# Water Dispenser System (Water ATM)

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***Abstract :*** The development of the new technologies in the field of electronics has brought incredible changes in the day to day life of every human being. They have entered the fields like industry, medicine, telecommunication and also home automation. Here we are building fully automated coin based water dispenser system using microcontroller and sensor. The system is capable of fully automated water/cola dispensing using motors and sensors. The system also senses if glass is placed at the counter to avoid water spoilage if there is no glass placed at the counter panel. The system uses IR sensors to detect presence of glass and then the sensors send a signal to the microcontroller. The microcontroller now processes the information sent by the sensors to determine if glass is present. The system also has a coin detector that is used to sense particular coins and send information to microcontroller about valid coins. On detecting a valid coin the system now sends a signal to the controller who checks if glass is present and then it starts the motor to pour water in glass using motor as long the glass is present. If glass is removed during the process, system stops the water supply until glass is encountered. Thus we here put forward a smart water dispenser system with water saving feature.

***IndexTerms*** **– CoinAcceptor,flow sensor,Level sensor,Bluetooth Module,Solenoid valve,IR Sensor.**

## I. INTRODUCTION

Here we put forward a fully automated coin based water dispenser system using microcontroller and sensor. The system is capable of fully automated water/cola dispensing using motors and sensors. The system also senses if glass is placed at the counter to avoid water spoilage if there is no glass placed at the counter panel. The system uses IR sensors to detect presence of glass and then the sensors send a signal to the microcontroller. The microcontroller now processes the information sent by the sensors to determine if glass is present. The system also has a coin detector that is used to sense particular coins and send information to microcontroller about valid coins. On detecting a valid coin the system now sends a signal to the controller who checks if glass is present and then it starts the motor to pour water in glass using motor as long the glass is present. If glass is removed during the process, system stops the water supply until glass is encountered. Thus we here put forward a smart water dispenser system with water saving feature. A water ATM, as the name implies, is a sort of a water vending machine similar to bank ATMs except that in a water ATM, money goes in to the machine in return for water. These machines, which run on a cash as well as a prepaid card or smart card system are built, owned and operated by private companies that have rights over public resources such as land and water. It is also not clear how much of groundwater a company can draw in a day. The controller also features built in RFID reader/writer, Real Time Clock, Pulse type Flow Sensor interface, control output for Solenoid Valve. The system is capable of fully automated water/cola dispensing using motors and sensors. The system also senses if glass is placed at the counter to avoid water spoilage if there is no glass placed at the counter panel. The system uses IR sensors to detect presence of glass and then the sensors send a signal to the microcontroller.

## II. LAYOUT OF PAPER

The paper is divided into following parts viz, Introduction, Layout of paper, Existing system, Proposed system, Architecture Model, Algorithms and Technologies, Future Work, Acknowledgement, Conclusion and References

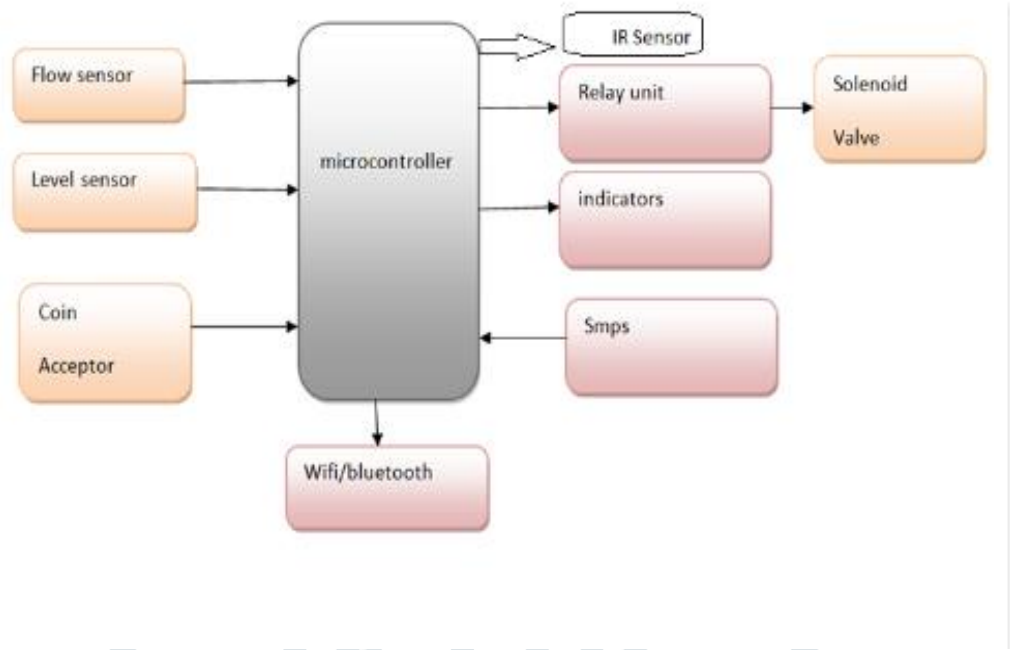
## III. EXISTING SYSTEM

The existing system comprises manually working of the water vending machine so as to dispense water. The current water vending machines needs manpower so as to manipulate the vending machine. 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.

