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Smart Water Distribution System Using GSM

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Abstract: ***One of the most important natural resource is water resource. But now a days water resource management and distributions are controversial issue. This paper deals with the automation in the water distribution and management with technical device. The level of the water will be sensed by the water level sensor. Depending on the level of the water in the tank, the speed of the water will be varied. The supply of water to different areas are automated through the use of GSM and these mobile controlled water distribution result accurate meter reading and bill payment. The flow meters are placed in pipe in particular intervals. If the flow rate is decreased from the designed level, the motor is automatically increased the speed. The advantage of this project is leak control and leak management which is achieved through flow sensors.***

Keywords: GSM, Level sensors, Flow sensors, motor, PIC

1. Introduction

Water is the basic necessity of economic development, but now days the water distribution and management are controversial issue. So nobody can take this effort. This paper presents the automatic water distribution and corresponding bill payment. This system is fully automated from the source of the water each customers. An operator fills the tank automatically from water resources by using AC pump.The level sensors are placed inside the water tank placed near the source, depending on the level of the water in the tank the motor is automatically ON and OFF. The Solenoidal valves are passing to different areas from the tank and these valves are controlled by the message arising from our phone. If the valve open message is send corresponding valve is open and if the valve closed message is send corresponding valve become closed. One of the most important advantage is that flow sensors are placed in the pipe, it sense the flow rate and it gives value to GSM and it notifies the microcontroller the it varies the rpm of the motor. These sensors give square wave output which is proportional to the quality of the water. These sensors output from GSM also given to GSM modem at the office end. Billing software receives the value, calculate the corresponding accurate bill and then it given to customers via Email or SMS. One of the main advantage of this system is leak control and it can be done by the sensors .This system provide efficient water distribution and accurate bill payment so this system can be easily implemented in towns and municipalities.

2. Water Distribution Section

This paper deals with the automatic water distribution using GSM. This system is fully automated from the source of the water each customers. An operator fills the tank automatically from water resources by using AC pump Three level sensors are placed inside the water tank in 20%,50%,and 90% of water respectively. If the level of the water is below 20%, the motor will automatically switch ON. If the level of the water is above 90%,the motor will automatically switched OFF. Here three Solenoidal valves are passing into different areas. The user in the first area send first valve open message, corresponding valve will open and this valve will close for first valve close message and similar operation can be done in second and third Solenoidal valves. The status of the message is done through GSM modules. Flow sensors are placed in the pipe, it sense the flow rate and it gives value to GSM and it notifies the microcontroller the it varies the rpm of the motor. This result efficient water distribution to different areas.

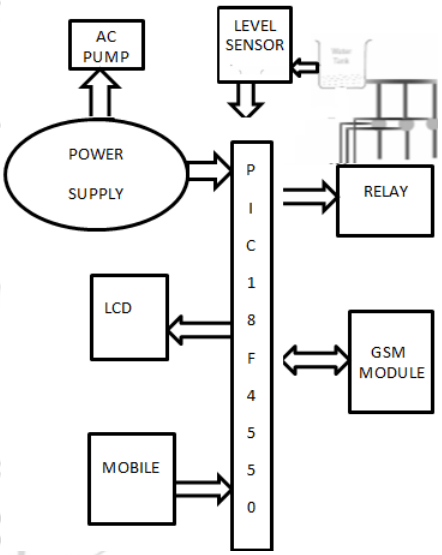

Figure 1: Block diagram of water distribution system

3. Billing Procedures

Water is distributed very efficiently and effectively. Also this paper can provide accurate billing procedures and it can be done through GSM and Microcontrollers. Flow sensors are used to sense the quality of water through the designed pipe. The flow sensors are placed to sense the quality of water and generate square wave output proportional to the quality of water flow. Sensors output is given to GSM modem at the user end through microcontroller. GSM modem also transmits data regarding the quality of water in the form of SMS to office side. Modem at the office end receive these SMS and gives o the billing software for calculating bill. These calculated bill is send to the customers side through SMS or Email.

