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SMART CONTROLLER FOR FUTURE WATER CRISES

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Abstract— Water is very important basic element for the life of all living organisms in this world including human being it is a vapid, straightforward, unscented fluid that frames the oceans, lakes, waterways and downpour fundamental liquid of living creature. A United Nations framework wide development of worldwide water asset positioned India 133rd in 180 nations for its helpless water accessibility of 1800 cubic meter for every individual annually. This Proposed System for irrigation can save water usage, Electricity and overall management, and also helps Farmer to save certain amount of usage of water. It is provided with Controller, Biometric security, Water flow sensor YF-S201, I2C LCD Module and submersible pump for proper Water distribution which is required for crop cultivation. Water Consumption can be promoted through automated control system by saving the water from being wasted. Here the Water can be controlled in real time it is the main advantage of this system. Seasoning control can also be done like (during rainy season Water requirement will be less as well as in summer season the requirement will be more).

Keywords- Arduino Mega 2560, Finger Print sensor (R305), Water flow Sensors (YF-S201), Submersible Pump, and I2C LCD Module.

I. INTRODUCTION

Agriculture is backbone of our country. To add more productivity for various crops, introduction of various sensors to collect through network and take appropriate action based on the data. The sensor data is analyzed and act accordingly purely based on the sample data. The controller will be acted to perform various operations based on various stages of crop. The most promising pooling of data related to environment concern need to accurate for proper controlling through controller. Agriculture has evolved research field to introduce various sensors and increase yield. Automation makes system improve in various parameters and increase crop productivity yield. The development of new intelligent controller for proper scheduling of water resources is very important. Hence, its needed for the agriculture field and testing, designing & implementation plays very vital role in the systems.

A. Introduction to Present Days

Water is perhaps the main assets for every one of the livings on the earth. Thus, it ought to be provided appropriately just as cautiously and at a correct opportunity to satisfy the everyday exercises. The essential target is to plan and build up a minimal effort, solid, productive and effective strategy to make suitable water conveyance by constant checking and furthermore controlling it from focal worker to water related intricacies. With the assistance of the inward regulator in the proposed system, the flow of water is controlled through the valve. This proposed framework will assist with controlling the wastage of water principally in homegrown and farming utilization. The ebb and flow level of accessibility and for sewage administrations is about 70%, giving the country an undeniable degree of water the board by world's norm. Th water requirement for various crop is listed in table-I.

Table-I: Water requirement for crop

CROPS	Mega liters/Hectares
Rice	10. 1
Maize	8-9
Soybeans	6-8
Cotton	2-5
Flowers	4.2
Mungreas	4
Sunflower	2-5

II. LITERATURE SURVEY

The author has highlighted model for water level and its control unit which is dependent on Internet of Things (IoT). The IoT holds all signals related to water level and supply to requirement. The system also provides the halt off the system when not in use. The controller gives required amount of water based on the request. The user assess is controlled through controller and processed his request based on data validation of user and amount of water availability. The valve is controlled for proper deliver of water requirement of user based on his/her request. The system gives information to user and owner about the water availability through data sampling and send via Wi-Fi. The overall system gives reliability and control over wasting of water as shown in fig.1[1]

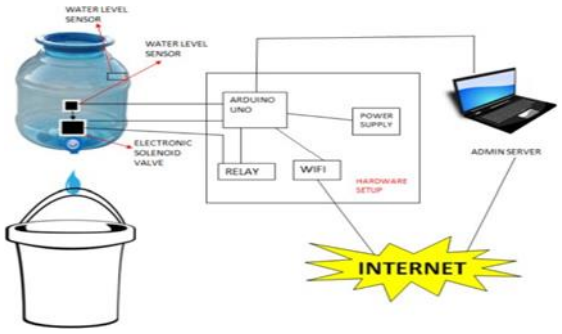

Fig-1: Design of smart and automatic Water Distribution control systems

Author proposed about conventional system of water flow using bidirectional communication in water infrastructure and risk minimization of assets. An ageing water distribution infrastructure encounter failure and increase the need for system with IoT for continuous monitoring of water and various parameters which is need based. Hence those system will be more reliable and reduce the repairs work.[2]

