



A Novel Wireless Monitoring System for Water Asset Improvement in Cultivation of Agriculture

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Abstract: In late building progresses the joining of web, correspondence and data advancements will make ready for new era. At present, circulated remote sensor network plays huge obligation in cultivating horticultural creation and relieving the anguish of agriculturists. Soil dampness and temperature sensor are covered at the root zone of the plant. Attributable to various climatic condition, Rain water sensor is situated at the surface of the dirt to deactivate the whole irrigation framework amid blustery season. The micro-controller is utilized to accumulate the sensor data continuously. The data can be obtained and handled by sending and accepting the data from cultivation field. The deliberate data is took into account data examination with cellular web interface to be graphically pictured through Wi-Fi module. The robotized irrigation framework is tried in turmeric and onion estate all the while for 50 days. Water reserve funds is upto 90% when contrasted and the present stream irrigation channel is accomplished. By fusing the computerized irrigation plot, utilization of water and power is lessened, advance it builds the nature of sustenance grains and the yield of products.

Keywords: Wireless Sensor Network (WSN), Raspberry-Pi Board, Cellular Internet, Wi-Fi Module, Water Resource, Power Supply.

I. INTRODUCTION

Water is a lacking normal asset, which is exceptionally fundamental thing to life, vocation, sustenance security and reasonable growth. Water necessity is expanding quickly because of populace development, urbanization and way of life. Inferable from expanding the prerequisite of water for residential, modern and vitality utilizes, there are serious constraints in the openness of water for horticulture. Because of the divergent climatic condition, it makes troublesome for additionally existing consecutive and spatial contrast in accessibility of water. The enormous activity like surges and dry season are happened all the more as often as possible and influences work and nourishment security. Agribusiness acknowledgment assumes an essential part in enhancing agrarian generation, profitability and alleviating the pain of ranchers. The Indian government has taken a few activities for enhancing horticultural credit stream for agriculturists. In any case, a portion of the ranchers conferred suicide by devouring pesticides, edit disappointment and powerlessness

to reimburse the obligation. Fundamental thought processes behind every one of these suicides were absence of enough water and insufficient precipitation. Agriculturists suicide for the most part occurs in the range of Maharashtra, delta areas of Tamilnadu, Punjab, Andhrapradesh, Kamataka and Kerala. Along these lines, the exploration is led on field review in Tamilnadu especially in the areas of Namakkal, Salem and Tiruchy.

The field overview is taken from the planted harvests like turmeric, onion, banana, tomato, com and custard. After that a few data are accumulated and dealt with a few prerequisites of these products according to the data given by the agriculturists around. Based on these information, three sensors are selected namely, temperature, soil moisture and rain sensor. The datas collected from the sensors are given to the remote base station through wireless sensor networking that has been confirmed with well distinct architecture. The lingering some portion of the original copy is arranged as takes after. Area II gives data about the writing review of the robotized agrarian framework. Area III depicts the mechanized irrigation framework Architecture, System model and Energy administration framework. Section IV specifies the Result, real time implantation details and testing are reported and discussed. Finally, the conclusion is presented in Section V.

II. EXISTING METHOD

The remote canopy temperature is used to automate the cotton crop irrigation system using thermometers. Robotized irrigation is triggered once shade temperature surpasses the limit esteem. Accordingly, streamlining cotton yields and water utilize effectiveness as for manual irrigation [1]. Vanishing based water controller is spared water up to 42% on time based irrigation plan [2]. The remote sensor networks in light of microcontroller and correspondence advancements enhanced the current system to screen constant application, for example, underground, earthbound, submerged and mixed media [3], [4]. In military operations in current situation of combat zone, constrain insurance has errand nearness, running, and imaging, location of synthetic, dangerous material explosives and atomic [5], [6]. WSN has been utilized to screen human services at their 0322 this full-content paper was peer-checked on and acknowledged to be

exhibited at the IEEE ICCSP 20 IS meeting. Homes through biomedical sensors like ECG, circulatory strain, body temperature [7]. Natural parameters are dampness, weight, temperature, soil water content is checked consecutively [8]. Power administration is critical for both equipment and programming with electronic outline. The determination of chip is fundamental for control mindful plan [9], [10]. The parallel mix of battery and super capacitor is utilized to broaden the runtime of low power WSNs [11]. Vitality sparing methodology has been accomplished through planning [12].

