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Automatic Water Dispenser for Any Reservoir

Prof. Jayesh Anavkar[1], *Amey Ogale*[2], *Avinash Gurav*[3], *Omkar Gudekar*[4], *Aniket Gavade*[5]

[1] *Prof. Jayesh Anavkar, Mehanical Engineering Dept & Finolex Academy Of Management & Tech, Ratnagiri, India.*
[2] *Amey Ogale, Mechanical Engineering Dept & Finolex Academy Of Management & Tech, Ratnagiri, India*
[3] *Avinash Gurav, Mechanical Engineering Dept & Finolex Academy Of Management & Tech, Ratnagiri, India*
[4] *Omkar Gudekar, Mechanical Engineering Dept & Finolex Academy Of Management & Tech, Ratnagiri, India*
[5] *Aniket Gavade, Mechanical Engineering Dept & Finolex Academy Of Management & Tech, Ratnagiri, India*

Abstract - *In summer, due to water shortage water tanker have to supply water day and night. Hence there is lack of communication and data entry problems between the owner of water reservoir and water tanker. To evaluate this problem our project will play important role, it will help owner of water reservior to know data of water dispenced from his reservoir, at what time and amount. Owner however can easily access to data he wants and accordingly make bill of payment.*

Key Words: Aurdino, Water Dispenser, Microcontroller, Aurdino UNO, Automatic Dispenser, Reservoir.

1.INTRODUCTION

This project titled Automatic Well Water Dispenser is a modern approach to the conventional well water dispenser that we use in our daily life. In this system we use the Arduino board to control the flow of water using the flow sensor and solenoid valve.

Generally during the summer season or in the water shortage area the water is supplied through water tanker. The water tanker services Run 24/7 daily and the well owner have to keep a close check on their dispensaries. Generally, they have to keep an operator to monitor all these activities but due to high demand of water and workload it become a very tedious job. Our device dispenses water only to the registered customer and monitors and keep the data of the water tanker taking water out of the reservoir.

In this project we are developing a system in order to monitor water dispensing from a well. Our system does not require any human operator. The registered customer is needed to enter the amount of water required and the system dispenses the exact quantity needed, the information regarding the customer dispensing water from well will be recorded and is accessible to the well owner. Only the registered customer can use our system so no malpractices can be performed and hence the well owners can rely on our product without need of any human operator.

1.1 Internet Of Things

The Internet of things (IOT) is the inter-networking of physical devices, vehicles, buildings, and other items embedded with electronics, software, sensors, actuators, and network connectivity which enable these objects to collect and exchange data. The IoT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, virtual power plants, smart homes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure.

2. Literature Review

[1]Implementation of automatic water distribution with RTC using 89S52 microcontroller: The Initial start for automatic water distribution for a city is designed using microcontroller 89S52 [Santosh A. Tamble et al, 2008].Hence supply of water has done separately to the different areas. It removes the manual requirement of man power. It is implemented for three different regions. When the system become ON it ask for the time setting to turn OFF & ON the water supply for particular area. This technique has several disadvantages like water theft, improper distribution which gets overcome using further technology.

[2]Automatic Water distribution system using PIC microcontroller:The above proposed system is also implemented using PIC controller [M.V.N.R. Pavankumar et al, 2014]. The speed of the motor is varied according to this water level. With the use of DTMF the water is supplied automatically to the targeted areas. The visual display is provided as graphical LCD for showing the necessary information and details. This system provided the given below function Mobile controlled water distribution Control of motor speed according to the tank water level Calculation of bill with respect to the water used GSM module is used for status updates on mobile the tank is automatically filled from the water resource with the help of AC pump. The level sensor present inside the tank senses the level of water and accordingly AC pump to fill the tank is turned ON or OFF automatically [Rey, J.R.D et al, 2007].

3. Design And development of Automatic water dispensing System from any Reservoir

3.1 Introduction

This is a project which was designed to apply an Internet of thing (IoT) system with Micro controller and WIFI module as the base. In order to apply the IoT system this project should be a more useful project that will be able to help and maximize the productivity of the user.

