Water Vending Machine

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ABSTRACT

Now a day's water vending machines are available and operated on only one coin but our aim is to design water vending machine which is operated on different coins. In India there is problem of safe drinking water therefore we are going to provide mineral water. Water has become the most commercial products of the century. This may sound bizarre, but true. The stress on the multiple water resources is a result of a multitude of factors. On the one hand, the rapidly rising population and changing lifestyles have increased the need for fresh water. If opportunity costs were taken into account, it would be clear that in most rural areas, households are paying far more for water supply than the often-normal rates charged in urban areas. Also, if this cost of fetching water which is almost equivalent. To 150 million women days each year, is covered into a loss for the national exchequer, it translates into a whopping 10 billion rupees per year.

Keywords-- I.R Sensor, Timer IC 555, Solonoid Pump, Transformer , Relay, Voltage Regulater , Lcd display

I. INTRODUCTION

Now a day's water vending machines are available and operated on only one coin but our aim is to design water vending machine which is operated on different coins. In India there is problem of safe drinking water therefore we are going to provide mineral water. Water has become the most commercial products of the century. This may sound bizarre, but true . The stress on the multiple water resources is a result of a multitude of factors. On the one hand, the rapidly rising population and changing lifestyles have increased the need for fresh water. If opportunity costs were taken into account, it would be clear that in most rural areas, households are paying far more for water supply than the often - normal rates charged in urban areas. Also, if this cost of fetching water which is almost equivalent. To 150 million women days each year, is covered into a loss for the national exchequer, it translates into a whopping 10 billion rupees per year. In summer we face the problem of drinking water. So is the panic over drinking water supply in the city as well as in villages. The reservoir has just 35.63 feet of water, which is not even half of the total water level We know that the available water resources has initiated towards the end. This problem is quietly related to poor water allocation, inefficient use, and lack of adequate and integrated water management. Since last few decades, several monitoring systems integrated with water level detection have been accepted; therefore water controlling system implementations have potential significance in the society. In this paper vending machine is going to be developed in such a way that water will get served to the customers. As it is coin operated machine, the required quantity of water and respective amount of money is decided that are affordable for common people.Coin acceptor is the mechanism used to insert the coin of Rs.1, Rs.2and Rs.5 into the machine.Coin acceptor will be developed with the help of sensor which works on processing technique which is best suitable than the other techniques.

Existing Systems

In most of the developed countries the vending machines are situated at public places. These machines dispense the snacks, cold drinks, coffee, tea, etc. to the people. Also in developing countries the vending machines are used to provide these things. The invention of coin operated vending machine is done in London. Initially it was used to dispense the post cards. As time passes the vending machines become much popular because of its numerous advantages. Coin operated vending machines are most popular in all the vending machines. The costumer is able to get required quantity of product by inserting coins in vending machine through coin discriminator. The basic idea of proposed system is originated from these existing systems. Majorly we are developing a system in which there are two water tanks to provide water to customer.

The two major water tanks are as follows
1. Primary Tank (Front Tank)
2. Secondary Tank (Back Tank)

Primary tank is only to give the required quantity of water to customers after inserting a coin in machine & secondary tank is connected to the hub tank (Central Tank) through the technique of pipelining. Pipelining is useful to provide the water to the back tank (secondary tank) from the Hub tank (central tank). The Central Tank will be the main source of water to

distribute water to secondary tank. Secondary tank will have two water levels empty & full respectively. These two water levels are controlled with the help of IC555 . Here microcontroller will be interfaced with IC555 maintain the constant water in the secondary tank. (Hong Gu, and Shuang Qiao Jiang Tian, 2006; Bhuvaneswari et al., 2013). The GSM Module will be able to control the operation of water pump which is near to central tank. Thus the water pump present at hub tank will be able to provide continuous water supply to the secondary tank.

II.   LITERATURE REVIEW

1). Micro Controller

An Arduino board consists of an Atmel 8-bit, 16-bit and 32-bit AVR microcontroller with complementary components that facilitate programming and incorporation into other circuits.

Most boards include a 5 volt linear regulator and a 16 MHz crystal oscillator (or ceramic resonator in some variants), although some designs such as the Lily Pad run at 8 MHz and dispense with the onboard voltage regulator due to specific form-factor restrictions

Fig 1: Main controller

A) Coin acceptar module:

When coin is inserted into the machine, it will get detected, after that machine   will be switched on automatically and it will give Xerox of the page which is kept inside the machine. In this type of machine one rupees coin is used

B) Coin rejection: Coin rejecter separates coins according to their size, weight, metal hardness and magnetic properties. When rejecter is adjusted for other coin, the result is not necessarily perfect. Too small diameter coins drop through the machine and are rejected. Too big ones do not get into the cradle because of size limiter. So the coin having right size will only move forward.