III. PROPOSED SYSTEM

The computerized irrigation framework (Fig1), comprises of two units, Wireless Sensor Unit (WSU) and Wireless Information Unit (WIU) associated with Wi-Fi. Soil Moisture and temperature sensor are covered at the root zone of the plant. Inferable from various climatic condition, Rain water sensor is situated at the surface of the dirt to deactivate the whole irrigation framework amid blustery season. The microcontroller is utilized to accumulate the sensor data continuously. The data can be procured and prepared by sending and accepting the data from cultivation field. The deliberate data is considered data investigation with cellular web interface to be graphically envisioned through Wi-Fi module. The Data can be obtained and handled by sending and accepting the data from cultivation field. The deliberate data is took into consideration data assessment with cellular web interface to be graphically imagined through Wi-Fi module.. By fusing the mechanized irrigation conspire, utilization of water and power is diminished, advance it expands the quality of food grains and the yield of crops. Environmental parameters are humidity, pressure, temperature; soil water content is monitored sequentially. Power management is important for both hardware and software with electronic design. The selection of microprocessor is essential for power aware design. By incorporating the automated irrigation scheme, consumption of water and electricity is reduced, further it increases the quality of food grains and the yield of crops.

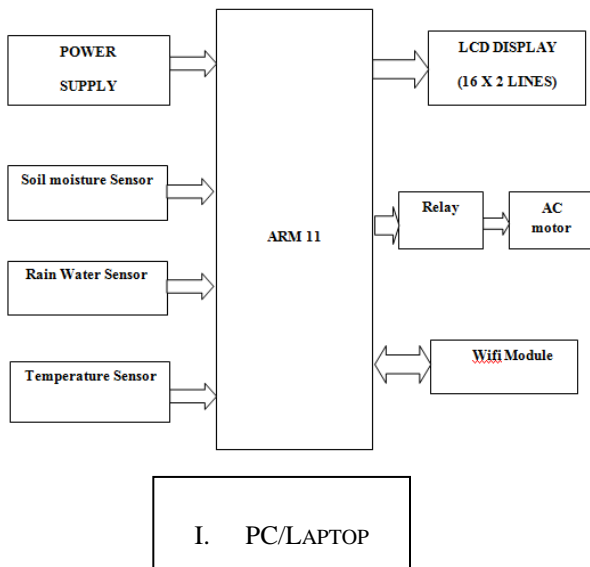


Fig 1 .Block diagram of proposed design

A. Raspberry-Pi Board (ARM 11 microcontroller)

The Raspberry Pi depends on the Broadcom BCM2835 framework on a chip (SoC), which incorporates an ARM1176JZF S 700 MHz processor, Video Core IV GPU, and was initially sent with 256 megabytes of RAM, later updated (Model B and Model B+) to 512 MB. The framework has Secure Digital (SD) or Micro SD (Model B+) attachments for boot media and industrious stockpiling. The Broadcom SoC utilized as a part of the Raspberry Pi is proportional to a chip utilized as a part of an old PDA (Android or I Phone). While working at 700 MHz as a matter of course, the Raspberry Pi gives a genuine execution generally equal to the 0.041 GFLOPS. On the CPU level the execution is like a 300 MHz Pentium II of 1997-1999. The GPU gives 1 Pixel/s or 1.5 Gtexel/s of designs preparing or 24 GFLOPS of universally useful processing execution.