3.2 Main Components

1. Arduino Uno Board
2. 16 x 2 LCD Modules
3. Flow Sensor
4. Keypad
5. Relay – 12V
6. Wi-Fi Module

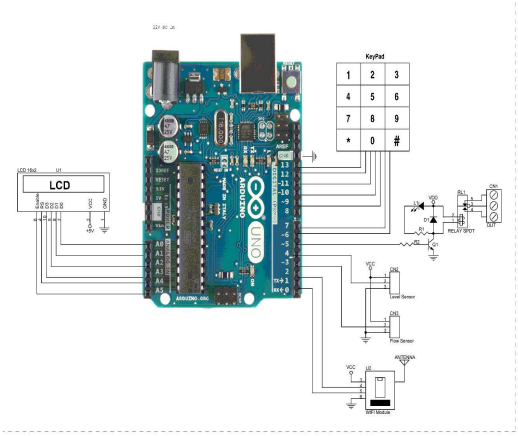

Fig -3.1: Connection overview

3.2.1 Arduino UNO development Board

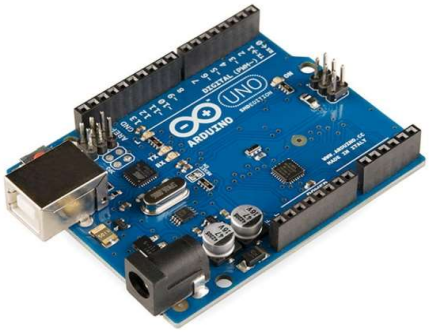

Fig -3.2:Arduino UNO [12]

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.Over the years Arduino has been the brain of thousands of projects, from everyday objects to complex scientific instruments.

There are different Arduino boards which are following:

[1] Arduino UNO (R3)
[2] LilyPad Arduino
[3] Red Board
[4] Arduino Mega (R3)
[5] Arduino Leonardo

For our project we have selected Arduino UNO.

The Arduino UNO R3 is a new board and by comparing with the previous Arduino boards it has some additional features. The Arduino UNO uses the Atmega16U2 which allows faster transfer rate & more memoy.

The board contains 14 digital input pins and output pins in which 6 pins are used as PWM, 6 pins as analog inputs, USB connection, reset button and one power jack. The Arduino UNO board can be attached to computer system buy USB port and also get power supply to board from computer system. The Arduino UNO contains flash memory of size 32 KB that is used to the data in it. The other feature of the Arduino UNO is compatibility with other shield and can be combined with other Arduino products

3.2.2 16 x 2 LCD Module

LCD display is used to display status messages or sensor readings. Then these LCD displays might be the perfect fit. They are extremely common and a fast way to add a readable interface to project.

In our project we have selected 6×2 character LCD display,

LCD display is used to display status messages or sensor readings. Then these LCD displays might be the perfect fit. They are extremely common and a fast way to add a readable interface to project.
A 16×2(1602) character LCDs, that are based on parallel interface LCD controller chip from Hitachi called the HD44780. Because, the Arduino community has already developed a library to handle HD44780 LCDs; so we'll have them interfaced in no time.

The background is dark graan and the characters are displayed in high contrast green light. They are very cheap and easy to use. The contrast adjustment is done with a 20K preset (potentiometer). If your LCD module has backlight LED, use a 22Ω resistance in series with the pin 15 or 16 to limit the current through the LED.

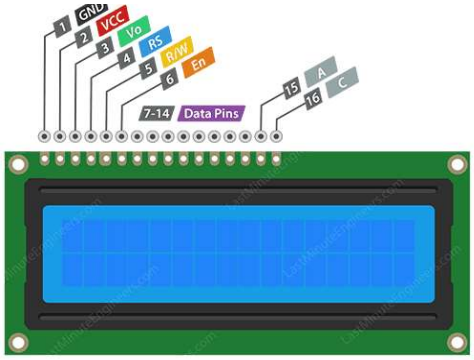

Fig -3.3:16 x 2 LCD Modules [13]

3.2.3 Flow Sensor

Fig -3.4:Flow Sensor [14]

We use a water flow sensor to measure the water flow rate. The water flow rate is the volume of fluid that passes per unit time. People often use water flow sensor for automatic water heater control, DIY coffee machines, water vending machines, etc. There are a variety of flow sensors of different principles, but for makers using Arduino or Raspberry Pi, the most common flow sensor is based on a Hall device. For example, the most classic water flow sensor YF-S402 and YF-S201 rely on Hall sensors.

