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Computerized Canal Water Distribution to Avoid Corruption

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Abstract - As we know that now a days at canal water distribution there is a lot of corruption at water distribution points as they are managed manually and decentralized way. A key man with canal inspector is responsible for delivering water at local farmers as per their demand respectively. Though water is given to all demand specific farmers it is widely observed that if 90% was demand then only 70% is delivered, also after this demand it is also seen that farmers who have no rights for water they also are delivered with ample amount of canal water without and centralized demand. This demand is unofficially fulfilled by local canal inspector and key man. These government offers collect black money from those farmers to supply the water which they need. As the water is distributed with the help of gate and it is handle with the human being known as key man and easy manipulation of canal gate is possible so some farmer gives extra money to the key man to keep gate open for extra time, because they need more water for farming. That's why in this case corruption increases and water shortage arises. We are developing a computerize system which will give the proper distribution of water to the farmers and avoid this corruption. We are replacing the gate by Solenoid valve/ Hydraulic gates, which will works on the Faraday law of electromagnetism, and it is control by an computerize system. Each farmer need to register on our application by means of requirement form which is going to be online as well as offline for the farmers. As per the requirement specified by farmer the computerize system will open the valve for the time span which the farmer will request. When the time gets over the valve will close automatically and suppose due to some reason the gate was not open by computerize system, then it could be opened with the help of Android App. Due to which the gate can controlled by Web Application as well as Android App, we will notify the farmer before supplying the water to the farm with the means of message on his phone..

Keywords — Canal Water Distribution, Reduce Corruption, Sensors, Solar panel, RF transmitter receiver, Hydraulic gates.

I. INTRODUCTION

There should be change in the field of our irrigation system operational management. Only then the irrigation systems set up with enormous investments through the various five-year plans can be sustained to ensure reasonable returns. In India, it is necessary to have a computerized water distribution network for monitoring and controlling canal operation not only at operational level but at farm level also. As the farmers are the end-users, when new technology is applied, they have to be informed during implementation of the improvements planned and of the anticipated benefits which they will gain. Upgrading existing canal system operations needs to be done in stages as a rehabilitation program. It can be done in small areas which are easily and economically assessable for improvement. In Indian conditions the cost of automation on the main canals can vary from Rs 1,500 to Rs 2,000 per hectare and that on the secondary canals from Rs 3,000 to Rs 4,000 per hectare. Specific amounts of water required for crop irrigation at particular times can be derived using the soil-water plant relationship. We have soil characteristics such as water-holding capacity as well as infiltration rate which can be used for calculation.

The paper is based on a technology through which the farmers as well as the public sector will get benefit as the water which is been used by the farmers will be limited and the because of which we will save water at great extent. Other than that there will be a system through which the farmers have to pay only for what they will be using. A transparency will be maintained between the users as well as the irrigation department. Because of saving the water in condition of drought there will be plenty of water available for the farmers as well as the public sectors. The paper is helping the public who are not aware of the digital benefits of the government will get all the benefits and they will also support the process of making India digital in different means as well as a disaster free country. Because of the online generation of bill for the water distribution there will be reduce in corruption which they used to do with the of paying more money to the key man. As we are using the solar panels in this project so we will not require more electricity. Other than that the pipes which we are going to install will

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have Density Sensor through which we can measure the density of water which is been flowing through the pipes so if any person tries make hole in the pipe and make a way tin his farm so it will be automatically detected and action will be immediately taken on it.

II. LITERATURE SURVEY

Adria Soldevila et. All, [1] From this paper we got a new method for getting leak localization in water distribution network which uses the model based approach combined with Bayesian reasoning. This is a density function in model based pressure residuals are calibrated online for all the possible leak scenarios by using a hydraulic simulator, being leak size un-certainty, demand uncertainty and sensor noise to considered.

In this they have applied Bayesian reasoning for online to the available residuals to determine the location of leaks present in the water distribution network. A time horizon method combined with the Bayesian reasoning is also proposed find actual leaks in that location. The Hanoi district metered area is used to do case study for the illustration of the proposed system.

Edwin Milton Calderon Mendoza et. all [2], This paper propose a neuro-fuzzy Smith predictor controller (NFSP) for e elective control of water distribution in an irrigation main canal, which allows to improve the efficiency and to reduce the water losses. By using the real-time data the dynamic model of this process is been obtained. A neuro-fuzzy controller combined with a Smith predictor is therefore designed which behaves robustly against the elect of external disturbance and plant dynamical parameters variations. Obtained results compare the performance of the proposed controller with a standard PI controller, also combined with a conventional Smith predictor for several operation conditions. These results show that the proposed controller out-performs the standard controller in terms of performance and robustness.

