Automatic Water Management System

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ABSTRACT

Automatic Water Management (AWM) system mainly concentrates on the water conservation process. This can be implemented in places where wastage of water exists. Water resource management is the activity of planning, developing, distributing and managing the optimum use of water resources. AWM helps the people at home to fill the overhead tank, water the plants and extinguish the fire during fire accidents automatically. The above three functions are performed by a single microcontroller and sensors used for different purposes. This project involves the use of microcontroller, water pump, display and an assembly language program. The water level indicator monitors the filling of overhead tank and displays the water level in the display. Fire alarm system plays an important role in maintaining and monitoring the safe of all kind environments and situations. The sensor has a two main parts i) detection system ii) monitoring system. Soil moisture detector system is designed to develop an automatic irrigation to the plants which switches the motor ON/OFF by sensing the moisture content of the soil.
Keywords: Micro Controller, Assembly Language program, Water pump, Detection, Managing system.

I. INTRODUCTION

The design of this project is to conserve the water resources in domestic usage. This system can reduce the wastage of water in different areas. Automatic water management system helps the people at home to fill the overhead tank, watering the plants and extinguish fire during fire accidents automatically. This problem is quietly related to poor water allocation, inefficient use, and lack of adequate and integrated water management. Therefore, efficient use and water monitoring are potential constraint for home or office water management system. In the last few decades several monitoring systems integrated with water level detection have been accepted. The paper introduces the notion of water level monitoring and management within the context of electrical conductivity of the water. The water level indicator indicates three levels low, medium, high and also empty tank. The system will automate the process by placing a single sensor unit in the tank that will periodically take measurements of the water level and will control the motor automatically. The problem like overflow of water in the tank of interest, empty tank condition and motor overheating due to continuous usage is avoided. Despite its smartness, this project does not explain the update water level of source tank. Moreover, during no lighting condition, SMS notification is sent to user. More specifically, it explains about the microcontroller based water level sensing and controlling in a wired environment. Water Level management approach would help in reducing the home power consumption and as well as water overflow. The user communicates with the centralized unit through SMS. The centralized unit communicates with the system through SMS which will be received by the GSM with the help of the SIM card. When the motor is started, a constant monitoring on soil moisture and water level is done & once the soil moisture is reached to sufficient level the motor is automatically turned off & a massage is send to subscriber that the motor is turned off. The system sets the irrigation time depending on the temperature and humidity reading from sensors and type of crop and can automatically irrigate the field when unattended. Information is exchanged between far end and designed system via SMS on GSM network.

## II. METHODS AND MATERIAL

A. Literature Survey

Water scarcity is one of the major problems facing most cities in the world and wastage during transmission has been identified as a drawback. The system used microcontroller to automate the process of water

pumping in an over-head tank storage system and has the ability to detect the level of water in a tank, switch on/off the pump according and display the status on an LCD screen. This research has successfully provided an improvement on existing water level controllers by its use of calibrated circuit to indicate the water level and use of DC instead of AC power thereby eliminating risk of electrocution [1]. Water scarcity is the serious issue in major cities. One has to keep on observing his tank water level to switch off the motor once it is switched on. And sometimes this also can happen that the motor coil burns because of absence of water in the sump. In this paper we have discussed about design and implementation of water level control system which is wireless, automatic, cost effective and reliable. It uses two Radio Frequency transceivers along with a controller used for wireless communication. It is completely automated with the help of a micro controller. The system doesn't need any attention of the user unless the sump is empty. Installation cost is reduced since the system is wireless. It is reliable because it has no problems arising after installation such as breakage of wire [2]. The greenhouse based modern agriculture industries are the recent requirement in every part of agriculture in India. In this technology, the humidity and temperature of plants are precisely controlled. It is observed that for the first time an android phone-control the Irrigation system, which could give the facilities of maintaining uniform environmental conditions are proposed. This application makes use of the GPRS [General Packet Radio Service] feature of mobile phone as a solution for irrigation control system. GSM (Global System for Mobile Communication) is used to inform the user about the exact field condition. The information is passed onto the user request in the form of SMS [3]. The paper presents a system of an automatic water level controller with SMS notification. The project was carried out to assist user in load shedding based country like Nepal. SMS notification was added to automatic controller system so that water can be managed by user during load shedding. Two systems work synergistically; automatic level controller system and SMS system. The program was developed in Arduino program developing environment and uploaded to the Microcontroller. Water level in the system is controlled automatically. The controller operates on a battery power. Whenever the system encounters empty level and the status of load shedding, the SMS notification is sent to the user [4]. With the use of low cost sensors and the simple circuitry this work aims low cost product. This work is best suit for places where water is scarce and has to be used in

limited quantity. The aim is to use the readily available material to construct low cost sensors. Relays are controlled by the microcontroller through the high current driver IC and provided for controlling solenoid valves, which controls the flow of water to different parts of the field. Other relay is used to shut-off the main motor which is used to pump the water to the field. Performance of sensors in terms of energy consumption has also been analyzed [5]