For our project we have selected **YFS201 Water Flow Sensor**There are a variety of flow sensors of different principles, but for makers using Arduino or Raspberry Pi, the most common flow sensor is based on a Hall device. For example, the most classic water flow sensor YF-S402 and YF-S201 rely on Hall sensors.we are working with samll pump having ½ inch diameter, so according to YFS201 specifications, the maximum current it draws at 5V is 15mA, and the working flow rate is 1 to 30 liters/minute. Thatswhy we selected **YFS201 Water Flow Sensor.**

3.2.4 Matrix Keypad

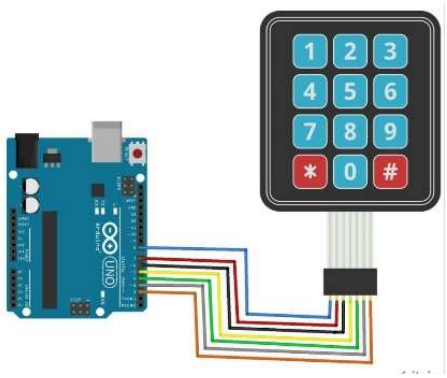

Fig -3.5: Matrix Keypad [15]

Membrane keypads are made of a thin, flexible membrane material. They do come in may sizes 4×3, 4×4, 4×1 etc. Regardless of their size, they all work in the same way.he text edit has been completed, the paper is ready for the template. Duplicate the template file by using the Save As command, and use the naming convention prescribed by your conference for the name of your paper. In this newly created file, highlight all of the contents and import your prepared text file. You are now ready to style your paper. Hence we selected 4×3 keypad which was cheap and best suitable for the Arduino.

3.2.5 SPDT Relay – 12V

The relay takes advantage of the fact that when electricity flows through a coil, it becomes an electromagnet. The electromagnetic coil attracts a steel plate, which is attached to a switch. So the switch's motion (ON and OFF) is controlled by the current flowing to the coil, or not, respectively. A very useful feature of a relay is that it can be used to electrically isolate different parts of a circuit. It will allow a low voltage circuit (e.g. 5VDC) to switch the power in a high voltage circuit (e.g. 230 VAC or more). The relay operates mechanically, so it cannot operate at high speed the selected 12v relay has Maximum AC load current 7A @ 250/125V AC, which is best suitable for 6W waterpump.

Fig -3.6:SPDT Relay – 12V [16]

3.2.6 Wi-Fi Module

The ESP8266 Wi-Fi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much WiFi-ability as a WiFi Shield offers The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community. This perticular wifi module works best with the selected Arduino board.

Fig -3.7: Wi-Fi Module [17]

3.3 Working and Execution

The Reservoir (well) owner will provide a particular passcode to the customer , the the passcode is a 4 digit number containing the information of the owner, this passcode help to sort the information on online web poratal of different customers (tankers) separately. The user first need to give an input of the passcode, Then the program runs and asks for the amount of water and then the user needs to input the amount of the water from the predefined list of water quantity after in putting the quantity the program will ask confirmation of dispensing the water and then after pressing the hash button the program will run and and signals will be given to the relay and the relay will initiate the pump ,The output of the pump is controlled by a relay, allowing any load until 230V AC / 3 Amp. as maximum consumption and if the well or any reservoir runs out of water the water level sensor will generate an error on the screen and the user will be notified . The information regarding people using this system will be updated live on the onine site with user passcode, name, time and date and quantity of water. For example:

