

IFARMS: IOT BASED INTELLIGENT DRIP IRRIGATION AND INTRUDER DETECTION SYSTEM ON CLOUD

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ABSTRACT

In India, the chief profession is the farming. Nearly all of the farming is led in the pastoral zones, but there is the deficiency of the accommodations and the obliviousness about the various new technologies and the devices, due to which peoples are wandering towards built-up areas. So, there is delinquent in agriculture. To conquer this issue, we go for brilliant farming methods utilizing IOT. This undertaking incorporates various highlights like GPS based remote checking, temperature detecting, dampness detecting, proper utilization of water in the homestead. It makes utilization of remote sensor systems for seeing the natural factors constantly Various sensor hubs are situated at better places in the homestead. Controlling these parameters with the help of any remote device or internet services and the operations are accepted by interfacing sensors, Wi-Fi, camera with microcontroller. The technique, Image processing is used for intruder's detection persistence. Intruder detection is done by using camera as well as various algorithms. After detection of intruder, the suitable action is taken by system. Overall system in the field can absolutely help to progress the yield of the crops and overall production.

Index Terms— IoT, Sensors, GPS, Microcontroller, Wi-Fi, Camera.

I. Introduction

Agriculture is the support of Indian economy. The key problem faced in many rural areas is that lack of mechanization in agricultural activities. AGRICULTURE is considered as most vital sources of income and food production worldwide. India is the nation of farming. The majority of the general population of India live in towns and are completely subject to agribusiness. The core of the horticulture is water system. In India farming exercises is done by difficult work, utilizing ordinary instruments, for example, furrow, sickle and so on. Our Smart Farming System reduces the manual work and automates the agricultural activities. Technically, the sensor nodes are deployed into the farmland. They start to collect environmental information and monitor soil characteristics. Then, they cooperate according to designed protocols to communicate the collected data to a dominant node. From that point forward, this data is prepared and treated to settle on a possible choice. The security viewpoint is case of by what means can the WSN enhance the horticultural yield. Actually, crops are adversely influenced by human or creature gatecrashers. Additionally, the generation procedure is still inadequately controlled which prompt a potential item misfortune. To defeat this point, the video reconnaissance hubs can be utilized to recognize and distinguish interlopers and to better deal with the creation procedure. The goal of this task is to computerize the customary water system framework. The principle objective of this venture is to spare labor, decreases squandering

of water, now and again the harvests may squander in light of over water system, likewise utilizing a SMS based technique to checking the procedure which is valuable for the digitalize the robotized procedure.

Farming is principle wellspring of the general population in current situation. It gives sustenance and in addition vast work. In this way, modernization of agribusiness is imperative in light of the fact that conventional cultivating can't support up the harvest yield. Thusly, agriculturist begin to utilize the different innovation to accomplish better yield and lessen the required labor.

In our undertaking, we are essentially focusing on following applications, for example,

To consistently screen the dirt dampness.

To consistently screen the water level.

To check the temperature, stickiness.

To screen and control the entire framework.

Give the detail data about the field condition to the client.

A) Internet of Things:

The Internet of Things (IoT) is one network which contains physical objects that are embedded with the electronic devices, software's, connectivity and sensors to achieve a higher value and provide some services regarding exchange of details with the product manufacturer, operator. Normally, it is expected to give modern and propelled associations between the gadgets for its appropriate correspondence and handles an assortment of conventions, applications and learning bases.

B) Cloud Computing:

Distributed computing empowers IT and organizations to use all the processing assets. Distributed computing comprises of a few favorable circumstances in business ventures and enterprises. A portion of the upsides of distributed computing are:

- **Elasticity:** If the registering requests expands, the organizations scale up and if the figuring requests diminishes then the organizations downsize.
- **Self-benefit provisioning:** End clients can utilize the figuring assets for a work to be adjusted on request
- **Pay per utilization:** All the processing assets all given with a legitimacy level permitting the clients for pay of assets. The administrations of distributed computing assets can be either half and half, open or private.

