms related to it. It is basically expansion of services provided by Internet. This section also presents the architecture of IoT. For example, when the household devices of our daily life connect with the internet the system can be called a Smart-Home in IoT environment. The IoT is not just deep vision for future. It is already under implementation and is having an impact on more than just technological development. The Internet of Things (IoT) is the network of physical objects—devices, instruments, vehicles, buildings and other items embedded with electronics, circuits ,software, sensors and network connectivity that enables these objects to collect and exchange data. The Internet of Things allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency and accuracy. The concept of a network of smart devices was discussed as early as 1982, with a modified Coke machine at Carnegie Mellon University becoming the first internet-connected appliance [3], able to report its inventory and whether newly loaded drinks were cold. Kevin Ashton (born 1968) is a British technology pioneer who is known for inventing the term "the Internet of Things" to describe a system where the Internet is connected to the physical world via ubiquitous sensors. IoT is able to interact without human intervention. Some preliminary IoT applications have been already developed in healthcare, transportation, and automotive industries. IoT technologies are at their infant stages; however, many new developments have occurred in the integration of objects with sensors in the Internet. The development of IoT involves many issues such as infrastructure, communications, interfaces, protocols, and standards. The objective of this paper is to give general concept of IoT, the architecture and layers in IoT, some basic terms associated with it and the services provided Kevin Ashton firstly proposed the concept of IoT in 1999, and he referred the IoT as uniquely identifiable connected

objects with radio-frequency identification (RFID) technology. However, the exact definition of IoT is still in the forming process that is subject to the perspectives taken. IoT was generally defined as “dynamic global network infrastructure with self-configuring capabilities based on standards and communication protocols”. Looking at the evolution of the Internet we can classify it into five eras: 1. The Internet of Documents -- e-libraries, document based webpages. 2. The Internet of Commerce -- e-commerce, e-banking and stock trading websites. 3. The Internet of Applications -- Web 2.0 4. The Internet of People -- Social networks. 5. The Internet of Things -- Connected devices and machines. Physical and virtual things in an IoT have their own identities and attributes and are capable of using intelligent interfaces and being integrated as an information network. In easy terms IoT can be treated as a set of connected devices that are uniquely identifiable. The words “Internet” and “Things” mean an inter-connected world-wide network based on sensors, communication, networking, and information processing technologies, which might be the new version of information and communications technology (ICT). To date, a number of technologies are involved in IoT, such as wireless sensor networks (WSNs), barcodes, intelligent sensing, RFID, NFCs, low energy wireless communications, cloud computing and so on. The IoT describes the next generation of Internet, where the physical things could be accessed and identified through the Internet. Depending on various technologies for the implementation, the definition of the IoT varies. However, the fundamental of IoT implies that objects in an IoT can be identified uniquely in the virtual representations. Within an IoT, all things are able to exchange data and if needed, process data according to predefined schemes.

IN” A.ANUSHA, A.GUPTHA, G.SIVANAGESWAR RAO, RAVI KUMAR TENALI, “A MODEL FOR SMART AGRICULTURE USING IOT”, INTERNATIONAL JOURNAL OF INNOVATIVE TECHNOLOGY AND EXPLORING ENGINEERING (IJITEE), ISSN: 2278-3075, VOLUME-8 ISSUE-6, APRIL 2019.” Climate changes and rainfall has been erratic over the past decade. Due to this in recent era, climate-smart methods called as smart agriculture is adopted by many Indian farmers. Smart agriculture is an automated and directed information technology implemented with the IOT (Internet of Things). IOT is developing rapidly and widely applied in all wireless environments. In this paper, sensor technology and wireless networks integration of IOT technology has been studied and reviewed based on the actual situation of agricultural system. A combined approach with internet and wireless communications, Remote Monitoring System (RMS) is proposed. Major objective is to collect real time data of agriculture production environment that provides easy access for agricultural facilities such as alerts through Short Massaging Service (SMS) and advices on weather pattern, crops etc. Agriculture is the basic source of livelihood of people in India. In past decade, it is

