

GSM and Wireless Sensor Network with Embedded based Smart Automated Irrigation System

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Abstract- An Android application which pushes the rancher to ON/OFF the engine without his physical vicinity in the field. This paper has continuous detecting and control of a watering system framework. At the point when the state of water in the horticultural homestead is unusual then the framework consequently switches OFF. light of the dirt dampness, through hand-off the pumping engine will be consequently switch on or off which spares the water and then again the plant can get most suitable water level which expands the profitability of the yield. Utilizing GSM (Global System for Mobile communication) innovation which is utilized to educate the client about the definite state of the field. This data is passed onto the client demand as SMS (Short Message Service). This framework gives uniform and required water level for the agrarian ranch and it maintains a strategic distance from water wastage. An android telephone that controls the Irrigation framework, which could give the offices in light of the fact that to keep up uniform natural conditions. This empowers clients to exploit the all inclusive sent GSM systems with its low SMS administration expense to utilize cell telephones and basic SMS charges to deal with the watering system framework. It is feasible for clients to utilize SMS to screen straightforwardly the states of their farmland, plan the water requirements for harvests, naturally water control, furthermore set control operational conditions as per the water needs of products. In this paper, keen detecting utilizing JAVA with PC control

Keywords: GSM, Android, Irrigation Frame work

I. INTRODUCTION

Farming is the foundation of India. Along these lines, in India horticulture has been the most essential need in the financial improvement of the nation. Significant part of the consumption is spent on horticulture alone and in spite of that rancher are not getting adequate yield. This venture offers a basic answer for this issue by creating mechanized microclimate watering system controllers with remote capacity helped with minimal effort remote sensor hub like temperature.

As prior said CSA has three central regions i.e. reasonably expanding rural profitability and earnings, adjusting and assembling flexibility to environmental change, decreasing and/or uprooting nursery gasses discharges where conceivable. Adjusting and fabricating flexibility to environmental change is particularly essential since it guarantees sustenance adequacy in spite of unacceptable conditions. Flexibility is characterized as the capacity of a social or environmental framework to ingest aggravations while holding the same fundamental structure and methods for working, the limit for self-organization, and the ability to adjust to stretch and change. The

Rockefeller Foundation went ahead to explicitly characterize atmosphere versatility as the limit of an individual, group, or organization to powerfully and successfully react to moving atmosphere sway circumstances while keeping on working at an adequate level. This is accomplished through a few soil administration hones that sequester carbon in the dirt, diminish nursery gas (GHG) discharges and helps increase generation. Over every one of the practices must improve the regular asset base. Consequently, the most essential reason of CSA is the working of sound soils; through expanding the dirt natural matter (SOM) status of the dirt. Soil administration hones for CSA incorporate; direct seeding under no/decreased culturing enhanced defensive soil spread through spread products, crop buildups or mulch and harvest expansion through revolutions; Davis et al., Moreover, coordinated soil ripeness administration, which incorporates both inorganic and natural sources and considers joining inputs of natural matter i.e. mulch, manure, crop deposits and green excrement with composts to address or counteract large scale and miniaturized scale supplement inadequacies ought to be painstakingly considered.

Sensor and mugginess sensor which detects the level of dampness substance in the dirt. Because of an uneven normal circulation of the downpour water it is exceptionally troublesome for ranchers to screen and control the dispersion of water to horticulture field in the entire homestead or according to the necessity of the yield.

The client corresponds through SMS with the concentrated unit. This concentrated unit corresponds with the framework through SMS which will be gotten by the GSM with the assistance of the SIM (Subscriber Identity Module) card. The engine is controlled by a straightforward control in the inside structure of the starter. At the point when the engine is begun, a steady observing on soil dampness and water level is done and once the dirt dampness is come to specific level of the engine is naturally killed and a back rub is send to endorser that the engine is killed.

The real issue confronted in numerous horticultural territories is that absence of automation in rural exercises. In India horticultural exercises is done by

II. LITERATURE SURVEY

physical work, utilizing traditional devices, for example, furrow, sickle and so on. Our Smart Farming System diminishes the manual work and computerizes the rural exercises. The ground water is dirtied because of the use of manufactured composts and pesticides. In smart cultivating, they are supplanted by natural composts (e.g. fertilizer, creature excrement, green compost) and by utilizing it the dirt structure is improved.