Author introduced an IOT absolute opposite which assists with assessing and plan the idea of water. And furthermore, the exceed framework where information base is designed. The corridor divides sensor-based dance meter is leftover to differentiate the stream figure of the water. Regardless of conditions that mineral store is the essentially 3% is straightforward mineral store and sometimes 1% of that is nearby for drinking. The extended family and inadequate precipitation are exacerbating the slack. Due to expect of checking crude material isn't because of applied appropriately. Sprinkling spaces of urban areas gat with is coming to one costing an arm and e.g. water to put some to get adequate water as shown in fig.2. To get this issue there is a need of nonstop checking during the water spend genuine water loan booking and relevant conveyance of water. Different issue expands wastage of water of water legitimacy to ill-conceived. There is an encapsulation called it which contemplate qualifier in the number advancing inventive answers for dedicate the issue of mineral store shortage. By working with the aggregate and cut and attempt climate world it empowers investigates and climatologist to perceive all the more

reasonable models for bear the consumed anticipating. the ruling regions where ICT can frolic a critical nature in water authority are planning of water staple and courageous anticipating.[3]

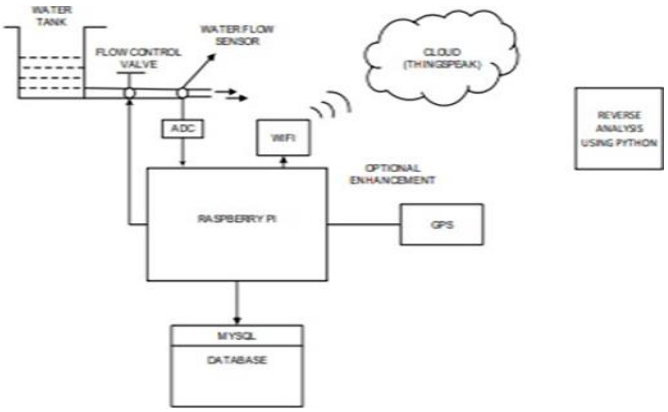

Fig.2 Block diagram of IoT based Water supply Monitoring and controlling system

III. PROBLEM IDENTIFICATION AND OBJECITIVES

Problem Identification

1. Some times by faulty sensors it can cause faulty decision which may lead to over use of water and by this the crop can be damaged.
2. Available controlled IoT model is expensive and farmers cannot afford and it's not scalable.
3. The IoT device needs continuous internet connection which is not completely available in some remote areas.

Proposed Objectives

Based on the Survey, we achieved the following design objectives.

Objective 1: To Design Smart Water controller unit for proper distribution of water.

This objective is achieved by designing a smart controller for proper distribution of water at various stages of crop development cycle. The proposed idea will improve the efficiency and crop yield.

IV. SYSTEM METHODOLOGY

The system block diagram is shown in fig.3 and detailed information about the parts are used below:

1.Security: Biometric is provided for security purpose. The motor will be turned on only when the authorized persons access it.

2.Arduino Mega(ATMEGA2560): This controllers establishes Communication between the Biometric to the Motor.

3.Relay: Relays are switching which can open and close circuits electromechanically or electronically, it is used protect from high voltage, high current loads like pump used in our system.

4.Controller: It is used to control water flow based on the requirements. It limits the water consumption for agriculture use as per the requirements and it controls the water usage in real time for different seasons.

5.Timer: Timer is used to measure time using special clock circuit. It is used in delay, pulse generation and oscillator applications.

6.Water Flow Sensor: The system consists of valve made of plastic , motor with sensor. At start the water enters through motor as it rolls and based on speed the pace of water flow can be measured.

7.Submersible Pump: This is additionally called as an electric Submersible siphon, which can be completely lowered in Water. The engine is airtight fixed and close-coupled to the body of the siphon. It pushes water to the surface by changing over rotating energy into active energy into pressure energy.

8. Power Supply: A Power Supply is an electrical gadget that provisions electric capacity to an electric burden. The essential capacity is to change electric flow from a source over to a right voltage or flow or recurrence to control the heap. Here the force supply is given to Relay and engine to play out their particular Operations.

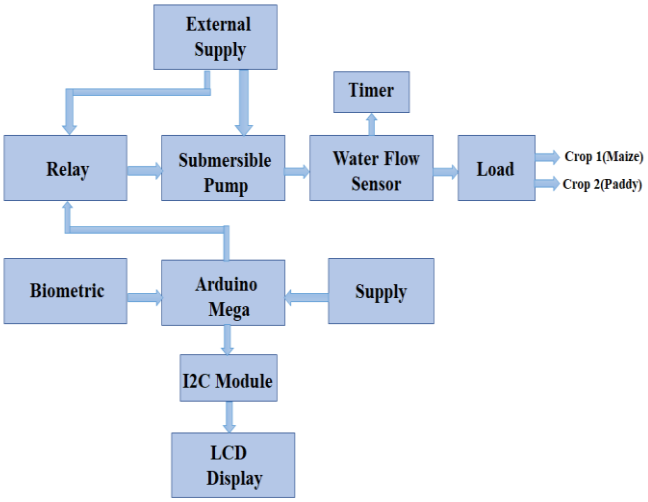

Fig.3 Block Diagram of System Methodology

9. The optical unique mark per user gadgets utilizes powerful DSP chip AS601 structure Synochip that does the picture delivering, estimation, highlight finding and looking. It gives TTL sequential out subsequently we can interface with any framework. The DSP processor has on board FLASH memory which can store 120 fingerprints. By the Adafruit here we have Fingerprint library so that interface this sensor to Arduino too. To record data through software is shown in fig. 4 & 5.