observed that there is not much crop development in agriculture sector. Food prices are continuously increasing because crop rate is declined. It has pushed over 40 million people into poverty since 2010[1]. There are number of factors which are responsible for this, it may be due to water waste, low soil fertility, fertilizer abuse, climate change or diseases, etc. It is very essential to make effective intervention in agriculture and the solution is IOT in integration with Wireless sensor networks. It has potential to change the way of development in agriculture and gives great contribution to make it smart agriculture. The internet of things involves a three-tier system. It includes perception layer, network layer and application layer. Perception layer includes sensor motes. Information communication technology (ICT) enabled devices, sensor motes are building blocks of sensor technology. It includes cameras, RFID tags, sensors and sensor network used to recognize objects and collecting real time information. The network layer is a infrastructure of the IOT to realize universal service. It directs towards the combination of the perception layer and application layer. The application layer is a layer that combines the IOT with the technology of specific industry. The internet of things almost applied in all areas of industry, including smart agriculture, smart parking, smart building environmental monitoring, healthcare transportation and many more. Among them, agriculture is one of the important areas which targets millions of people The research in agriculture area is enhanced in various aspects to improve the quality and quantity of productivity of agriculture. Researchers have been worked on many different projects on soil attributes, different weather conditions as well as scouting crops. Some projects worked on actual farm fields and some worked on polyhouses. Researches of Carrnige Mellon University worked on plant nursery using Wireless Sensor Technology [2]. Wireless Sensor Network based polyhouse monitoring system is explained in [3] which make use of environment temperature, humidity, CO2 level and sufficient light detection modules. This polyhouse control technology provides automatic adjustment of polyhouse. . In [4] authors have proposed development of wsn based above mentioned parameters for agriculture using ZigBee protocol and GPS technology. In some projects such as [5] authors have designed and implemented an approach in development of crops monitoring system in real time to increase production of rice plants. This system has used motes with sensors to check leaf wetness. Later on use of IoT has been proposed in [6-8]. IoT gives platform to researches to maintain real time data and send alerts immediately to farmers. IoT implementation gives easy access to information that comes from sensor nodes. IoT is also used for product supply chain business process. Cloud architecture gives additional support to IoT in maintaining Big data of agriculture information viz. history information, soil properties, fertilizers distribution, image cultivation through camera and information collected through sensors, recording information etc. Authors have analyzed collected data for finding correlation between environment, work and yield for standard work model construction. Monitoring for adverse signs and fault detection. In [9] authors have discussed the application of data mining with the help of WEKA tool and analysis model using of machine learning algorithms. In [10] authors have concentrated on crop monitoring. Information of temperature and rainfall is collected as initial spatial data and analyzed to reduce the crop losses and to improve the crop production. They have used optimization method to show progressive refinement for spatial association analysis. Although authors mentioned above have proposed many models in agriculture domain, the effective model is needed that uses new technologies and provides an integrated approach to monitor

environmental conditions periodically and various soil properties of farm field through IoT devices and store these details at the central place in the cloud storage which results in Big –data over the time. It is also usable by multiple vendors or farmers who enquire about crop yield maximization. Farmer can analyze these data for fertilizer requirements for current crop. It will help for smart climate solutions and disaster prevention

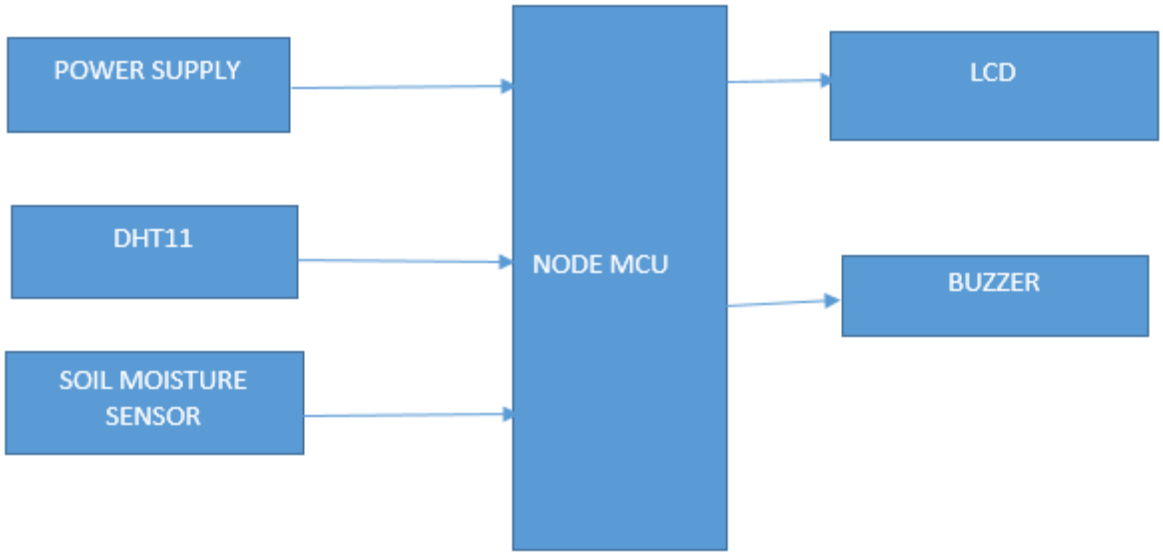
EXISTING SYSTEM

An existing system doesn't have the controlling over IOT. The smart irrigation system having all contol over sensors. Many new concepts are being developed to allow agricultural automation to flourish and deliver its full potential.