II. Literature Survey

In the event of cultivating, a standout amongst the most imperative term is only the Drip Irrigation System. The technique for dribble water system framework utilizing remote sensor systems [1] are presented on the premise of TDMA (Time Division Multiple Accesses) figure that allows the hubs to attempt to ON/OFF with the assistance of extent as per orchestrated spaces. This model is additionally including the dirt dampness sensor, temperature and weight sensors for checking the water system operations in the homestead zone. At every single procedure, every one of the hubs are in at work till there is essential of a few hubs as it were. Along these lines, there is utilization of hubs vitality in the correspondence which causes the less information throughput in general framework.

The development, testing and utilization of a coordinated conveyed remote sensor network(WSN) are existing in Remote Sensing and Control of an Irrigation System Using a Distributed Wireless Sensor Network [2] for sensor based impermanent rate water system framework. This strategy is likewise given broad points of interest to remote correspondence interface of sensors from in-field sensor station to the PC at a base station. Bluetooth is utilized as remote radio Communication in the framework. By utilizing this technique, it expands the profitability while sparing water. Be that as it may, the theory would be extensive because of different sensors are in the process and additionally data transfer capacity of Bluetooth is bring down contrast with wi-fi.

A total determination for the mechanized water system of rice crops utilizing water level sensors, remote supervision framework (SCADA) and remote correspondence (GPRS) is depicted in Automatic Control of Irrigation Systems Aiming at High Energy Efficiency in Rice Crops [3]. It having the productive utilization of water and power is required in entire design. As devoted controller is utilized, it dispenses with the utilization of PC on location. In any case, it is appropriate the for-rice yields and changes in nature like temp, air turbulence impacts ultrasonic response.

With the end goal of minimal effort multi-mode control for a water system framework worked around a PC is specify in PC-Based Automation of a multi-mode control for an Irrigation System [4]. The implanted chip based equipment with its firmware and completely devoted Delphi based graphical UI were produced and effectively tried. It expanding vitality costs and diminishing water supplies. However, there is the likelihood of data misfortunes in correspondence because of postponement.

A remote use of dribble water system upheld by soil dampness sensors [5] is undertaking and acknowledged for minimal effort multi-mode control for a water system framework. Efficient water overseeing is a main fear for yield of products since it is relying upon the fractional essential of water supply. In any case, in oblivious dribble framework, water system will do just if there will be commitment of water and furthermore to take think about unreasonable measure of watering is makes sicknesses plants and there is plausibility of cease to exist the plant moreover. This framework has 3 units which are Base Station Unit(BSU), Valve Unit(VU) and Sensor Unit(SU) for the determination to maintaining a strategic distance from dampness nervousness of trees and decreasing of pointless water utilize.

III. Proposed Work

The sensors are deployed in the agricultural field. Temperature sensor is utilized to quantify temperature of the field, water level sensor is utilized to gauge the level of water, dampness sensor is utilized to gauge dampness in soil and mugginess sensor is utilized to gauge nearness of water drops noticeable all around. The gathered information from these sensors is send to the microcontroller through RS-232. On the premise of readings, the hardware is monitored and controlled by user using android application. The received data is compared with the threshold values. If the data exceeds threshold value the notification is sent to the user on android phone. The values are generated in the web page so the user gets all details about sensor values.

The hardware is controlled by the user in 3 different ways. viz. manual mode, automatic mode and time scheduling. In manual mode, the user has to control the microcontroller by pressing the button in android application. In automatic mode, if the value exceeds the threshold microcontroller is switch ON or OFF automatically. In time scheduling, on the basis of current sensor readings user schedule the time to switch ON or OFF the hardware.

