

An Overview on IOT Based Smart Agriculture System

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Abstract

It is known that the internet of Things (IOT) can be revolutionary to each field of common man's life. IOT includes a high potential to assist in building a sensible agriculture system. It will have most of the impact within the development of intelligent sensible farming devices that provide the farmers the technology to access the live information of the agricultural field with a high accuracy level. Also, with the combination of GSM technologies, it reduces the possibilities of any danger by causation the SMS notifications and notification on the applying developed to the farmers' phone just in case of any discrepancy using Wi-Fi/3G/4G. There are one or two of villages had been known during which this whole plan of IOT based mostly sensible agriculture has been enforced and located helpful for the farmers.

Keywords: IOT, Smart Agriculture.

Introduction

Agriculture is that the foundation of human life as a result of it's the foremost vital supply of food grains and numerous raw materials. It plays a crucial role within the country's economic process. It additionally provides several job opportunities for residents. The growth of the agricultural sector is vital for the economic conditions of the country. Sadly, several farmers still use the recent farming ways, that results in lower yields of crops and fruits. However, where on-the-spot automation was done and men were replaced with automatic devices, performance was improved. So it's necessary to use fashionable science and technology within the agricultural sector to expand performance [6]. Agriculture parameters use IOT technology additionally to accessing a system that uses these objects to gather information and the way it's used [3]. web of Things (IOT) may be a platform through that devices are connected over the web to create the system sensible and self-efficient. sensible agriculture is associate degree implementation within the recent farming method by mistreatment IOT with integrated ICT tools to create it easier, economical and profitable for farmers. Through this sensible system, farmers will access the soil and water they have and learn a lot of regarding it while not about to the sphere. This is often done a lot of specifically for sensible irrigation. IOT are often helpful in building systems capable of forming a wise irrigation management system [1]. web of Things (IOT) is extremely standard for connecting devices and grouping info. internet of Things is employed with net of Things frames to manage and handle info and information. among the system, users can register their sensors, generating a flow of data and technique information. the online of things is applicable to several agricultural methodologies. IOT applications are sensitive cities, sensitive atmosphere, sensitive water, sensitive meters, security and emergency, engineering, sensitive agriculture, home automation, health, etc. internet things accept a tool which will analyze sensors and transmit info to the user [2].

Components of Smart Agriculture System

Soil Moisture sensor

Soil moisture sensors are the devices which are used to detect the content of moisture present in the soil. It gives the farming the requirement of water amount to the soil so that farming can pour the water accordingly. These type of sensors gives both the analog and the digital output that increases its importance more particularly. In this, the LED device is used to indicates when the output is high or low.

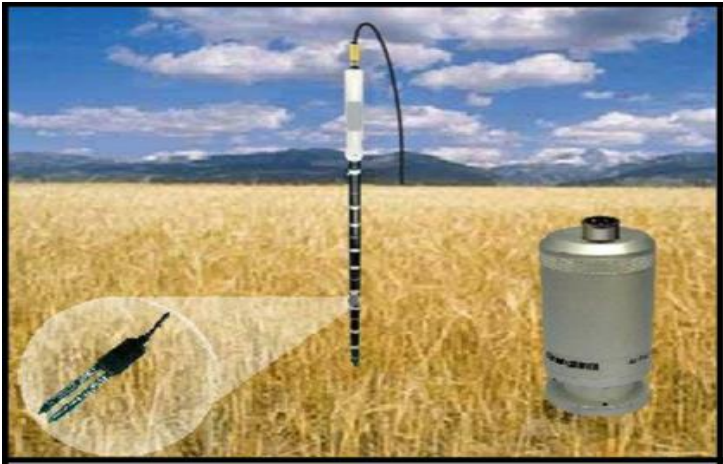


Fig. 1: Soil Moisture Sensor

Wireless technology (Zigbee)

ZigBee could be a wireless network protocol. it's created for management and detection networks helps communication devices within the wireless network system. ZigBee could be a set of specifications for WPANs, that is digital radio communications between computers and associated devices.