Preferences of legitimate watering for plants: 1) when watering system gets to be essential and adequate water ought to be connected so that the dirt is wetted to the profundity of four to six inches. This measure of water will change with the dirt composition; around one inch of water ought to completely wet most soils to a profundity of four to six inches.

2) Irrigate the field whenever amid the day or evening times. Notwithstanding, both day and evening time watering have their favorable circumstances and weaknesses. The Midday watering can serves to cool the turf and diminish heat weight on hot summer days.

3) Night watering system rations water in light of the negligible dissipation around evening time. Unless ailment will happen and effectively harming the field, there is little motivation to stay away from the night watering. The late evening or early morning watering might minimize vanishing without irritating ailment action.

The normal water prerequisite in mm and rate of aggregate water necessity of rice harvest at various phases of development. Abundance or restricted or no water prompts lessening in yield. Rice a semi - oceanic plant requires close submergence. Submergence helps in - smothering weeds development and more accessibility of specific supplements. Day by day immoderate utilization of rice is 6 – 10 mm. Absolute water necessity of rice is 1200 - 1400 mm. 2000 - 3000 liters of water required to create 1 kg rice. Exceptionally bitter and saline water not useful for watering system. Immaculate leveling can keep up uniform profundity of water all through field. Keeping up the water profundities in the field as suggested for high water use effectiveness and yield. The water prerequisite in liters and misfortunes of water for various soil sorts in rice field. Permeation decreased to significant degree by impeccable leveling. Dissipation misfortunes can be minimized by half when the dirt is kept at immersion under leveled field conditions. Higher the transpiration higher the yield (a typical harvest of 4.5t/ha (tones/hectare) with a watering system time of 100 days expends 6 mm/day by transpiration [6]. 1.4 mm/day the yield reductions to 1t/ha when it increments 10.5mm the yield of product will be expanded up to 7.5 t/ha). WSN (Wireless Sensor Network) in light of ARM7 is used as a climate station system sending climate data. This exploration concentrates on creating gadgets furthermore deals with the devices, show and alarms the climate or calamity notices utilizing the benefits of a remote sensor system framework. The remote sensor system necessity to actualize minimal effort, low power utilization, elite and high affectability and the counter impedance capacity.

[1] *Kaewmard, et al.* The paper titled as “Sensor data collection and irrigation control on vegetable crop using smart phone and wireless sensor networks for smart farm” In our system Feeding of the world in the 21st century is the biggest challenge, especially for smart farm business. The smart farm has used agriculture automation system instead of traditional agriculture. Traditional agricultural methods employed by the local people are highly sustainable, although the all inclusive cost is not cheap. Our research goal is to provide long term sustainable solution for automation of agriculture. Agriculture automation has several methods to getting data from vegetable crop like sensor for environmental measurement. Therefore, we developed a portable measurement technology including soil moisture sensor, air humidity sensor and air temperature sensor. Moreover, irrigation system using wireless sensor network has installed these sensors, with the purpose for collecting the environment data and controlling the irrigation system via smart phone. The purpose of the experiment is to find better ways of controlling an irrigation system with automatic system and manual control by smart phone. In order to control an irrigation system, we have developed the communication methodology of the wireless sensor network for collected environment data and sending control command to turn on/off irrigation system. It is successful for controlling the irrigation system and controlling the water near the vegetable roots.

[2] *Rupanagudi, SudhirRao; Ranjani B.S.; Nagaraj et al* The paper titled as, “A novel cloud computing based smart farming system for early detection of borer insects in tomatoes” In our system Every year farmers experience huge losses due to pest infestation in crops & this inturn impacts his livelihood. In this paper we discuss a novel approach to solve this problem by constantly monitoring crops using video processing, cloud computing and robotics. The paper concentrates in methodologies to detect pests in one of the most popular fruits in the world - the tomato. An insight into how the idea of the Internet of Things can also be conceptualized in this project has been elaborated.