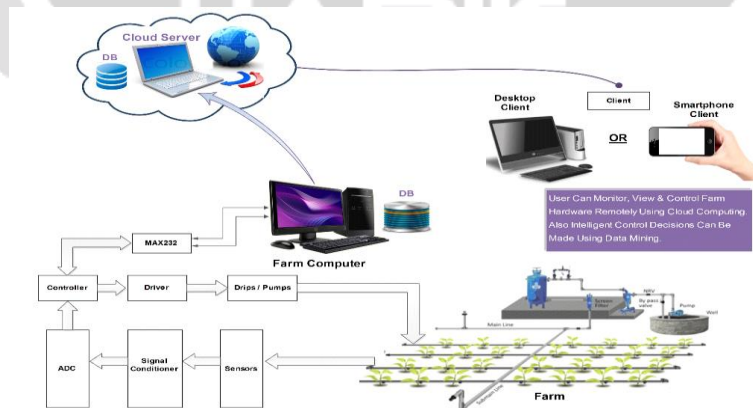


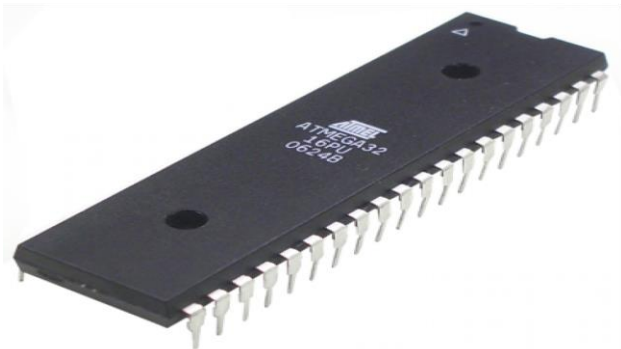
Fig.1. Architecture of system

Along with this, A camera is deployed in the field for Intruder detection and it is done using image processing. If any intruder enters the field area, an image is captured in a camera then processing is done on that image. for this, blob detection algorithm is used. when the intruder is detected buzzer is switched ON and notification is sent on a

user's android application. according to the calculated aspect ratio it is easy to check whether it is human or animal in order to take action on it.

Hardware Requirements

1) AVR microcontroller:



An AVR microcontroller is a kind of gadget fabricated by Atmel, which has specific advantages over other basic chips. AVR microcontrollers come in various bundles, some intended for through-opening mounting and some surface mount. AVRs are accessible with 8-pins to 100-pins, in spite of the fact that anything 64-stick or over is surface mount as it were.

The AVR is substantially easier and manages information in 8-bit pieces as its information transport is 8-bit wide, in spite of the fact that there is currently an AVR32 with 32-bit transport and an AT super family with a 16-bit information transport. An 8-bit microcontroller like the AVR doesn't more often than not have a working

framework, in spite of the fact that it could run a basic one if required, and rather it just runs a solitary program. Similarly, as your PC would be pointless in the event that you didn't introduce any projects, an AVR must have a program introduced to be any utilization. This program is put away in memory worked in to the AVR, not on an outside plate drive like a PC. Stacking this program into the AVR is finished with an AVR software engineer.

2) Sensors

a) Soil Moisture Sensor:

This Moisture Sensor uses Immersion Gold which shields the nickel from oxidation. Electro less nickel dousing gold (ENIG) has a couple of good conditions over more customary (and more affordable) surface plantings, for instance, HASL (fix), including brilliant surface planarity (particularly obliging for PCB's with colossal BGA packs), incredible oxidation insurance, and convenience for untreated contact surfaces, for instance, film switches and contact centers. This Moisture Sensor can read the measure of moistness appear in the earth including it. It's a low-tech sensor, however ideal for checking a urban garden, or your pet plant's water level. This is an irrefutable prerequisite have gadget for a related develop! This Moisture Sensor can be used to recognize the moistness of soil or judge if there is water around the sensor, let the plants in your garden interface for human offer help. They can be to a great degree to use, essentially install it into the soil and a while later read it. With help of this sensor, it will be doable to impact the plant to remind you: Hey, I am dry now, please give me some water. This Moisture Sensor uses the two tests to go current through the soil, and after that it examines that security from get the sogginess level. More water impacts the earth to coordinate power more viably (less insurance), while dry soil conducts control insufficiently. It will be valuable to remind you to water your indoor plants or to screen the earth moistness in your garden. This thing has low power use, and high affectability, which are the best characteristics of this module.