Fig. 2: Zigbee – Wireless Networking Protocol

Current applications of agricultural information wireless communications have faith in a structure consisting of 1 or additional environmental data sensors (temperature, humidity, etc.), signal acquisition block, silicon chip / microcontroller with external memory module and wireless radio, Communication between detector nodes and / or base station.

Software (Arduino IDE)

There is a significant role of Arduino in structuring associate degree programming the complete IoT based mostly system because it is an open supply platform, a user community, and hardware and package firm that programs and manufactures kits for making digital devices and interactive objects that may sense and management objects within the physical world. So, all the hardware devices are being programmed and most significantly controlled on that. These systems offer associate degree analog digital array which will be connected to utterly totally different growth cards and different circuits. For microcontroller programming, the Arduino project provides associate degree integrated development setting (IDE) supported the method project, that in addition supports programming languages like C and C++.

Relay Switch

A relay could be a switch that works on power rather than mechanical power. it's additionally used for preventing injury within the system. It switches ON or off the motor within the field supported the command of Adriano. it's additionally used for preventing injury within the system. Generally, electromagnets are utilised in relays to figure a switch mechanically, whereas others use semiconductor devices. it's used once necessary to manage the circuit with associate degree isolated low power signal or once multiple circuits got to be controlled with one signal. as a result of relays are way more resistive to radiations than semiconductors, they're wide used for safety functions. mechanical device protecting relays are accustomed realize the high load and alternative discrepancies on electrical lines via gap and shorting circuit breakers.

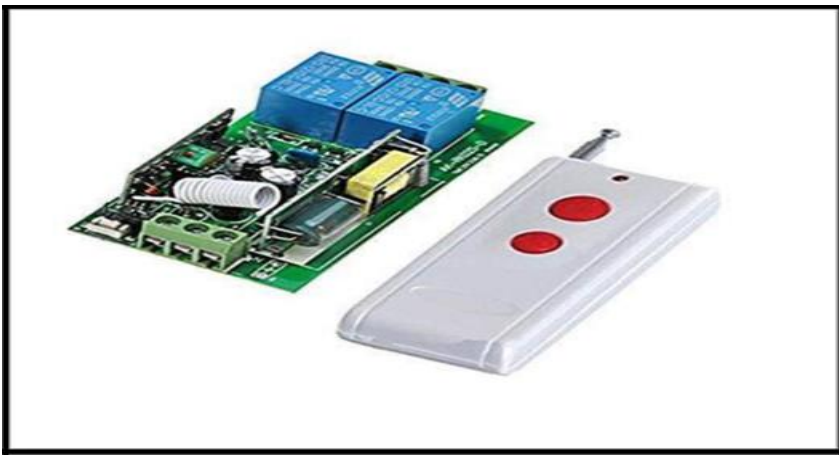


Fig. 3: Arduino Hardware

GSM (Global System for Mobile Communication)

GSM may be a digital movable net that's usually accepted by movable recipient users in numerous sections of the realm. GSM takes a form of season division multiple access and is that the general generally applied of the 3 digital broadcast telecom technologies: TDMA, GSM, and code-division multiplex path (CDMA). GSM digitizes conjointly decreases information, next drives it below away by couple many waters of user information, personal in its amount gap. operating GSM systems, a command theme ought to done purposed this insistence order being an interior methodology that seat

director conjointly establish a farming machine and completely different styles close operating intrinsic information and production peripherals.



Fig. 4: GSM Global System for Mobile Communication

Working of Smart Agriculture System

The good agriculture system 1st involves the login credentials to induce the user logged within the system. this allows the user to convey command (ON/OFF) to application. From the IOT primarily based platform, the gathering and causation method of all Analog knowledge to GSM protect takes place. This GSM protect is connected in personal computer through that command (ON/OFF) pass to the microcomputer device. personal computer is simply just like the main controller of this technique that converts all the analog knowledge into digital kind.

There are varied condition occur within the field that should be detected like unsuitable wetness level, unwanted water level or several alternative that causes the command sends to the relay module. Now, This GSM protect connected with personal computer access digital knowledge from it. Then the Arduino GSM protect SIM connects to the web send/receive SMS messages from good phone and tablets or computers. Through this, farmer is obtaining SMS of data like Motor: ON or OFF, Current wetness content and Current water level.