2). Solonoid Valve

This is simple on\off type 9V dc supply valve.This type of valve is used in motors. This module consists of interface between vending machine and water output valve with the help of Arduino microcontroller and its programming by using different sensors and pulse signals.

Fig 2: Soloniod valve

3).Coin aceeptor

1st displays massage on LCD as "Insert Coin. User inserts a coin in machine. User inserts a coin in coin box. It passes through the path where sensors are situated. If coin is accepted.passes signal to valve If coin is rejected then exist coin from machine.
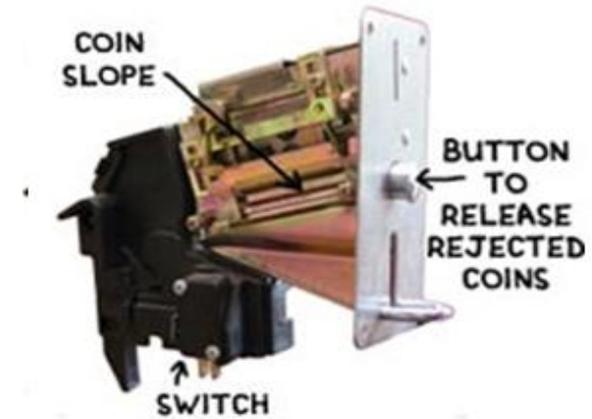

Fig 3: Coin sensor

4).LCD

A liquid-crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements
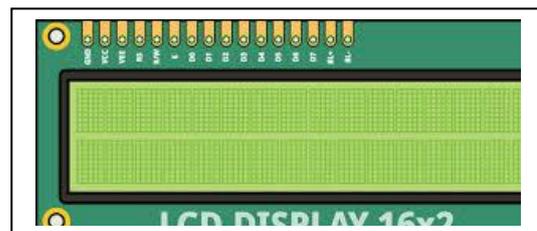

Fig 4: LCD display

III.   DESIGN AND IMPLEMENTATION

In order to overcome the difficulties in the existing method and to provide the cost effective and user friendly system for water vending machine, the following design is proposed .Fig.1 shows that this project mainly consist on five parts namely ,Microcontroller, Solonoid Valve, L.C.D, Power supply.
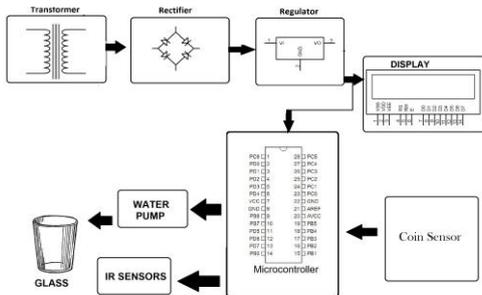

Fig 5: Block Diagram of Water vending machine

1. HARDWARE DESCRIPTION:
A).P.C.B Design

To create a PCB Design you need to draw holes, pads and wires for your circuit. Then you send this drawing to you etch it yourself.Before you start drawing wires and stuff, you need to know what circuit you want to build. So you need to find or design schematics for your circuit. And you need a PCB design software. Then you are ready to begin the process.Now it's time to draw the board. You need to transfer your schematic diagram into a drawing of your printed circuit board.Drawing PCB's is artwork. Take your time, and make sure it looks good. Follow the design guidelines for drawing circuit boards.
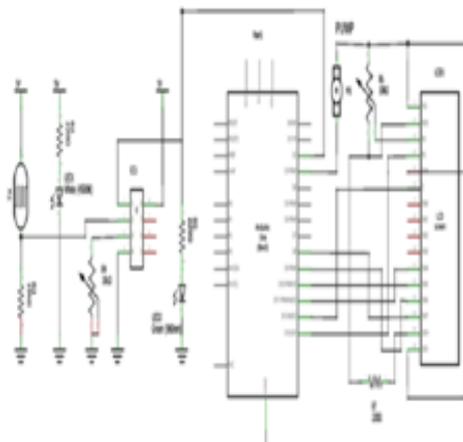

Fig 6: circuit diagram

B).Transformer A Transformer is an electrical device that takes electricity of one voltage and changes it into another voltage. In AC circuits, AC voltage, current and waveform can be transformed with the help of

Transformers. Transformer plays an important role in electronic equipment. AC and DC voltage in Power supply equipment are almost achieved by transformer's transformation and commutation. Figure 1 shows the Transformer. Basically, a Transformer changes electricity from high to low voltage or low to high voltage using two properties of electricity. In an electric circuit, there is magnetism around it. Second, whenever a magnetic field changes (by moving or by changing strength) a voltage is made.

