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REVIEW ON MICROCONTROLLER-BASED WATER LEVEL INDICATOR AND CONTROLLER

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Abstract: A water pump controller and level indicator (EWPCLI) was designed, built, and tested. The EWPCLI uses the electrical conductivity of water to calculate the water level in a storage tank and to automatically operate the water pump. The EWPCLI uses metallic conductors, or probes, placed at various points along the tank's height to serve as sensors. Utilizing the high conductivity of ionized water due to its impurities, comparators detect the presence of water at the wires and provide corresponding digital outputs used by the microcontroller to drive a digital result that activates a visual display LED that shows different water levels in the tank. The microprocessor also manages a switch that turns on or off the water pump when the water level drops below the predetermined minimum (when water goes above the chosen maximum level). In active mode, EWPCLI activates the water pump based on the tank's water level. Additionally turned on at the relevant water level is the necessary visible LED. The technology will help to increase the performance and lifespan of the electric water pump while reducing the expense and inefficiency of human involvement involved in monitoring and managing the pump.
Keywords: microcontroller, comparator, LED display, and EWPCLI

I.INTRODUCTION

The greatest gift from nature to humanity is water. Water is essential to life. The water problem has raised worldwide risk in the current age or decade. Inaccessibility to clean water affects more than 750 million people worldwide [16]. As a result, we should make the required efforts to save water. Automated design systems that reduce the need for human labour are now possible thanks to modern science. Estimating the water level in a significant architectural structure is difficult.. We have deployed microcontroller techniques to reduce water waste. This design is needed to indicate the water level when the tank is filled with water and a high-level motor gets a signal to stop [17].

It's important to avoid wasting water and energy. Water Level Indicator Application:

- Problems with overflow
- Attention
- Observation
- Shutdown

Automatic Water level indicators serve as a framework via which we can gather information on the volume of water held.

II. METHODOLOGY

The primary tenet of this philosophy is that "water conducts electricity." The tank has four wires with a space between them to represent the various water levels. The microcontroller

displays the water level on the LCD and regulates the flow of water by controlling the DC motor based on the outputs of these wires. The programme was a dump on the microcontroller at the initial stage. The circuit schematic then shows the required connections. According to construction, four copper wires are kept on the tank at a slight distance, which indicates that the water level in the tank influences the speed of the motor, which will control the water flow accordingly. The system starts to operate slowly when it changes to high-activity mode..

Four wires that detect the presence of water in the tank give a signal to the CPU, which recognises it and shows the water level on the LCD. The microcontroller not only shows the water level status but also sends a signal to the electric motor, which controls the flow of water as per its necessities.

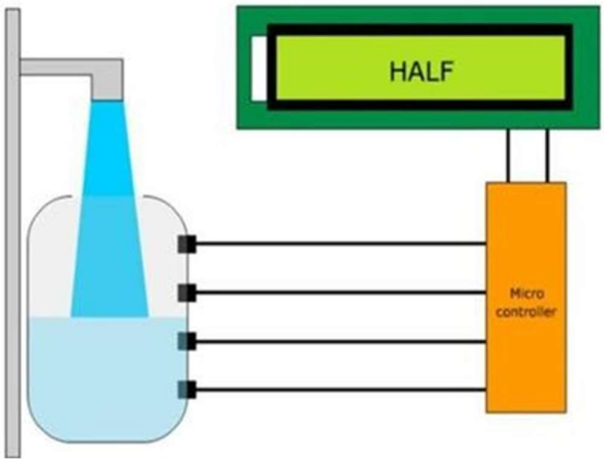

Figure 1: Layout Diagram [20]

The outcomes of the above-discussed technique are as follows:

1. The motor gets controlled automatically.
2. decreases the workload of humans.
3. Cheap, reliable, and user-friendly
4. used in any industry concerned with fluids.

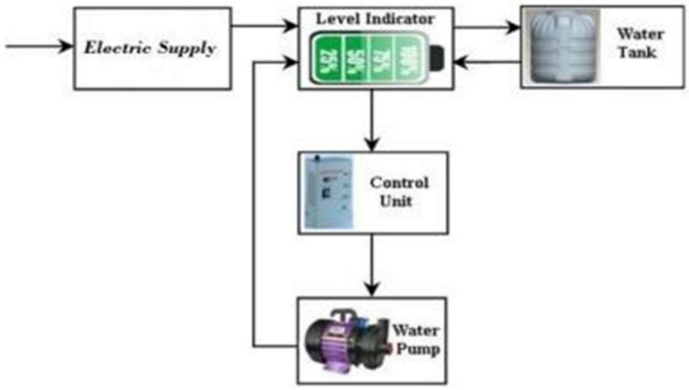

Figure 2: Block diagram [20]

III. LITERATURE

[1] The topic of this essay is limiting the water supply to each household. When this system is placed in a home, it constantly tracks the home's overall water usage. The system sends an email notification to the user once the limit hits 80% or 100% once the amount of water used exceeds a threshold, which number, leads to the flow of water entering the house is decreased by a portion of the original amount. Additionally, it provides the user with periodic updates on the amount of water used and details on the locations where consumption is highest in the home locations in the home where consumption is highest.. [2] This project mainly focuses on minimizing water and electricity waste by building an efficient automated water pump. Some sophisticated automation materials enable you to set off some work automatically, such as Arduino microprocessors, which enable the logical control of electrical circuits.