[3] *Angel, G.; Brindha, A et al*, “Real-time monitoring of GPS-tracking multifunctional vehicle path control and data acquisition based on ZigBee multi-hop mesh network” In our system Motion planning has spawned a large literature that is surveyed by several scholars. This research is a part of smart farm system in the framework of precision agriculture. This project summarizes portion that is related to path planning for a mechatronics based multifunctional vehicle. The vehicle tracking system employs the Global Positioning System (GPS) and ZigBee wireless network based on mesh topology to make the system communicate covering a large area. Router nodes are used for re-transmission of data in the network. Software was developed for acquiring data from the vehicle, storing data and displaying in real time on a web site. The rationale of

developing this prototype is to make use of it in miscellaneous fields. The fields of interest include agriculture, military, space explore and investigations. The key endeavour is to develop a micro robot in the prospect with the identical functionalities of this prototype.

III. EXISTING SYSTEM

The late improvement in data and correspondence advances has permitted ranchers to get an endless measure of site-particular information for the fields. The principle exercises included are information accumulation, handling, and variable rate of use of inputs. We can diminish a ton of manual work in the field of farming utilizing mechanization. The significant issue confronted in numerous horticultural ranges is that absence of automation in rural exercises.

In India horticultural exercises is completed by difficult work, utilizing routine devices, for example, furrow, sickle and so forth. The fundamental issues confronted by them are power deficiency, difficult work, absence of motorization, learning shortage about cultivating, and not thinking about the satisfactory use of large scale mineral substance (N, P, and K). Our framework does the occupation of detecting furthermore habituates to the environment.

DRAWBACKS:

The primary issues confronted by them are power deficiency, difficult work, absence of automation, information shortage about cultivating, and not thinking about the satisfactory use of large scale mineral substance (N, P, and K). Our framework does the occupation of detecting furthermore habituates to the environment.

Major part of the consumption is spent on agribusiness alone and in spite of that agriculturist are not getting adequate yield.

Highly salty and saline water not useful for watering system.

It additionally has low self warming and don't causes more than 0.1 oC temperature ascend in air.

Liquid gems that does not discharge light specifically and are slight and level and expend little measure of force contrasted with LED showcases and cathode Ray Tubes.

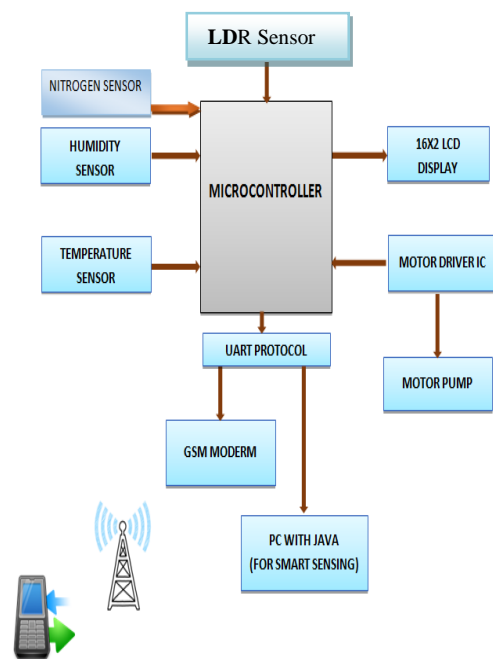
IV. PROPOSED SYSTEM

An android telephone that controls the Irrigation framework, which could gives the offices in light of the fact that to keep up uniform ecological conditions. This empowers clients to exploit the internationally conveyed GSM systems with its low SMS administration expense to utilize cell telephones and basic SMS summons to deal with the watering system framework. It is workable for clients to utilize SMS to screen straightforwardly the states of their farmland, plan the water requirements for products, consequently water control, furthermore set control operational conditions as per the water needs of yields.

