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Computerized Aquatic Hoard Diaspora and Regulator

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Abstract **- Now-a-days there is a growing need to develop appropriate methods to distribute the water. Especially in cities, it is very critical to distribute the water according to the time schedule. Main concentration lies on eradicating this problem. A new low cost and easy way to distribute the water is being introduced. This method is used to distribute the water from water treatment plants to consumer in a programmed manner. The valves are being controlled by the device and the device is controlled by the website. The device is interfaced with the LAN using RJ45 cable. So the valve can be controlled in an automated manner. The design approach is based on the use of computers and the peripheral interface controller. This eliminates the need for the manpower and hence provides the automated distribution of water. The volume of incoming and outgoing water is measured and water level is also indicated.**

Keywords **– Ethernet, LAN, Outgoings, Server, Valve.**

I. INTRODUCTION

Fresh water is naturally occurring water on the Earth's surface in ice sheets, ice caps, glaciers, bogs, ponds, lakes, rivers and streams, and underground as groundwater in aquifers and underground streams. Fresh water is generally characterized by having low concentrations of dissolved salts and other total dissolved solids. Water is a critical issue for the survival of all living organisms. Out of all the water on Earth, salt water in oceans, seas and saline groundwater make up about 97% of it. Only 2.5–2.75% is fresh water, including 1.75–2% frozen in glaciers, ice and snow, 0.7–0.8% as fresh groundwater and soil moisture, and less than 0.01% of it as surface water in lakes, swamps and rivers. Many areas suffer from lack of distribution of fresh water, such as deserts.

The water is first banked into the dam and is impelled from the well near to the dam. From fig (1) impelled water stored in the reservoir and is routed to the water treatment plants. This water will be distributed to different areas for domestic purposes.

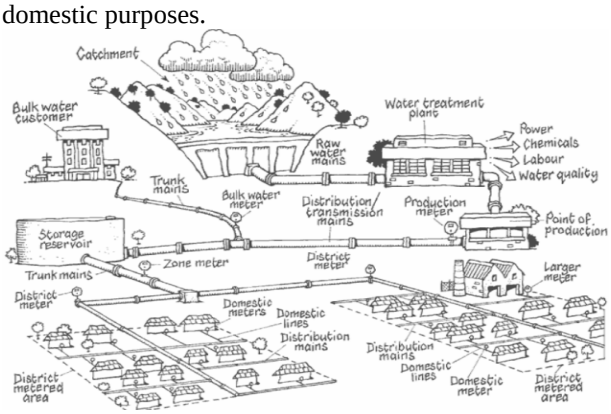

Fig.1. Water distribution

The main tank in the area will distribute the water to different streets. This process is very time consuming one.

II. RELATED WORKS

In earlier works [1] they proposed a particular solution for wireless sensor networks, specifically a water distribution network monitoring system and also discuss an approach and algorithm for leak detection in water distribution pipes. They only focused on book keeping and billing information system. And new metering database.

Limitation of battery power feeding wireless sensor still is a problem issue, which was worked out mostly as a trade-off between the needs of timely data and transmitting cycle's frequency.

The other problem issue is the reliability of GSM network used for transmitting data between concentrators and central server.

In this paper [2] they introduce a new, low-cost and easy-to-use leak detection system to help water utilities improve their effectiveness in locating leaks. The paper also presents an overview of leakage management strategies including acoustic and other leak detection techniques.

The aim of this document [3] is to provide a general and preliminary study on the topics related to ICT and water management. In particular the aspects considered are:

a) Control and monitoring mechanisms of water distribution networks
b) Losses in water distribution networks
c) Demand and supply management in water distribution networks
d) Energy (electrical) cost for water distribution networks and water management systems
e) Service-Oriented Architecture approaches to water management
f) Design and analysis of water distribution networks

This paper [4] state of our reticulation systems, design and environmental concepts to allow us to categorize the problem, methods of leakage detection, solution concepts to solve leakage and finally methods to allow planning to occur to prioritize asset management solutions. To solve leakage in both sewer and water reticulation systems, sophisticated 5 leak detection techniques are required.

III. MODULE DESCRIPTION

The proposed system consists of PIC controller placed on Ethernet web development board. The controller is assigned an IP address. Each controller is fixed to a specific area and it is connected to valve which is interfaced to a motor. The valve joins a number of consumer pipe lines. The IP addresses of all the controllers are stored in the server. If water is to be supplied to a particular area the IP address will be clicked in the server which awakes the controller belonging to that particular area. The controller automatically rotates the motor which is fixed on the valve and the valve is opened water will be

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supplied. When the duration of water supply to that area is completed the control will be passed to the next area. The main server is controlled by authorized persons. The server can be accessed from anywhere in the world.

Fig.(2) the water which is collected in the dam can be regulated to each district belonging to it in a automated manner. This system avoids the manual control of valves and proves to be efficient.