C).Full Wave Rectifier

In a full wave rectifier circuit two diodes are now used, one for each half of the cycle. A Multiple Winding Transformer is used whose secondary winding is split equally into two halves with a common centre tapped connection, (C). This configuration results in each diode conducting in turn when its anode terminal is positive with respect to the transformer centre point C producing an output during both half-cycles, twice that for the half wave rectifier so it is 100% efficient as shown below.

D).Voltage Regulator

A simple voltage/current regulator can be made from a resistor in series with a diode(or series of diodes). Due to the logarithmic shape of diode V-I curves, the voltage across the diode changes only slightly due to changes in current drawn or changes in the input. When precise voltage control and efficiency are not important, this design may be fine.

E).Timer I.C

The **555 timer IC** is an integrated circui (chip) used in a variety of timer, pulse generation, and oscillator applications. The 555 can be used to provide time delays, as an oscillator, and as a flip-flop element.Derivatives provide two or four timing circuits in one package.
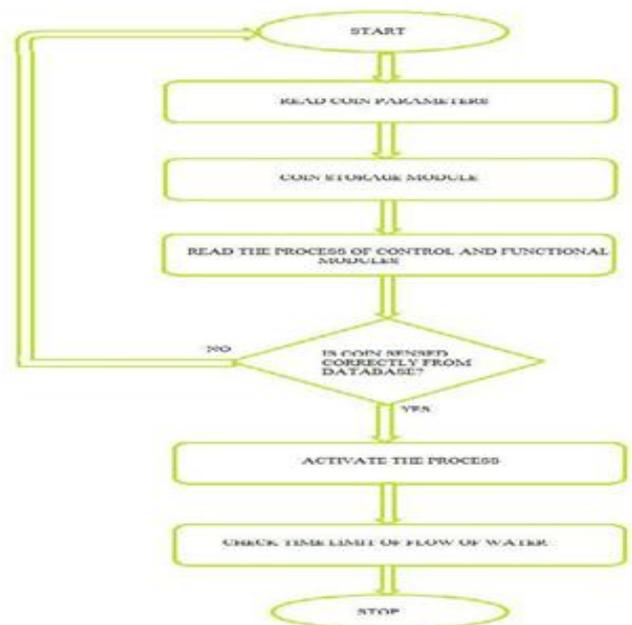
FLOW CHART

Fig-7: Flow chart of Water Vending Machine

IV.   SIMULATION AND RESULTS

In our project we conclude that acceptance ratio is almost 100% and vending machine works on arduino controller .To develop low cost water vending machine. To avoid wastage of water.

Table-1 Result of water vending machine

Activity(coin)	No. Of Readings	TestResults
1 Rupees	10	90
10 Rupees	10	96

ADVANTAGES
- Low design time.
- Low production cost.
- This system is applicable for both the indoor and outdoor environment.
- Conservation of space
- Safe
- Cost Effective
- Clean Space
- Low power consumption.

V.   CONCLUSION AND FUTURE SCOPE

A).CONCLUSION

Implementation of Coin-Operated Automatic Drinking Water Machine is the step towards the future technology and it is a step to enter in eco-friendly world. This machine is easy to use and can be easily accessed by the ordinary person. This proposed system can be implemented almost everywhere even in the remote sensing areas and the places where there is water crises. This system is most suitable in trains because it takes less space and in each bogie of train we can place it easily. It will also help in reducing the diseases which are being spread because of using contaminated or unhygienic water by people.

B).FUTURE SCOPE

Various Indian as well as multinational companies such as Sarvajal, DJB-Tata Power, Amrutdhara Water Services Pvt. Ltd etc. are involved in this business. They currently provide drinking water to people in the range of 15 paisa to 1 rupee per liter on a pilot basis. we will replace the wired network installed in the machine by a wireless network to remove the complex indoor wiring and provide the easy installation of sensor .we will install more sensors such as humidity, temperature, dust, and smell.

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