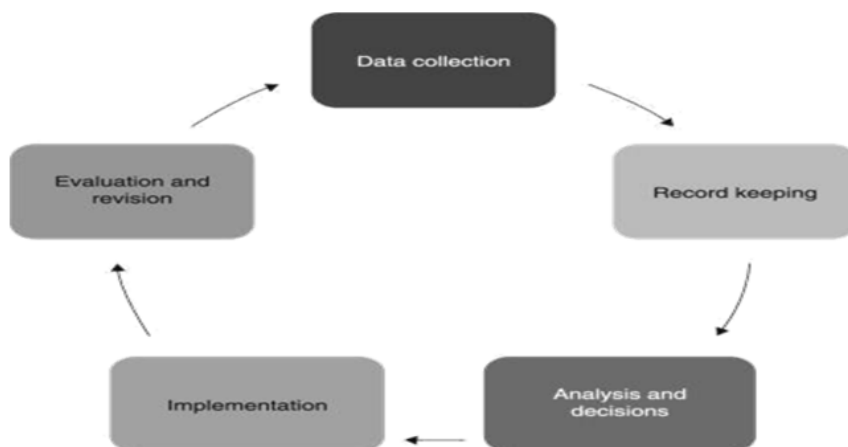


Fig. 5: Working of Smart Irrigation System

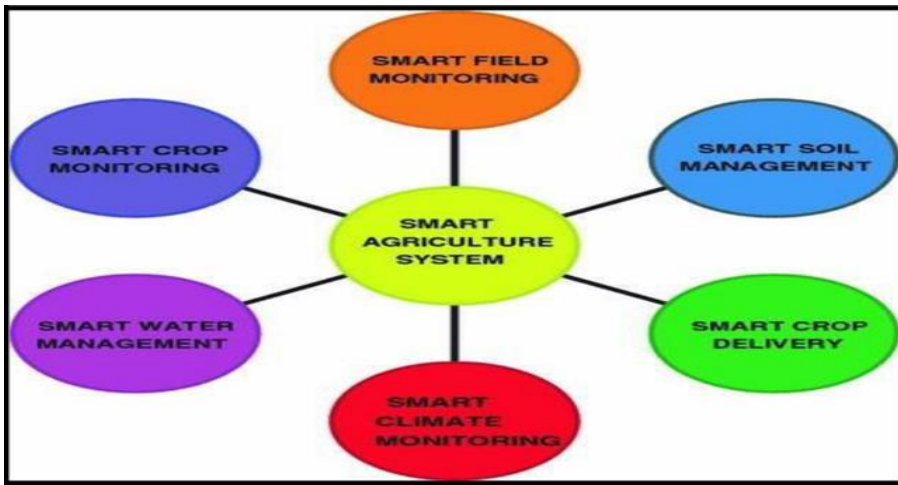


Fig. 6: Smart Agriculture System

Advantages

Smart farming, using automation and sensor technology, benefits society in the following ways [4-5]:

1. It enables tenants to maximize yields applying least sources before-mentioned as water, fertilizers, seeds, etc.
2. Solar-powered including mobile advanced pumps keep the price of power.
3. Smart agriculture control vibrations also androids which supports in various forms. Those enhance that information gathering method plus benefits in broadcast monitoring including command.
4. It is a cost-effective approach.
5. It produces high-quality voltage product.
6. It optimizes the energy resources.
7. Time efficiency, accurate diagnosis of nutrient deficiency.

Challenges

1. Complexity
2. Privacy/Security
3. Lesser Employment of Manual staff or unskilled workers
4. Equipment is costlier
5. Awareness of Indian farmer for this technology

Conclusion

This implementation to the old traditional method of farming can be done with ease. This will also improve the lifestyle of farmers. Through the implementation of IoT, various resources like money, water, labor work will be reduced. Farmer will get all required information anytime and from anywhere. Also integrating IoT must be done carefully with proper prerequisites as there are various problems which could be faced and make the farmer in a position of trouble.

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