ADVANTAGES:

- 1) This measure of water will differ with the dirt surface; around one inch of water ought to completely wet most soils to a profundity of four to six inches.
- 2) Irrigate the field whenever amid the day or evening times. In any case, both day and evening time watering have their focal points and hindrances. The Midday watering can serves to cool the turf and lessen heat weight on hot summer days.
- 3) Night watering system monitors water due to the negligible dissipation around evening time. Unless infection will happen and effectively harming the field, there is little motivation to maintain a strategic distance from the night watering.
- 4) The late evening or early morning watering might minimize dissipation without irritating malady action.
- 5) The agriculturist can have control over the framework by having a remote correspondence with GSM module through his cellular telephone.
- 6) This framework is beat the issue of confronted in cultivating.
- 7) To beat the power deficiency.
- 8) This Model was effective.

V. ARCHITECTURE



VI. HARDWARE IMPLEMENTATION

1. MICROCONTROLLER

The name PIC at first alluded to Peripheral Interface Controller. Microcontrollers give you a phenomenal method for making ventures. A PIC microcontroller is a processor with implicit memory and RAM and you can utilize it to control your activities (or assemble ventures around it). So it spares you assembling a circuit that has separate outer RAM, ROM and Fringe chips.

2. HUMIDITY SENSOR

The moistness level checking System screens and the present mugginess level and keep up it around a Predefined esteem.

3. TEMPERATURE SENSOR:

Temperature screen and control System works as indicated by the temperature esteem set by the client. To begin with it gets the quality from the client and keeps up the temperature around that esteem. It Displays. The Current temperature in the LCD screen for client reference.

LDR (Light Dependent Resistor) SENSOR:

Light power checking and control framework. LDR is utilized for the framework since light is falling onto the yields uniformly.

4. 16X2 LCD DISPLAY

The information from the Agriculture will be measured by the sensor and the Data that are gathered will send to the beneficiary. The information that has been perused will be shown on the LCD screen. The LCD screen continuously as a source of perspective for the client and this can be utilized to check whether the temperature is controlled legitimately. Engine Driver IC: Motor Driver coordinated circuit which is utilized to drive direct momentum on either heading. Likewise most microchips work at low voltages and require a little measure of current to work while the engines require a generally higher voltages and current. In this manner current can't be supplied to the engines from the chip. This is the essential requirement for the engine driver IC. Engine Pump: The pumping engine will pump the water into the field. The mugginess sensor is checking the dirt condition, whether the dirt is dry or Wet. In the event that it is dry, then by utilizing pumping engine, water must be pumped naturally. Pumping engine will be consequently switch on or off through hand-off.

5. GSM MODERM

GSM (Global System for Mobile Communication) is an open administration accessible at no expense to the client. These days portable hand set is not new to the ranchers. All over the place ranchers can be seen utilizing cellular telephones and they are all that much familiar with portable hand set. There is no additional expense of correspondence supplies. Utilizing GSM innovation, an engine can be controlled and checked from each side of the world. UART PROTOCOL: An all inclusive nonconcurrent recipient/transmitter. Transmitting and accepting UARTs must be set for the same piece speed, Character length, equality, and stop bits for appropriate operation.

6. NITROGEN SENSOR

A nitrogen oxide sensor or NO_x sensor is commonly a high-temperature gadget worked to identify nitrogen oxides in burning Situations.

RESULTS

To measure the moisture level ,temperature level ,light intensity and nitrogen content of the crop. These measurement are display in LCD for user reference and to display in the mobile phones by using GSM module. An Android application which helps the farmer to ON/OFF the motor without his physical presence in the field.

CONCLUSION

Watering system in horticultural territories has critical. Expanding the interest for water assets, Usage of water assets is ideal which has been given more noteworthy degree via computerization innovation. Since prior days rancher should visit their agrarian land and check the dampness substance of soil physically. To maintain a strategic distance from more human endeavors this innovation utilized. It permits the client to screen furthermore keep up the dampness remotely paying little heed to time. It is truly powerful and financial approach to diminish human exertion and water wastage in horticulture land. Ebb and flow issues in horticulture are diminished water level in area and accessibility of human asset. In this way, as clarified the versatile watering system framework can help rancher from multiple points of view. The framework has an enormous interest and future degree as well. It permits a considerable measure of improvement inside of it and prompts the standard and valuable framework which can be utilized differ generally as a part of agrarian field. Consequently, venture is proposed out utilizing Microcontroller center with the assistance of GSM advances.

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