B. Temperatures Sensor

The LM35 arrangement are exactness incorporated circuit LM35 temperature sensors, whose yield voltage is straightly corresponding to the Celsius (Centigrade) temperature. The LM35 sensor subsequently has preference over direct temperature sensors adjusted in ° Kelvin, as the client is not required to subtract an expansive consistent voltage from its yield to get advantageous Centigrade scaling. The LM35 sensor does not require any outer alignment or trimming to give commonplace correctnesses of ±¼°C at room temperature and ±¾°C over a full -55 to +150°C temperature extend. Minimal effort is guaranteed by trimming and adjustment at the wafer level. The LM35's low yield impedance, straight yield, and exact innate adjustment make interfacing to readout or control hardware particularly simple. It can be utilized with single power supplies, or with in addition to and short supplies. As it draws just 60 µA from its supply, it has low self-warming, under 0.1°C in still air. The LM35 is evaluated to work over a - 55° to +150°C temperature go, while the LM35C sensor is appraised for a - 40° to +110°C territory (- 10° with enhanced precision). The LM35 arrangement is accessible bundled in hermetic TO-46 transistor bundles, while the LM35C, LM35CA, and LM35D are likewise accessible in the plastic TO-92 transistor bundle. The LM35D sensor is additionally accessible in a 8-lead surface mount little blueprint bundle and a plastic TO-220 bundle.

C. Soil Sensor Arrangement:

The soil sensor course of action comprises of two sensors, to be specific soil temperature and dampness sensor that are covered under the root zone of the plants. The DS1820 is a soil temperature sensor which measures temperature from - 55°C to 125°C (- 67°F to +257°F). The DS1820 change over temperature to 12 bit computerized word in 250ms and stores the advanced yield in 2 byte temperature enlist. The DS 1820 imparts more than 1 wire transport convention, it requires just a single advanced port for correspondence. The thermometer has ±2.0oC precision over - lo°C to +85°C and gives 9 to 12 bit centigrade temperature estimations. The power supply run is 3.0V to 5.5V. The measuring soil dampness is a vital procedure for agribusiness to help

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agriculturists and deal with their irrigation framework all the more effectively. The test assesses dielectric steady of the soil utilizing transmission line strategy which is corresponding to volumetric water content. The yield go is between 0 to 3V and fueled at 3.3V and specifically associated with the controller through simple to advanced converter port.

D. Soil Moisture Sensor Calibration:

The soil moisture calibration is necessary for Indian agricultural system because of non uniform wetting surface. The soil moisture calibration is mainly conducted in red soil and black soil. They are commonly found in the regions of Tamilnadu, Andhra Pradesh, Kerala, Maharashtra and Karnataka. To calibrate soil moisture, several samples are calculated with 1 kg of soil taken from the cultivation field. The composition of the loamy sand is 60%, silt is 33% and clay is 11%. The water content in the loam sand soil is used to determine the non uniform soil wetting surfaces. Glass containing the soil sample at five different places are weighed on a weight machine and heated in oven at 200°C. After they had cooled, the soil samples were weighed again to determine dry weight and jar themselves is weighed for a tare weight.

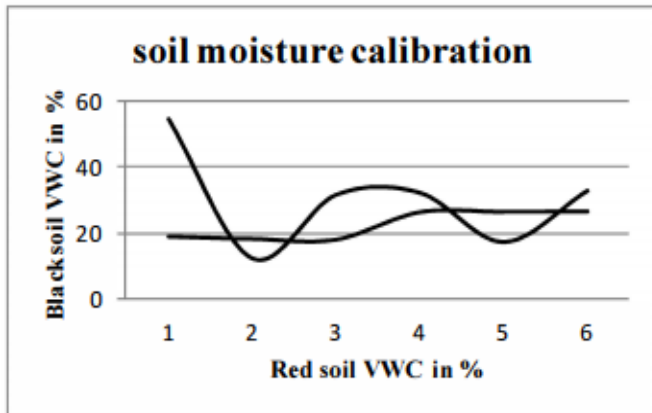


Fig 2. Soil moisture calibration

E. Rain Meter Sensor

This module permits you measure moisture through simple yield pins and it gives a digital yield when an edge of moisture is surpassed. The module depends on the LM393 operation amp. It incorporates the gadgets module and a printed circuit board that "gathers" the rain drops. As rain drops are gathered on the circuit board, they make ways of parallel resistance that are measured by means of the operation amp. The lower the resistance (or the more water), the lower the voltage yield. Then again, less water, the more prominent the yield voltage on the simple stick. A totally dry board for instance will make the module yield five volts.