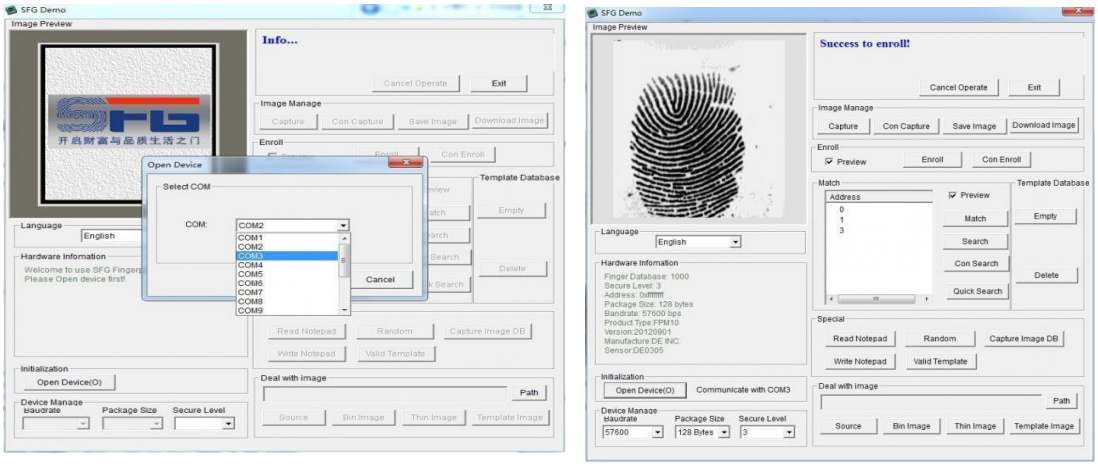

Fig.4 SFGdemo software to record biometric

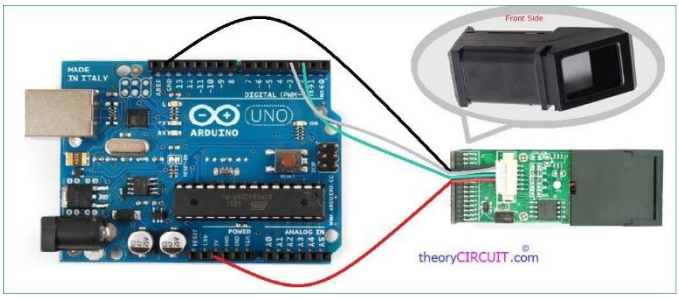

Fig 5 Arduino Controller interface with Biometric

The source code for the IDE is delivered under the GNU General Public License, variant. The stage upholds the dialects C and C++ utilizing extraordinary principles of coding structure. The IDE supplies a rundown of libraries from composing a code to wiring a venture. It helps in deciding the info and yield methods. The client executes the program by composing the program and checking it with the assistance of the complier. The file is converted to an executable code into a text file in hexadecimal and is uploaded in the Arduino board by the loader program in the board's firmware. The operations of overall model are explained through Flowchart as shown in fig.6