## IV .PROPOSED SYSTEM

The system comprises Bluetooth Module for communication with the vending machine. The objective is to design and to implement a cheap and open source automation device that is capable of controlling and automating most of the appliance through an easy Android App interface to run and maintain the automation

**V. Architectural Diagram**




1. The system uses IR sensors to detect presence of glass and then the sensors send a signal to the microcontroller. The microcontroller now processes the information sent by the sensors to determine if glass is present.
2. The system is capable of fully automated water/cola dispensing using motors and sensors.
3. The Proton Automatic Dispenser delivers water to an individual by his placing the RFID card (Smart Card) on the Proton ATM Controller on the dispenser panel.
4. The system also has a coin detector that is used to sense particular coins and send information to microcontroller about valid coins. On detecting a valid coin the system now sends a signal to the controller who checks if glass is present and then it starts the motor to pour water in glass using motor as long the glass is present.
5. If glass is removed during the process, system stops the water supply until glass is encountered. Thus we here put forward a smart water dispenser system with water saving feature.

**VI. Mathematical Model**

Calculations of 5V and 3.3V

Rectifier: A single silicon rectifier diode in forward conduction develops a voltage of around 0.7V (but can be up to 2V). In general we allow about 2V -3V drop for the bridge rectifier configuration.
The voltage at different points in the circuit, based on a 240:12V transformer. Here you can see the output from the transformer. The output is a sine wave centered around 0 volts. The peak voltage Vp is 1.414 times the RMS output - the transformers quoted value.
Thus Bridge rectifier output is
Vdc= ( Vac X 1.414)-1.4.
Here,
Vac=12V
Therefore Vdc= (12 * 1.414)-1.4
=16.968-1.4
=15.568≈15V
Smoothing capacitor
If we assume that your step down transformer reduces the amplitude of 60 Hz sine wave from 220 V to 15 V, and if we assume that your 5 V power supply will need to output at most I_max = 1 A current, then we can start making some calculations. Smoothing capacitor, which will place after the bridge rectifier, will have V_max = 15 V on it, which is the amplitude of our sine wave.

C >= (Imax*Tdischarge)/(Vbeforedischarge -Vafterdischarge)
Using the values; Vbeforedischarge = Vmax = 15 V.
Vafterdischarge = Vmin = 7 V.
Imax = 1 A
Tdischarge = 8.3 ms,

We can calculate that:
Cmin = (1 A)*(8.3 ms)/ (15 V - 7 V) = 1 mF=1000uF.

Calculation of 3.3 V using LM317

The output voltage is selected using two resistors. Normally R1 is chosen to be around 220Ω or 240Ω. The formula for calculating the value of R2 is

Vout = Vref*(1+ (R2/R1))

Or to put it another way

R2=R1 ((V/1.25)-1)

Setting R2 to zero (ground the adjusting pin) will cause the output voltage to drop to 1.25V. R2 may be replaced by a pot to give an adjustable output voltage range.

Here Vout=3.3V, Vref=1.25 and Assuming R1=330E
Then R2=330((3.3/1.25)-1)
=330(1.64)
=541E.
So the R2 is replaced with POT to adjust the output voltage.

**VII. Technologies and Algorithm used**

This method relates to product-dispensing mechanisms for coin-operated vending machines. More particularly, this process relates to coin-operated vending machines that discharge vended products from product-holding and transporting spiral coils, and that allow changes to be made in the number of coins required to activate the machines. Specifically, this method relates to coin-operated vending machines, the loops of whose product holding and transporting coils are spaced further apart at the product-dispensing front end of the coils, than at their back end, allowing product to be transported to the front end of the machine where it can drop from the coils into a chute accessible to purchasers of the product. In addition, the coin mechanism that allows the coils to be rotated when a predetermined number of coins have been inserted therein, and that includes inactivating means to prevent rotation of the coils in the absence of such coins, is provided with means to selectively disable the inactivating means, thereby allowing changes to be made in the number of coins required to activate the machine.

**VII. Acknowledgement**

We would like to take this opportunity to thank my internal guide Prof. Triveni Dhamale for giving me all the help and guidance we needed. We are really grateful to them for their kind support. Their valuable suggestions were very helpful. I am also grateful to Dr. Rahul Mapare, Head of Electronics and Telecommunication Engineering Department, PCCOER for his indispensable support, suggestions. In the end our special thanks to Principal Dr. H.U. Tiwari for providing various resources such as laboratory with all needed software platforms, continuous Internet Connection, for our project.

**VIII. Future work**

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**.**

**IX. Conclusion** This project introduces a water dispensing machine which operates on coin. Various devices like a regulated power supply, IR sensor, coin sensor water pump etc., are embodied to design an efficient dispensing system. The system can be programmed for different types of coin (also for more than one coin with the help of multi coin acceptor) and for certain duration with the help of algorithm and programming in Arduino. The dispenser can be installed on roads (highways), railway stations and other public places to provide pure water to people at low cost.

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