>> ID: 1001:200ML:Time=29,Apr,2022 – 12:48,18 PM

>> ID: 1002:500ML:Time=30,Apr,2022 – 05:14,19 AM

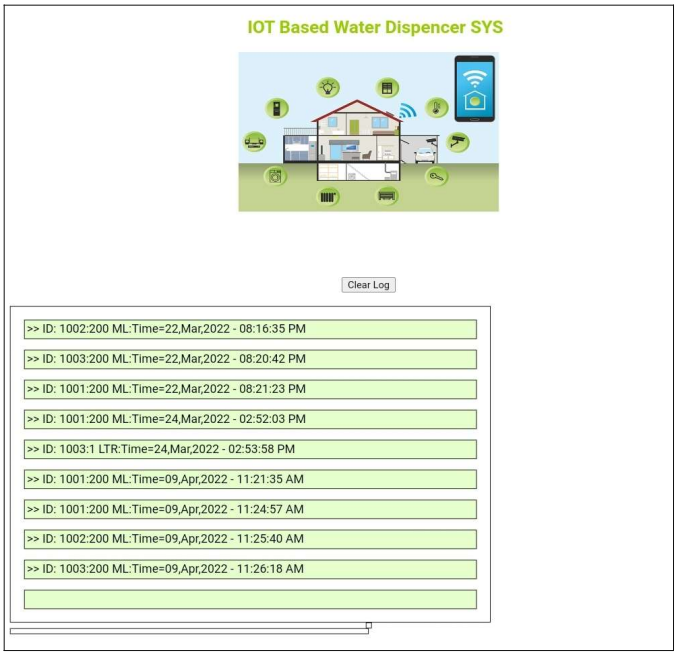

Fig -3.8:Informaion of user on online site

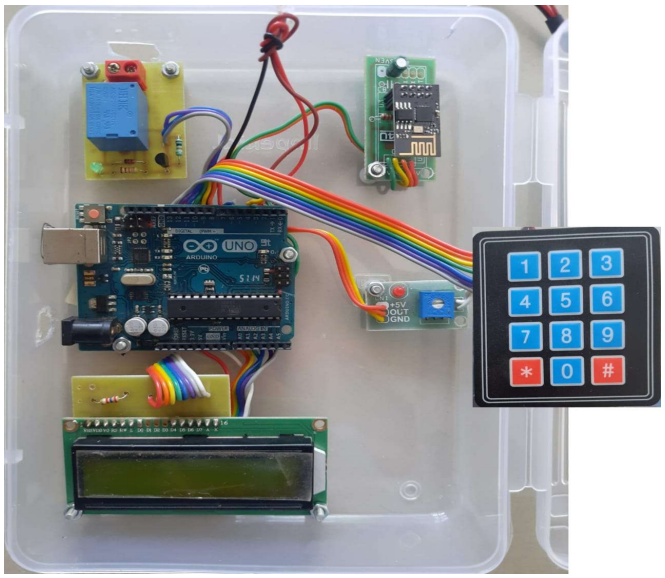

Fig -3.9:Image of the built system setup

4. Result and Discussion

The advancements in science and technology are taking human race to the era of artificial intelligence and thereby reducing the human interaction with machines. The automatic water dispenser is such a machine which is capable of making the human work a lot easier.

This work unveils the design and implementation of an automatic water dispensing system. This system dispences the water quantity required when given the correct input, If the water level decreases below optimum water level then the person is notified with erron on display and no water will be dispened.

If the water is dispenced the data of customer (water tanker) will be uploded on web servor and can be access any time any where by the water reservior owner.

5. Conclusion and Future scope

5.1 Conclusion

Our developed system dispences the exact amount of water to the registered customer(water tanker) and keeps the data of this custmer saved on onine portal, which is readily available for the reservior owner. Any kind of malpractices can be avoided by using our system.

5.2 Future scope

Further enhancements to the device can be made such as adding an application support for the system which can make the user experience much more easy to use. We can include instant payment optition and spread sheet on web site. Other improvement in system like user input water quantity rater than predefined and OTP system insted of passcode can also be implemented

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[14] (https://images.app.goo.gl/g5U88Ev8eVHZaqtV6)

[15](Source:https://images.app.goo.gl/qv5m32JAMaTk7iaX8)

[16] http s://images.app.goo.gl/e4CtJaZAHdkQB35j8

[17] source: (google images)