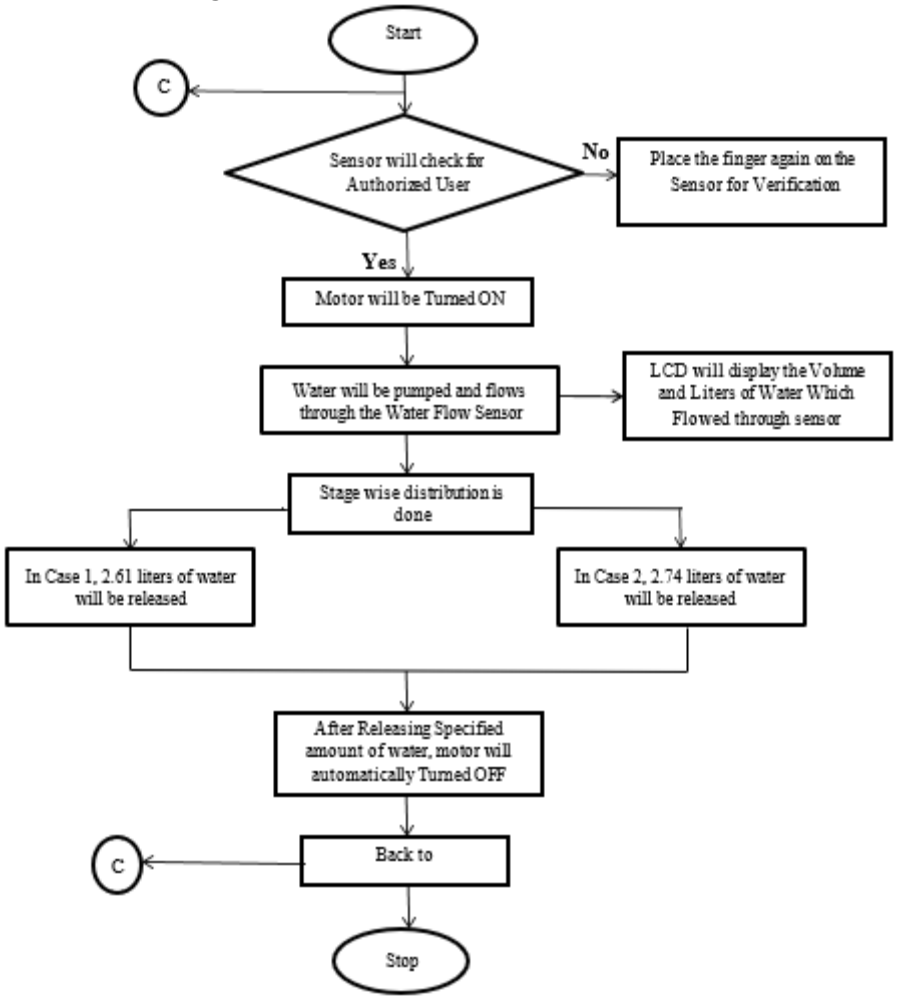

Fig. 6: Flowchart of System Model Operations

The flow meter works on Hall effect principle where difference in voltage induced in conductor which transverse to current and field perpendicular to it. In addition to Hall Effect, flow meter suing fan is placed for liquid flowing. In this Flow meter, for every litre of liquid passing through it per minute, it outputs about 4.5 Pulses/Voltage, So the Pulse/Voltage = 4.5 per minute Total liquid = (Total Pulse) / 4.5 Water Passing / hr = Total liquid * 60 Sensor is Accurate to + or - 3 %

V. RESULT AND DISCUSSION

The Project is simulated by placing submersible pump inside the container filled with water as shown in below figure and the result obtained is satisfactory. The submersible pump will lift the water which will flows through flow sensor YF-S201, which will limit the excess water flow by turning off the motor when the water flow through the sensor is above the fixed value. The fig.7 shows the water level discharged for various stages of water requirement for crops. The table II gives water requirement for various stages of crop.

Output Case: 1
Crop Type: Maize, total 2.61 L of water will be released with the delay of 20s for each stage.

Table II(a): Output of Case 1

Stages	Output
Stage 1-Seed Sowing	0.29 L
Stage 2-Irrigation	0.87 L
Stage 3-Crop Growth	1.45 L

Fig 7 (a): Stage 1 Output of Case 1

Fig 7 (b): Stage 2 Output of Case 1

Fig 7(c): Stage 3 Output of Case 1

Output Case: 2 - Crop Type: Paddy, total 2.74 L of water will be released with the delay of 20s for each stage.
Table II(b): Output of Case 2

Stages	Output
Stage 1-Seed Sowing	0.46 L
Stage 2-Irrigation	0.91 L
Stage 3-Crop Growth	1.37 L

Fig 7(d): Stage 1 Output of Case 2

Fig 7(e): Stage 2 Output of Case 2

Fig 7(f): Stage 3 Output of Case 2

APPLICATIONS AND ADVANTAGES

The system can be used to distribute the water for domestic purpose, by limiting the water usage for each house. System can also be used for controlling the over usage of water in agriculture

Prototype model highlights advantages of system like limiting water consumption for agricultural usage based on stages / demand and also monitors water usage in real time for different seasons. The model highlights about the saving of electricity and water through control techniques which increases yield of crop.

VI. CONCLUSION AND FUTURE SCOPE OF DEVELOPMENT

By constructing the project, it was observed that water controlling can be done by fixing the water flow rate value on the basis of amount of water required for the user, by this over usage of water can be controlled (as the motor will be automatically turned off as the usage limit exceeds).

As the project main aim is to control the over flow and to distribute the water as per the requirements, it can be further implemented as follows,

i) The Biometric which is used in this project can be replaced with the GSM, by which we can operate the system from anywhere.

ii) In addition to this by the GSM the user can know how much water is used to grow a crop and notification alert will be sent to the user regarding the motor status.

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