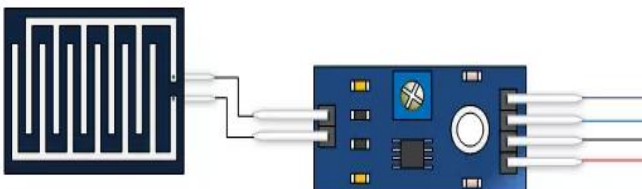


Fig 3. Pin description of rain sensor.

F. Wireless information Unit

The inside hub is the data accumulation framework, principally in charge of data reaction, uploading the data to PC and issue control to the middle hub. Wi-Fi is short for Wireless Fidelity and is intended to be utilized nonexclusively when alluding to a 802.11 network, regardless of whether 802.11b, 802.11a, 802.11g, double band, and so forth. Wi-fi is a wireless innovation that utilizes radio frequency to transmit data through the air. An Access Point is a different wireless unit, which can stretch out from the switch to augment wireless gathering. Up to 16 clients can associate with one access point. It enables a few wireless customers to interface with a solitary gadget. Wi-fi problem area is defined as any area in which wireless innovation both exists and is accessible for use to buyers. Wi-fi was proposed to be utilized for wireless gadgets and LANS, yet is presently frequently utilized for web access. Wi-Fi is a wireless innovation that utilizes radio frequency to transmit data through the air.

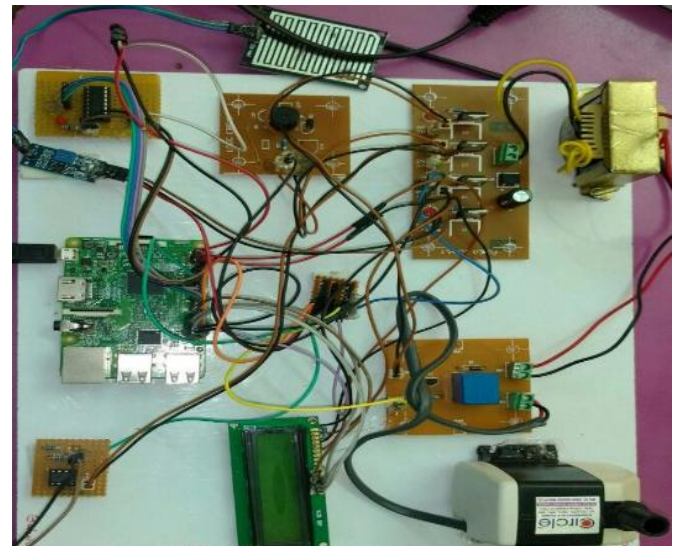
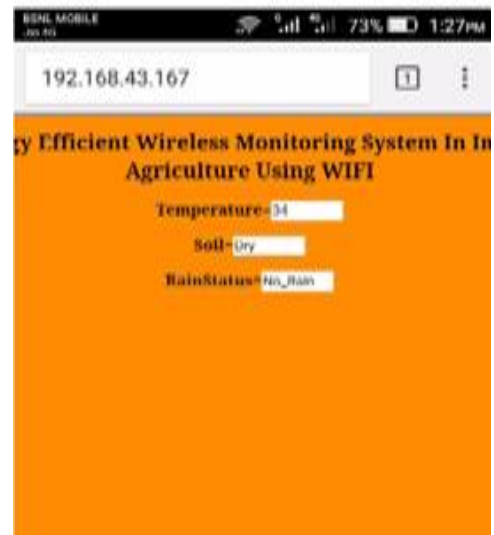


Fig4. Experimental Hardware System

IV.RESULTS



(a)



(b)

Fig5. Console Window Output.

V. CONCLUSION

The trial consequences of mechanized irrigation framework are observed to be sufficient vitality efficient in the field of horticulture generation for water asset improvement. In this way, the irrigation framework permits advanced cultivation in spots of water shortage, use of pesticides and manures. The computerized irrigation framework is imperative for natural yields by use of sun oriented power. The battery administration calculation gives 24hour power use to day and night operation. The irrigation framework required just least upkeep and can be balanced for assortment of yields as indicated by soil alignment methodology. In future, the web interface permits the supervision through portable media transmission gadget.

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