PROPOSED SYSTEM

The main advantage of the proposed irrigation system is that it can send the information of a soil to the user through IoT network for irrigation. Power supply is given to the circuit in the form of voltage or current. Here soil moisture sensor measures the water content of soil and its output is fed to the amplifier, which is used to improve the gain value. And this measured value is given to the Arduino nano as analog input

IMPLEMENTATION



DESCRIPTION

ESP8266

The ESP8266 is a low-cost Wi-Fi microchip, with a full TCP/IP stack and microcontroller capability, produced by Espressif Systems[1] in Shanghai, China. The chip first came to the attention of Western makers in August 2014 with the ESP-01 module, made by a third-party manufacturer Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands. However, at first there was almost no English-language documentation on the chip and the commands it accepted.[2] The very low price and the fact that there were very few external components on the module, which suggested that it could eventually be very inexpensive in volume, attracted many hackers to explore the module, the chip, and the software on it, as well as to translate the Chinese documentation.[3] The ESP8285 is an ESP8266 with 1 MiB of built-in flash, allowing the building of single-chip devices capable of connecting to Wi-Fi.[4] The successors to these microcontroller chips is the ESP32 family of chips, including the pin-compatible ESP32-C3

SOIL MOISTURE METER, SOIL HUMIDITY SENSOR, WATER SENSOR, SOIL HYGROMETER FOR ARDUNIO

This is Soil Moisture Meter, Soil Humidity Sensor, Water Sensor, Soil Hygrometer for **Ardunio**. With this module, you can tell when your plants need watering by how moist the soil is in your pot, garden, or yard. The two probes on the sensor act as variable resistors. Use it in a home automated watering system, hook it up to IoT, or just use it to find out when your plant needs a

little love. Installing this sensor and its PCB will have you on your way to growing a green thumb!

The soil moisture sensor consists of two probes which are used to measure the volumetric content of water. The two probes allow the current to pass through the soil and then it gets the resistance value to measure the moisture value.

DHT TEMPERATURE & HUMIDITY SENSORS.

These sensors are very basic and slow, but are great for hobbyists who want to do some basic data logging. The DHT sensors are made of two parts, a capacitive humidity sensor and a thermistor. There is also a very basic chip inside that does some analog to digital conversion and spits out a digital signal with the temperature and humidity. The digital signal is fairly easy to read using any microcontroller.

Humidity is the measure of water vapour present in the air. The level of humidity in air affects various physical, chemical and biological processes. In industrial applications, humidity can affect the business cost of the products, health and safety of the employees. So, in semiconductor industries and control system industries measurement of humidity is very important. Humidity measurement determines the amount of moisture present in the gas that can be a mixture of water vapour, nitrogen, argon or pure gas etc… Humidity sensors are of two types based on their measurement units. They are a relative humidity sensor and Absolute humidity sensor. DHT11 is a digital temperature and humidity sensor

BUZZERS

In common parlance a Buzzer is a signaling device that is not a loudspeaker. It can be mechanical, electromechanical, or electronic (a piezo transducer). BeStar produces Buzzers in every available configuration for a wide variety of applications. A Piezo transducer can produce the sound for panel mount buzzers, household goods, medical devices and even very loud sirens. When a lower frequency is required an electromagnetic buzzer can fill the need. These are very common in automotive chimes and higher end clinical diagnostic devices. The BeStar buzzer range includes self drive units with their own drive circuitry (indicators), or external drive units, which allow the designer the flexibility to create their own sound patterns.

CONCLUSION

In this paper, IoT technology is used to sense and analyze the temperature, humidity level, soil moisture level and the rain condition and DC motor is controlled using NodeMCU. All these

values are sent to the smart phone using Wi-Fi. Due to the usage of this system, adequate water is pumped and rain is also utilized efficiently. This system is very much helpful to farmers as they need to regularly pump water and check the status of each crop. From anywhere in the world, farmers can know the values of humidity, temperature and soil moisture and if the DC motor is ON through the blynk app present in their smartphones.

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