Design and Implementation of Intelligent Water Distribution System for Apartments

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***Abstract*- The proposed work focus on the major problems facing urban cities of the world and wastage of water during transmission has been identified as a major drawback; this is one of the motivations for this research, to deploy computing techniques in creating a barrier to wastage of water to not only provide more financial gains and energy saving but also help the environment and water cycle which in turn ensures that we save water for our future. For this reason, we are creating this project called an automatic water distribution system. We are monitoring the level of water and a set time for distributing water based on the two conditions we are distributing the water. The level sensor is used and based on this sensor water is distributed and the message sent user via GSM modem. The valve opens and closes control by using mobile and intimate a level of water to the user and the user turn the water pump or set time is reached the water is automatically distributed.**

***Index terms*- Distribution System, GSM Modem, Monitoring, Level sensor**

INTRODUCTION

With the continuous economic growth, the water demand of enterprises is also increasing. The monitoring of water resources for these enterprises can prevent the occurrence of stealing water and leaking water effectively. Therefore, the monitoring system of the urban water supply has aroused extensive attention in recent years. Urban water supply networks form the link between drinking water supply and drinking water consumers. These large-scale networks are vital for the survival of urban life, for maintaining a healthy level of economic development, and for the continuous operation of factories and hospitals. In the world, urban water supply systems are public enterprises, usually, part of a local government and the recent increased interest in privatizing public enterprises has not led to reforms of water systems. Nevertheless, in about 50 cities in the developing world, the water system either has been privatized or franchised to a non-governmental entity for its operation and maintenance. One of the most important aspects of any town management includes water management. it is a crucial aspect as nowadays water resources are very limited and nobody can afford its wastage. For this reason, we are creating this project to distribute the water automatically and avoid wastage water. The level sensor is used to monitor the level of water. The working our proposed system is initially the level sensor is used to monitor the level of the water and the sensor level the water is distributed and the message sent user via GSM modem. The valve opens and closes control by using mobile and intimate a level of water to the user and the user turn the water pump or set time is reached the water is automatically distributed. The level sensor is continuously monitoring the level of water and a potentiometer is used to set the particular value and distributing purpose and the water distribution is monitored by the user via GSM modem in case of water level is low automatically distribute the water. Using this project we can avoid water wastage and automatically

DISTRIBUTION MODEL AND ASSUMPTIONS

See the mapping between Arduino pins and ATmega328P ports. The mapping for the Atmega8, 168 and 328 is identical. Each of the 14 digital pins on the Uno can be used as an input or output, using pin Mode(), digital Write(), and digital Read() functions. Serial: 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serial data. These pins are connected to the corresponding pins of the ATmega8U2 USB-to-TTL Serial chip. External Interrupts 2 and 3. These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value. See the attach Interrupt() function for details. PWM: 3, 5, 6, 9, 10, and 11. Provide 8-bit PWM output with the analog Write() function. SPI: 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). These pins support SPI communication using the SPI library. LED: 13. There is a built-in LED driven by digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it's off. TWI: A4 or SDA pin and A5 or SCL pin. Support TWI communication using the Wire library. The Uno has 6 analog inputs, labeled A0 through A5, each of which provides 10 bits of resolution (i.e. 1024 different values). By default, they measure from ground to 5 volts, though is it possible to change the upper end of their range using the AREF pin and the analog Reference () function. There are a couple of other pins on the board. AREF. Reference voltage for the analog inputs. Used with analog Reference (). Reset. Bring this line LOW to reset the microcontroller. Typically used to add a reset button to shields which block the one on the board.