Subha Austalekshmi et. all [3], This Paper Water leakage is a significance problem in both developing and developed countries causing water loss in water distribution system. Leakage causes economic loss in the form of wastage of water, damage to pipe networks and foundations of roads and buildings, and also poses risk to public health due to water contamination. The lost or unaccounted amount of water is typically 20-30 percent of production. Some older system may loss even up to 50 percent. The water pipe network which is present at houses as well as the public places are kept hidden and hence detection of water is a big problem in such places such as efficiency being dependent on size, depth and material of pipes, need for manual inspection and repair, dependency on weather and surface conditions and effect of water pressure.

In this paper, we propose an automated water leakage detection system using wireless sensor network created along the distribution pipe based on thermal (IR) imaging. A process called thermal imaging is used to find the water leakages as it is capable of capturing the contract between hot and cold areas and it can also work in low light or dark conditions. This network has low cost, low power thermal imaging sensor and each having its own processing radio frequency transreciever unit and it can operate independent on pipe, weather or surface condition is given in this paper. For a real time base a centralized database is been updated which enables very early leakage detection and initially subsequent action can be taken to the problem. This system is a model which gives the actual cost and power impact which are made by the sensor network system.

Rakhel Kumar Parida et. all [4], The Paper need of water would bring major challenges for populated Wes. With the need, there comes a security concern regarding environmental issues, pollution and even the revenue. As eWes like Chennai do not have perennial sources of and doesn't have the leverage to distribute it in a massive scale. Thus the private players come into action, which uses various lakes and Bore wells in and around to full the need using trucks and Lorries. But these organizations are not properly regulated, especially the trucks with increasing amount of theft occurrences. An automated model is been prepared in this paper through which the Lorries can be monitored and thus controlling the theft.

Shizra Sultan et. all [5] ,The paper Smartphones are overpower-ing the IT world by rising as a prerequisite for other technologies. Cloud computing, web data service, online banking and many other are the emerging technology which are giving a new improved form to smartphones.Banking is a vital and critical need in daily life. It involves routine nancial transactions among sellers, buyers and third parties. Several payment protocols are designed for mobile platforms which involve hardware tokens, PIN, credit cards, ATMs etc. for secure transactions.They may have hidden flaws and are not properly verified. Numerous vulnerabilities have been found in existing solutions which raise a big question about the defense capability of smartphones to protect user's data. In this paper they have not used hardware tokens instead they are using secure payment protocol for smartphones. It implicates bank as a transparent entity and users rely on a payment gate-way to mark a successful transaction. Suggested protocol uses symmetric keys, Digital certificates X.509, and two -factor authentication to make a secure nancial deal. To prove the secrecy and authentication properties of the protocol we have formally verified it by AVISPA.

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III. SYSTEM ARCHITECTURE

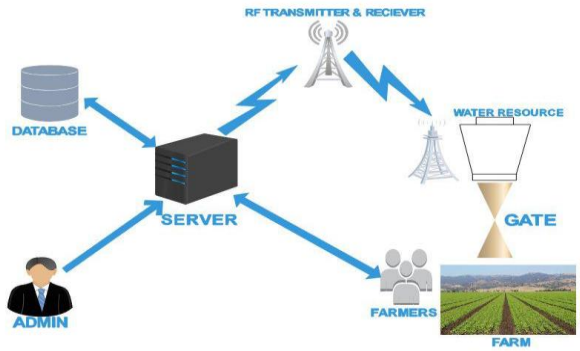

Fig1. Architecture Diagram

This system is centralized and automated. It has multiple users(Farmers) and these farmers are controlled by an single admin. The farmers have to fill an online form which will be saved in the database, then as they have to provide the requirement of water which they will require for their farms. Those request will be analyzed by the admin and he will load the information to the system, Then with the help of radio waves the server will contact the hydraulic gates which will get open through it. When the water get supplied the system will make a text message to the farmer about the supply of water. After the time gets over the hydraulic gates will get closed and an online bill will be generated by the system.

IV. MATHEMATICAL MODEL

System Description:

S = (I,O,F) Where,

S: System.