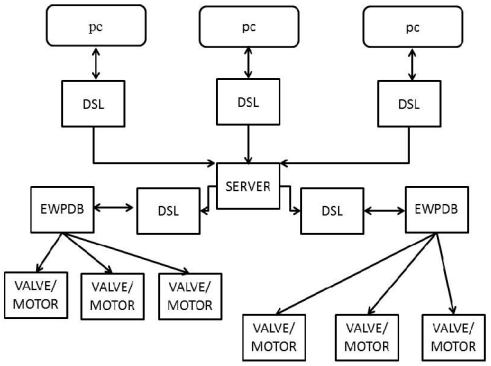

Fig.2. Server Control

UEXT is a board to board connector which supports three serial communication interfaces - I2C, SPI and RS232. It is a great way to expand the features of the development boards we already have. The customer can choose which new feature he wants to expand .It is also used to interface with pc.

Ethernet uses a bus or star topology and supports data transfer rates of 10 Mbps. The Ethernet specification serves as the basis for the IEEE 802.3 standard, which specifies the physical and lower software layers. Ethernet uses the CSMA/CD access method to handle simultaneous demands and is one of the most widely implemented LAN standards.

DSL, or Digital Subscriber Line, is an electronic component used in broadband technology. A copper wire enables the transfer and transmission of data (Internet) and voice (telephone) between servers and consumers. This change means that telephone lines can operate at higher speeds.

As fig.(3) shows the description about the module which is used in our project. EEPROM is used to dump and store the program in the controller. Unlike EPROM chips, EEPROMs do not need to be removed from the computer to be modified. However, an EEPROM chip has to be erased and reprogrammed in its entirety, not selectively. It also has a limited life - that is, the number of times it can be reprogrammed is limited to tens or hundreds of thousands of times. In an EEPROM that is frequently reprogrammed while the computer is in use, the life of the EEPROM can be an important design consideration. An internet controller is an integrated circuit chip that controls Ethernet communications. Internet is the method most computers use to communicate with each other.

This is also how most computers connect with the Internet. The Internet cable, which plugs into our computer, transfers data to the Ethernet controller, which decodes the data and puts it into a form our computer can use.

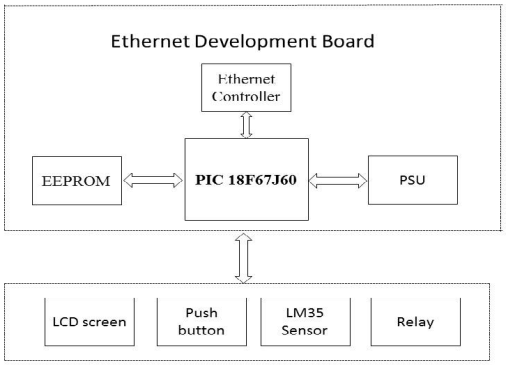

Fig.3. Hardware control

A. Protocol

Ethernet protocols refer to the family of local-area network (LAN) covered by the IEEE 802.3. In the Ethernet standard, there are two modes of operation: half-duplex and full-duplex modes. In the half duplex mode, data are transmitted using the popular Carrier-Sense Multiple Access/Collision Detection (CSMA/CD) protocol on a shared medium.

The main disadvantages of the half-duplex are the efficiency and distance limitation, in which the link distance is limited by the minimum MAC frame size. This restriction reduces the efficiency drastically for high-rate transmission. Therefore, the carrier extension technique is used to ensure the minimum frame size of 512 bytes in Gigabit Ethernet to achieve a reasonable link distance.

The MAC sub-layer has two primary responsibilities:

- Data encapsulation, including frame assembly before transmission, and frame parsing/error detection during and after reception. .
- Media access control, including initiation of frame transmission and recovery from transmission failure

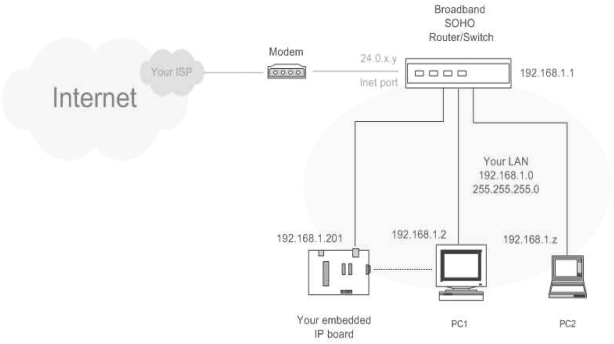

Fig.4. LAN Connectivity

The MAC-client sub-layer may be one of the following:

- Logical Link Control (LLC), which provides the interface between the Ethernet MAC and the upper layers in the protocol stack of the end station. The LLC sub layer is defined by IEEE 802.2 standards.
- Bridge entity, which provides LAN-to-LAN interfaces between LANs that use the same protocol (for example, Ethernet to Ethernet) and also between different protocols (for example, Ethernet to Token Ring) fig (4).

Each layer of the protocol stack is responsible for a particular level of functionality. As an example, the

physical layer is concerned with the actual electrical transmission of bits across a medium. Each higher layer in the model utilizes the underlying layers in a somewhat independent fashion.