b) Temperature Sensor:

A temperature sensor is a gadget, commonly, a thermocouple or RTD, that accommodates temperature estimation through an electrical flag. A thermocouple (T/C) is produced using two divergent metals that create electrical voltage in guide extent to changes in temperature. The coolant temperature sensor is utilized to gauge the temperature of the motor coolant of an inside ignition motor. The readings from this sensor are then encouraged back to the motor control unit (ECU), which utilizes this information to modify the fuel infusion and start timing.

Contact sensors incorporate thermocouples and thermistors that touch the question they are to quantify, and noncontact sensors measure the warm radiation a warmth source discharges to decide its temperature. The last gathering measures temperature from a separation and regularly are utilized as a part of risky conditions.

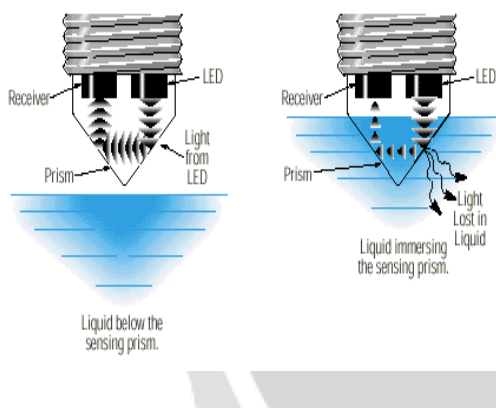
c) Humidity Sensor:

Using the high exactness SY-HC-1 dampness sensor, SY-HC-1000 is a devoted mugginess and temperature transducer intended for OEM (unique gear producer) applications that require solid and precise estimation. It includes a profoundly reduced for simple, practical mechanical mounting.

It is feasible for SY-HC-1 to have the modules straight recurrence yield by means of direct interface with a microcontroller. Moistness sensors are little in estimate, low power devouring. Stickiness sensor have high dependability and long-haul security.



d) Water Level Sensor:



Water Level Sensors. Level sensors are utilized to distinguish the level of substances that can stream. Such substances join liquids, slurries, granular material and powders. Such estimations can be used to choose the measure of materials inside a close compartment or the flood of water in open channels. Hydrostatic weight. Hydrostatic weight level sensors are submersible or remotely mounted weight sensors fitting for measuring the level of damaging liquids in significant tanks or water in stores. Something else, typical changes in barometric weight will present extensive blunder in the sensor yield flag.

3) Dc Motor essentials:

Coordinate current (DC) engines are generally used to create movement in an assortment of items. Perpetual magnet DC (coordinate current) engines are getting a charge out of expanding prominence in applications requiring minimal size, high torque, high productivity, and low power utilization. In a brushed DC engine, the brushes reach an arrangement of electrical contacts gave on a commutator secured to an armature, shaping an electrical circuit between the DC electrical source and loop windings on the armature. As the armature pivots on a hub, the stationary brushes come into contact with various segments of the turning commutator. Perpetual magnet DC engines use at least two brushes reaching a commutator which gives the immediate current stream to the windings of the rotor, which thus give the coveted attractive shock/fascination with the lasting magnets situated around the fringe of the engine.