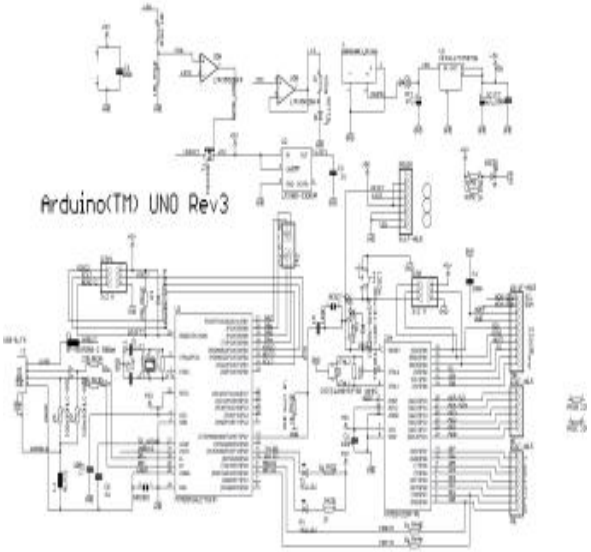

Fig.1: Arduino Connection

Pin out: Added SDA and SCL pins that are near to the AREF pin and two other new pins placed near to the RESET pin, the IOREF that allow the shields to adapt to the voltage provided from the board. In the future, shields will be compatible with both the board that uses the AVR, which operates with 5V and with the Arduino Due that operates with 3.3V. The second one is a not connected pin that is reserved for future purposes.

EFFICIENT DISTRIBUTION

Pump efficiency is defined as the ratio of the power imparted on the fluid by the pump concerning the power supplied to drive the pump. Its value is not fixed for a given pump; efficiency is a function of the discharge and therefore also operating head. For centrifugal pumps, the efficiency tends to increase with flow rate up to a point midway through the operating range (peak efficiency) and then declines as flow rates rise further. Pump performance data such as this is usually supplied by the manufacturer before pump selection. Pump efficiencies tend to decline over time due to wear (e.g. increasing clearances as impellers reduce in size). One important part of system design involves matching the pipeline head loss flow characteristic with the appropriate pump or pumps which will operate at or close to the point of maximum efficiency. There are free tools that help calculate head needed and show pump curves including their Best Efficiency Points (BEP). Pump efficiency is an important aspect and pumps should be regularly tested. Thermodynamic pump testing is one method maximum efficiency. There are free tools that help calculate head needed and show pump curves including their Best Efficiency Points (BEP). Pump efficiency is an important aspect and pumps should be regularly tested.

COMPONENTS

A liquid crystal display(LCD) are used in a wide range of applications including computer monitors, television, instrument panels, aircraft cockpit displays, signage, etc. They are common in consumer devices such as video players, gaming devices, clocks, watches, calculators, and telephones. LCDs have displaced cathode ray tube (CRT) displays in most applications. They are usually more compact, lightweight, portable, less expensive, more reliable,

and easier on the eyes. They are available in a wider range of screen sizes than CRT and plasma displays, and since they do not use phosphors, they cannot suffer image burn in LCDs are more energy-efficient and offer safer disposal than CRTs.