The DC motor will automatically turn on the machine in the water tank and get turned off automatically after the water tank gets filled. In case you need a water level controller, there are several options. [3] A system consists of similar components instead of an LCD and has a buzzer system. When the tank is empty, the buzzer makes a sound, indicating that the water in the tank is empty. It helps to prevent the dry running of the motor, which causes financial loss and waste of time. There is an overview of the Efficient Automatic Water Level Regulator, which is also implemented by Arduino and a water level sensor [4]. It can be controlled through a mobile application, making it accessible from anywhere. This system also helps save time. It also uses a relay module to break or join contact with a given circuit based on the input. [5] This paper is used to make automatic water level monitoring possible. The main goal of the water level indicator is to detect the water level according to the tank's level. [6] This paper has developed a system that first checks the water level in a tank with the help of a water level indicator. This system consists of a water level sensor and an Arduino Uno.

[7] This paper introduced a system in which automatic water level monitoring takes place with the help of a sensor. With the help of a sensor, we can determine the different water levels in a tank and stop the overflow of water. [8] This paper deals with developing a system for the automation of a fossil fuel pump by filling a container. The author is working on a water level indicator that is an automated audio buzzer system. With the help of a magnetic sensor, the author has come up with a unique application. Water level controllers are not exact in this project due to the direct contact of liquid with the electrodes.

The concept is similar to the water level indicator project but defined differently. [9] This paper works with the concept of measuring water levels. The author has used water level measurements for measuring the level of water and a microcontroller (AT89C51) to control the flow of water. They have used an LCD to display the water level in the motor pump. [10] This paper deals with the same concept of checking the water level. The motor turns on or off depending on the amount in the tank. [11] This project checks the water level and uses a pump to switch off the water supply when required. It mainly focuses on minimizing manpower and reducing time waste. [12] This paper gives us an idea of an automatic water level controller for residential applications. The system monitors the water level and automatically switches the

motor on when the tank gets empty and turns it off when it gets full. It also displays water on the LCD. To detect and control the water level, we used a microcontroller, the AT89C51.

[13] In this paper, we compared old concepts with adaptive technology. They have used a water level sensor, which works on the principle of the electrical conductivity of water. [14] This paper deals with a modern water level indicator. In this paper, the author has presented optimistic indicators for a water control system. One faces more problems while selecting an appropriate indicator for the canal system, so here is the one with the optimised indicator for the water control system.

IV COMPONENTS USED

(a).At89c51 controller: The AT89C51 is a low-power, high-performance CMOS 8-bit microcomputer with 4 Kbytes of Flash Programmable and Erasable Read Only Memory (PEROM). The device is manufactured using Atmel's high-density non-volatile memory technology and is compatible with the industry standard MCS-51 instruction set and pin out [18].

(b). 16*2 LCD (LCD16X2): The LCD (Liquid Crystal Display) screen is an electronic display module and has a wide range of applications. A 16x2 LCD is a simple module used in various devices and circuits. These modules are for over seven segments and other multi-segment LEDs.

(c)Relay: 5V Relay modules use low-level data signals to switch relays capable of handling loads up to 10 amps. Ideal for devices like PIR detectors and other sensors that output low-level signals that need to turn another device on or off, they are great for use with Arduino and other microcontrollers.

(d). One buzzer: 5-15 volts: The buzzers are of different types, such as mechanical buzzers, electro-mechanical buzzers, and piezoelectric buzzers. The piezoelectric buzzer is generally used with Arduino.

(e). Transistors: BC547 (NPN) is used for a current amplifier, quick switching, and pulse-width modulation (PWM). Therefore, if you need to control the speed of a motor or actuator in some of your projects, you can easily use this transistor to achieve it.

(f). Resistors: 200 ohms A resistor is a passive, two-terminal electrical component that produces electrical resistance as a circuit element. Resistors are used to reduce current flow, adjust signals, and distribute voltages.

(g). AC Motor: An induction motor is an AC electric motor in which the electric current in the rotor is to produce torque produced by electromagnetic induction from the magnetic field of the stator winding.

(h). Pot: 10k.A 10k potentiometer ("pot" or "knob") is an electronic component used to control the flow of electricity through a circuit, much like a faucet regulates the flow of water in your home.

V. CONCLUSION

Water level indicator is one of the most promising applications with the microcontroller implementation. The purpose of our project is to save water by controlling its flow with the flexibility of the technique used in any industry concerned with fluid.

VI. FUTURE SCOPE

The basic need of human beings is water which is a necessity for all humans. But unfortunately, a large amount of water is being wasted by uncontrolled use and due to our negligence. Some other automated water level monitoring systems has introduced. We tried to overcome these problems and implemented an efficient automatic water level monitoring and controlling system. The Main intention of this research journal is to establish a flexible and easily configurable system that can solve water loss problems. In the Upcoming days, a home automation web-based water level monitoring and control system has been designed, through which the system can be controlled from any place via the internet through a mobile phone. Hence this could have a substantial benefit from this research work for the efficient management of water usage.

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