B. Proposed Water Management System

Automatic water management system mainly concentrates on the water conservation process. This is implemented in houses where excess of wastage of water prevails. AWM helps the residing people at home to fill the overhead tank, watering the plants and extinguish the fire during fire accident automatically. The above three functions are performed by a single microcontroller and sensors used for different purposes.
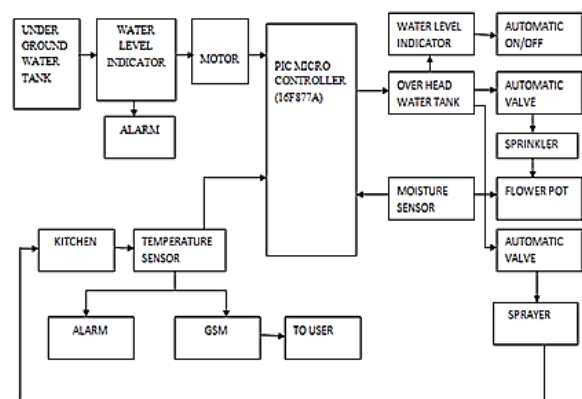
**Figure 1.** Block Diagram of Automatic Water Management System

Explanation:
The design of this project is to conserve the water resources in domestic usage. This system can reduce the wastage of water in different areas. Automatic water management system helps the people at home to fill the overhead tank, water the plants and extinguish fire during fire accidents automatically. This system consists of various sensors like water level indicator, soil moisture sensor and temperature sensor. The water level indicator is constructed in the underground and overhead water tank with two sensors, one foot above the ground level and one foot below the brim level. The main purpose of water level indicator is to pump water from underground tank and fill the overhead tank using motor. The motor gets switched ON at two conditions. (i) When the water level touches the sensor A at overhead tank,

the motor gets switched ON and water is pulled towards the overhead tank. (ii) When the water level touches sensor B at underground tank, motor is switched ON automatically and is filled in the overhead tank. The motor gets switched OFF at two conditions. (i) When the water level touches the sensor B in overhead tank (or) touches the sensor A in underground tank, the motor automatically switches to OFF state. A buzzer is blown when the water level in both the tanks touches the B level. With this system we can automatically control the water level in the reservoir. The overhead tank solves two purposes. (i) Water the plants automatically at certain intervals and outs OFF fire at kitchen in case of any fire accident. The overhead tank is connected to the soil moisture sensor and temperature sensor. The soil moisture sensor keeps track of the water content in the soil and when it reaches the dry state, the automatic valve gets opened and water from the overhead tank is sprinkled to the plants at a certain pressure. After the soil gets damped, the valve closes automatically. Simultaneously, the temperature sensor fixed at the kitchen keeps track of the room temperature. If the temperature crosses >50C, the automatic valve opens and water reaches from the overhead tank and is sprayed everywhere. Immediately, the owner is alerted with a message and the buzzer is blown aloud.

III. RESULTS AND DISCUSSION

The system supports water management decision, which determines the controlling time for the process and monitoring the whole system through GSM module. The system continuously monitors the water level in the tank and provide accurate amount of water required to the plant or tree (crop). The system checks the temperature, humidity and dew point so as to forecast the weather condition. Low cost and effective with less power consumption using sensors for remote monitoring and controlling devices which are controlled via SMS using a GSM using android mobile.
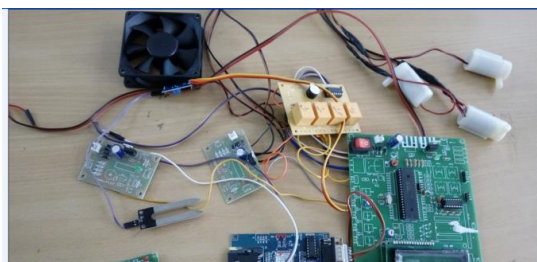
Figure 2a : Overview of Hardware Setup

Figure 2b: LCD output of Hardware Setup

IV. FUTURE SCOPE

Timely actions are taken accordingly by preventing the overflow of water. Human intervention is low. This can be implemented almost in all houses and it is a great advantage to the residents who go for work. The main drawback of automatic water management system is that motor should be repaired manually in case of any malfunction.

V. REFERENCES

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