Starting at the application layer, the web browser would generate an HTTP request using an application-specific command. This request would then be passed down to the TCP layer, which would construct a TCP packet consisting of a TCP header and TCP data. The TCP header contains information particular to the TCP protocol, such as packet sequencing information, checksum information and the source and destination port number.

The FTP's main purpose is to promote file sharing and data transfers efficiently and reliably.

It uses two connections:

The control connection on which FTP commands and control data are transmitted between the client and the provider a data connection for the transfer of data (files)

The client FTP always controls the connection; using the interpreter the client asks for a connection with the provider through the provider's listening port from a temporary port. The provider makes the connection and the control channel is established.

There are two operational modes for the data connection - active and passive. The data connection may be established on the initiative either of the client or the provider, depending on the mode.

B. Uploading pages to the server

There are 2 easy ways to upload pages to the server, but that should always need to convert the files as want to upload in a MPFS file format. One other way is to include the web page on the source code and link it in a project, but if we did it in this way we won't use the EEPROM included in the platform wasting program memory.

C. Microchip File System (MPFS)

The implemented HTTP server uses the MPFS simplified file system to store the pages on the embedded system. That is why it is necessary to transform the files to that file system before uploading them.

D. Solenoid Valve

A solenoid valve is an electromechanical device used for controlling liquid or gas flow. The solenoid valve is controlled by electrical current, which is run through a coil. When the coil is energized, a magnetic field is created, causing a plunger inside the coil to move. Depending on the design of the valve, the plunger will either open or close the valve. When electrical current is removed from the coil, the valve will return to its de-energized state.

In direct-acting solenoid valves, the plunger directly opens and closes an orifice inside the valve. In pilot-operated valves (also called the servo-type), the plunger opens and closes a pilot orifice. The inlet line pressure, which is led through the pilot orifice, opens and closes the valve seal.

The most common solenoid valve has two ports: an inlet port and an outlet port. Advanced design may have three or more ports. Some designs utilize a manifold-type design.

Solenoid valves make automation of fluid and gas control possible. Modern solenoid valves offer fast operation, high reliability, long service life, and compact design.

E. Water Level Sensor

Water Level Sensor submersible pressure transducer consists of a solid state pressure sensor encapsulated in a submersible stainless steel. The water level gauge uses a marine grade cable to connect the water pressure sensor to the monitoring device.

The water depth indicator is available in a 0-3' full scale range which is ideal for measuring shallow flows or small water level changes. The 0-3' range is great for measuring flows in sewers, storm drains, weirs, flumes, lakes, tanks or any water body that is less than 3' deep. The 0-3' water monitoring sensor accurately measures small changes in water, even when the water's depth is only a few inches deep. Other metal foil type sensors typically have serious problems at low level ranges because of crinkling, stretching and drifting.

IV. FLOW DIAGRAM

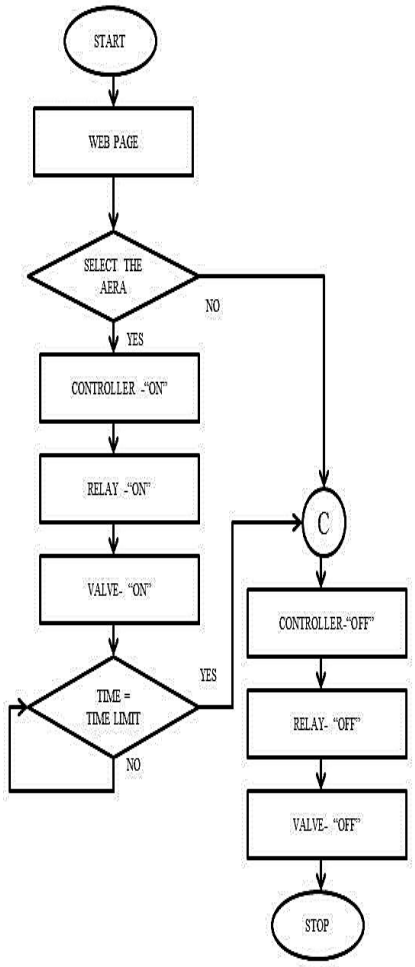

Fig.5. Flow diagram of the system

In fig (5) flow diagram shows how the project will work and the timer is fixed according to the time schedule.

IV. Advantage of this Approach

- Cost is low for both implementing and maintaining it. because of computerized record maintenance system can be implemented easily.
- Long life of the system makes it more suitable for Indian conditions.
- Manpower is reduced
- Controller can work under any circumstance. environment won't affect its operation.
- The server can only be accessed by authorized person.

V. Conclusion

In this paper we proposed a particular solution for water distribution in an automated manner and the manual work is reduced. The water level in the tank is measured using the water level indicator which indicates the level of water in the tank. Incase if the water level is low the water pump will be turned on to pump the water to the tank up to the required level.

The water is thus distributed in an automated manner i.e. In a time scheduled manner. As future works pipe leakage detection mechanisms and monitoring the water tax payment can be done.

Acknowledgment

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