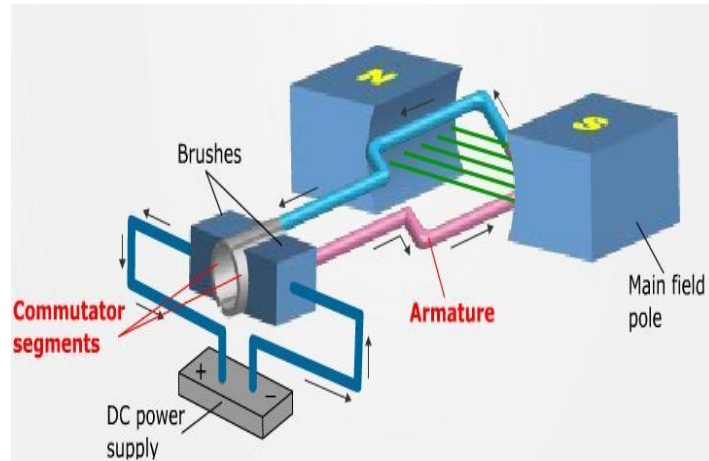
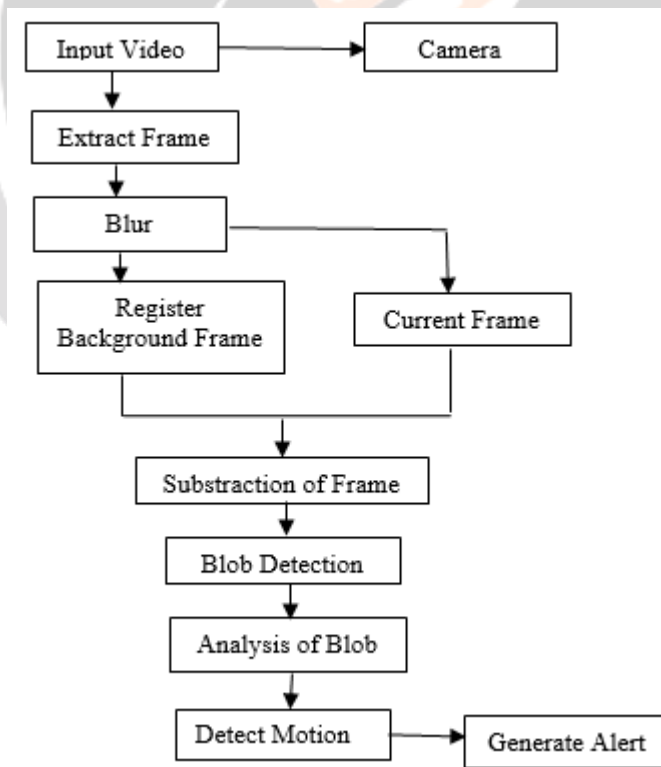


Fig.5. Working of DC motor

The brushes are ordinarily situated in brush boxes and use some U-formed spring which inclinations the brush into contact with the commutator. Lasting magnet brushless dc engines are broadly utilized as a part of an assortment of uses because of their straightforwardness of plan, high effectiveness, and low clamor. These engines work by electronic replacement of stator windings instead of the traditional mechanical compensation achieved by the squeezing engagement of brushes against a turning commutator.

Flowchart for Intruder Detection



Intruder detection is done in this project. Firstly, the images are captured by the camera in the form of frame, then this frame are extracted. Blur algorithm is applied to these frames there is one basic background image and other is current image captured by camera, by blur algorithm the background image is getting blurred and the current image

remains as it is, after that the subtraction algorithm is applied and blurred image is subtracted, only the current image is visible to user, then the blob detection is applied and blob analysis is carried out and motion is detected. According to motion detected proper alert is generated by this system. In this way system is useful for intruder detection

IV. Conclusion and Future work

Through the technologies and Web Services technology, we can realize the function of remote monitoring and the retrieved sensor details are updated via web technology. The user can anytime view their sensor data details and the intimation about the water flow level will be sent via SMS to the user's mobile phone. In this paper, we have introduced a model design for a trickle water system framework utilizing the WSNs. Our model incorporates the dirt dampness, temperature, moistness and water level sensor to screen the water system operations. On the off chance that various types of sensors (that is, temperature, moistness) are engaged with such water system in future works, one might say that a web based remote control of water system mechanization will be conceivable. Also, the intruder detection is done in this project, because of which the damaging of the crop is avoided at large extend. We can get efficient result from this system which will be very effective for our agricultural field.

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