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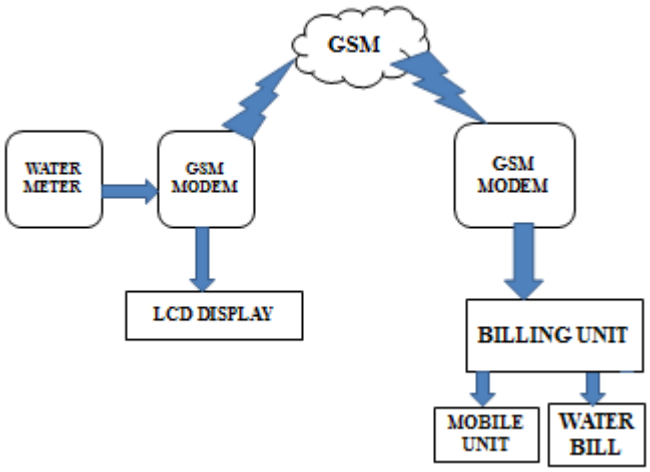

Figure 2: Billing section

4. GSM Modem

Microcontroller gives the value regarding the amount of water used by the customers in the form of decimal units to the GSM modem. By using AT commands, GSM modem formats these decimal values into message formats. In this paper, reading collection work is automatically done by the GSM network so no manpower is required. Amount of water used by the customer is collected by sensor which give corresponding square wave output to GSM modem which provide SMS facility through GSM technology. .Numbers related to the usage of water by customers will be transmitted by the GSM modem through SMS to the customers. This SMS will be received at the office end GSM modem for billing purposes. AT Commands for sending SMS:

1. ”AT+CMGF=1” (Define message format by typing -Text mode).
2. ” AT+CSCA=XXXXX”(Set message center number by typing -Center number of service provider)
3. ”AT+CMGS=YYYYYY”(Enter recipient number).
4. Write message and press Ctrl-z.

AT Commands for receiving SMS:
1. ”AT+CMGF=1”(Define message format by typing Text mode).
2. “AT+CNMI=1,,2,0,0,0” (In order to see all received messages.

5. Leak Detection

Leak detection is one of the most advantage of this work. It can save our precious natural resource. The advantage of the GSM make the leak detection very efficiently. Flow sensors are used to sense the quality of water through the designed pipe. The flow sensors are placed to sense the quality of water and generate square wave output proportional to the quality of water flow. Sensors output is given to GSM modem at the user end through microcontroller. If any of the leaks occur in the pipes, flow sensor sense the quality of water, but there is a decrease in the quality of water. It results the square wave output proportional to the quality of water become distorted. This value is given to the microcontroller and it send error message to the office through GSM. Also microcontroller notifies which section is complainted. Then the operators check the pipeline according to the message.

6. Conclusion

This paper cover the automatic water management system. This system is completely operator free. All operation include the water management system is fully automatic. Status updates on mobile through GSM. A tank is placed near the resource and level sensors are inserted in the tank. The whole system is controlled by the microcontroller. Depending on the level of the water in the tank the motor is automatically ON and OFF. The valve open or close message is send, the corresponding solenoid valve is opened or closed. Flow sensors are placed in the pipe, it sense the flow rate and it gives value to GSM and it notifies the microcontroller the it varies the rpm of the motor. This result efficient water distribution to different areas. The flow sensors are placed to sense the quality of water and generate square wave output proportional to the quality of water flow. Sensors output is given to GSM modem at the user end through microcontroller. GSM modem also transmits data regarding the quality of water in the form of SMS to office side. Modem at the office end receive these SMS and gives o the billing software for calculating bill. These calculated bill is send to the customers side through SMS or Email. If any of the leaks occur in the pipes, flow sensor sense the quality of water, but there is a decrease in the quality of water. It results the square wave output proportional to the quality of water become distorted. This value is given to the microcontroller and it send error message. The operators check the corresponding pipeline according to the message. The advantage of this system is that water is distributed efficiently and effectively. This GSM based system provide accurate consumption of water to customers and also provide leak management system.

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