I= fAI, FI, WI, AU, AP, FU, FP, FRg are set of Input

Where,

1) AI : Admin Information.
2) FI : Farmer Information.
3) WI : Water Information.
4) AU : Admin Username.
5) AP : Admin Password.
6) FU : Farmer Username.
7) FP : Farmer Password.
8) FR : Farmer Requirements.

F = fF1, F2, F3, F4, F5g are set of Function Where,

1) F1 : Sensing.
2) F2 : ON-OFF canal.
3) F3 : Message sending.
4) F4 : Calculation of Water.
5) F5 : Bill Generation.

O = fW, NM, OP g are set of Output

1) W : Water Distribution.
2) NM : Notification Message.
3) OP : Online Payment.

V. METHODOLOGY

The basic requirement of the system is to improve the existing system which is a manual system. This will reduce corruption as well as the wastage of water will also be reduced. There could be possibility of leaks in the pipes as well as the canals for that we are using pressure sensor as well as density sensor. Other than that we are using the Advanced.

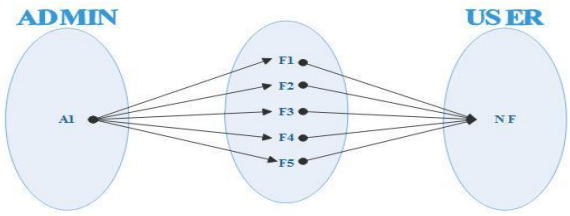

Fig 2. Venn Diagram

Encryption Standard (AES) algorithm for keeping all the data safe. This system also has solar panels because of which there could be reduce in consumption of electricity.

A. Circuits Analysis

1)Solenoid Valve

Solenoid Valves have one inlet and one outlet, and are used to permit and shut off fluid flow. The two types of operations are Normally Closed and Normally Open. ASCO 3-Way Solenoid Valves have three pipe connections and two orifices. A solenoid valve is an electro-mechanically operated valve. The valve is controlled by an electric current through a solenoid in the case of a two-port valve the flow is switched on or off; in the case of a three-port valve, the outflow is switched between the two outlet ports.

2)Hydraulic Gates

These are used to automatically open an electric driveway gate. As the name implies they use hydraulic fluids to operate their motion. Typically hydraulic operators have less moving parts than mechanical operators. The hydraulic motors have a number of advantages when operating gates: they are capable of producing more power than mechanical motors for heavy sized barriers and do not have to work at full power when operating large gates. Drawbacks of using hydraulic operated barriers are caused because of the technology itself, being under pressure, they tend to be harder to handle and less safe.

3)Solar panels

Absorb the sunlight as a source of energy to generate electricity or heat.(min 12watt-max 500watt)

4)Transistor

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A transistor is a semiconductor device used to amplify and switch electronic signals and electrical power. It is composed of semiconductor material with at least three terminals for connection to an external circuit. A transistor is a semiconductor device used to amplify and switch electronic signals and electrical power. It is composed of semiconductor material with at least three terminals for connection to an external circuit.

5)Register

In computer architecture, a processor register is a small amount of storage available as part of a digital processor, such as a central processing unit (CPU). Such registers are typically addressed by mechanisms other than main memory and can be accessed faster. Almost all computers, load-store architecture or not, load data from a larger memory into registers where it is used for arithmetic, manipulated or tested by machine instructions. Manipulated data is then often stored back into main memory, either by the same instruction or a subsequent one. Modern processors use either static or dynamic RAM as main memory, with the latter usually accessed via one or more cache levels.

6)Relay

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits as amplifiers: they repeated the signal coming in from one circuit and re-transmitted it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations.

7)RF Transmitter and Receiver

An RF module (radio frequency module) is a (usually) small electronic device used to transmit and/or receive radio signals between two devices. In an embedded system it is often desirable to communicate with another device wirelessly. This wireless communication may be accomplished through optical communication or through Radio Frequency (RF) communication. For many applications the medium of choice is RF since it does not require line of sight. RF communications incorporate a transmitter and/or receiver.

VI. CONCLUSION

This system is going to give a new way to the water distribution network through canals. Because of the use of automated system the manual work is been reduced through which we are going to avoid corruption. Leaks and flaws are also detected through sensors so it avoids wastage of water and management of canals is also very easy. Water is distributed as per the requirement of the farmers and the limitation given to them, so the water will also be saved and can be utilized by other people. Other than that it also has online payment option for the generated bill for the water they are going to use so no third person is required for the bill payment. It also has solar panels through which the electricity will also be saved. So these are the topics we are going to overcome in this system.

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