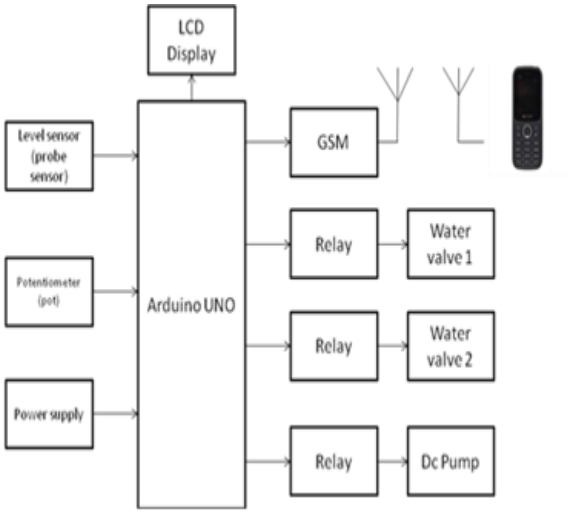

Fig.2: Block Diagram

An electronic amplifier is a device for increasing the power of a signal. It does this by taking energy from a power supply and controlling the output to match the input signal shape but with a larger amplitude. In this sense, an amplifier may be considered as modulating the output of the power supply. Here we use the inverting amplifier as a gain amplifier. We can change the gain by adjusting the value of the feedback resistance value. Negative Feedback is the process of "feeding back" some of the output signals back to the input, but to make the feedback negative we must feed it back to the "Negative input" terminal using an external Feedback Resistor called Rf. This feedback connection between the output and the inverting input terminal produces a closed-loop circuit to the amplifier resulting in the gain of the amplifier now being called its Closed-loop Gain. A potentiometer (colloquially known as a "pot") is a three-terminal resistor with a sliding contact that forms an adjustable voltage divider.[1] If only two terminals are used (one side and the wiper), it acts as a variable resistor or rheostat. Potentiometers are commonly used to control electrical devices such as volume controls on audio equipment. Potentiometers operated by a mechanism can be used as position transducers, for example, in a joystick. Construction of a wire-wound circular potentiometer

A GSM modem is a specialized type of modem that accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. A GSM modem exposes an interface that allows applications such as Now SMS to send and receive messages over the modem interface. The mobile operator charges for this message sending and receiving as if it was performed directly on a mobile phone. To perform these tasks, a GSM modem must support an "extended AT command set" for sending/receiving SMS messages, as defined in the ETSI GSM 07.05 and 3GPP TS 27.005 specifications. Due to some compatibility issues that can exist with mobile phones, using a dedicated GSM modem is usually preferable to a GSM mobile phone. This is more of an issue with MMS messaging, where if you wish to be able to receive inbound MMS messages with the gateway, the modem interface on most GSM phones will only allow you to send MMS messages. This is because the mobile phone automatically processes received MMS message notifications without forwarding them via the modem interface.

A valve is a device that regulates the flow of a fluid (gases, liquids, fluidized solids, or slurries) by opening, closing, or partially obstructing various passageways. Valves are technically pipe fittings but are usually discussed as a separate category. In an open valve, fluid flows in a direction from higher pressure to lower pressure. Valves may be operated manually, either by a hand wheel, lever or pedal. Valves may also be automatic, driven by changes in pressure, temperature, or flow. These changes may act upon a diaphragm or a piston which in turn activates the valve, examples of this type of valve found commonly are safety valves fitted to hot water systems or boilers. Valves are also found in the Otto cycle (internal combustion) engines driven by a camshaft, tappets or pushrods where they play a major role in engine cycle control. The potential transformer will step down the power supply voltage (0-230V) to (0-6V) level. Then the secondary of the potential transformer will be connected to the precision rectifier, which is constructed with the help of op-amp. The advantages of using a precision rectifier are it will give peak voltage output as DC, the rest of the circuits will give only RMS output.

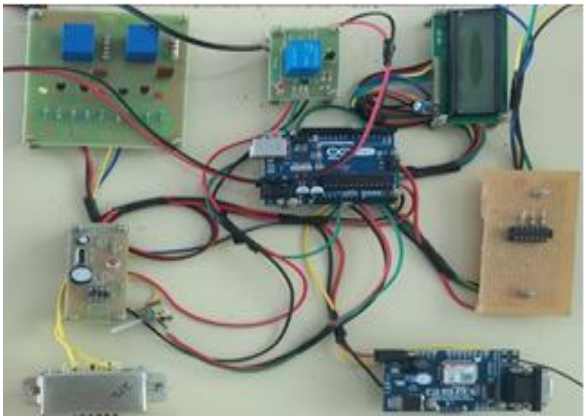

Fig.3: Hardware Module

CONCLUSIONS

In this effective way we are designing an automatic water distribution system for home and other applications. Water is main source for living human. Most of the water is wasted in an existing water distributing system. For this reason we are creating this project to avoid water wastage and automatically distribute the water based on level of water. The main feature of this project is GSM modem is used. It will intimate level water through message. Based on water level the distribution performed and it will monitored by GSM modem. Using this project we can distribute water automatically and avoid the wastage of water.

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