

Water ATM with Bottle Dispenser

Bhusani Navyasri¹, Bodla Unnathsai², Kunde Tejasri³, Mallipeddi sindhupriya⁴, Buddula Jamuna⁵

^{1,2,3,4}Student, Department of Electronics and communication Engineering, Teegala Krishna Reddy Engineering College.

⁵Assistant Professor, Department of Electronics and Communication Engineering, Teegala Krishna Reddy Engineering College.

Abstract— Water is a vital component of existence and a major force behind sustainable growth and development. The process of effectively planning, developing, and allocating water resources is known as water administration. Water resources management, flood defense, irrigation, industrial water management, and wastewater or sewage management are all included. As a result of population development and rising demand, water use has significantly increased in modern society while supply has decreased. The implementation of Drinking Water ATM to effectively control water resources is the main topic of this paper. In this essay, a coin-operated water dispenser and RFID card-based water dispenser is described. When the correct penny or RFID card is detected, the water dispenser releases water. Coins of 1, 2, and 5 Rupees or RFID Cards (Smart Cards) are required to activate water ATM machines.

INDEX TERMS: At mega 328 microcontroller, Coin sensor, RFID card, Water ATM

I. INTRODUCTION

For both the economy and for human existence, water is a crucial resource. Solving and managing the water shortage is currently one of the biggest obstacles. Only 0.08% of the groundwater on Earth is currently being used by humans for a variety of purposes. The need for high-quality water is growing every day as water supplies are being depleted.

According to the International Water Management Institute, most of Central and South America, Asia, and all of Africa and the Middle East will either run out of water or be unable to purchase it by 2025. Water was readily accessible in the past and provided for all of the needs of the populace. It was primarily used for meal preparation.

Since the rivers, it has become increasingly rare. Since the basins are closed and no one is able to collect water, it is now scarce. Changes in water management can be brought about by implementing new laws, such

as those governing agricultural water access and managing rainwater. The discipline of managing water resources will need to keep evolving to address both current and foreseeable problems with water distribution. Since groundwater is the primary resource, relying solely on it could lead to overexploitation. Today's problems require innovative approaches to water administration, so one must develop these. The "Coin and RFID tag Based Water Dispenser" is comfortable and works well for its users in the modern age thanks to technological advancements.

II. PROJECT OBJECTIVES

The main objectives of our project are:

[1] Providing access to clean and safe drinking water: The primary objective of the water dispensing with coin and RFID is to provide access with clean and safe drinking water in a convenient and secure manner.

[2] Promoting water conservation:

A coin and RFID-based water dispensing project can aid in promoting water conservation and cutting down on waste by using a system that records and measures water usage.

[3] Reducing maintenance and operating system: compared to traditional water dispensing system, coin and RFID (Radio Frequency Identification) based systems can reduce maintenance and operating costs by minimizing the need for manual intervention and reducing the risk of vandalism.

[4] Enhancing security:

By eliminating the need for cash transactions, a coin and RFID based water dispensing project can enhance security and reduce the risk of theft and fraud.

[5] Providing user accountability: User accountability is provided by the use of RFID cards and coin payments, which improve water usage monitoring.

This can assist in preventing misuse and ensuring that only authorized users are using the system.

III.METHODOLGY

It takes a methodical strategy to design a coin and RFID-based water dispenser system for an embedded system. To create such a framework, use the following methodology:

1. Define the System Requirements: Defining the system requirements is the first stage. This includes defining the target market, the water dispenser's capacity, the kinds of coins that will be taken, and the specifications for the RFID reader.

2. Select the Hardware: After the system requirements have been established, selecting the hardware is the next stage. This involves picking the water pump, solenoid valve, RFID reader, currency acceptor, microcontroller, and more.

3. Create the Software: After choosing the physical components, the software must be created. The software will include the microcontroller firmware, the RFID reader software, and the coin recognition software.

4. System Prototyping: After the components and software have been created, the system needs to be prototyped. The hardware must be put together, and the programme must be tested.

5. Test and debug: Following initial development, the system needs to be put to the test and fixed. This entails putting the system through a variety of tests and fixing any flaws that are found.

6. System Refinement: The system needs to be tweaked to work better in light of the testing results. This might entail changing the hardware or programme parts.

7. Finalize the Design: After the system has been improved and put to the test, the design must be completed. The design documentation, manufacturing specs, and user manual creation are all included in this.

IV.MODELLING ANALYSIS

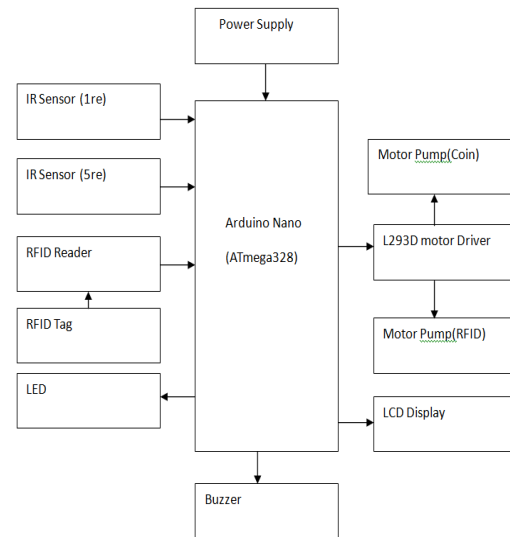


Fig: Hardware Block diagram of Project

Identifying System Inputs and Outputs:

Once the system block has been developed, the next step is to identify system inputs and outputs, in this case the inputs include any type of coins and Radio Frequency Identification tag (RFID tag) and the output would be dispensing of water.

Working Process:

The detection and water dispensing concept underlies coin-operated water dispenser operation. The four interface components—an IR sensor, LCD, water pump, and coin sensor—are each individually coded in the Arduino IDE. The programme is run sequentially. Four different colored lines make up the coin sensor: white, black, red, and grey. Red and black wire are linked to Vcc and Ground, respectively, while a white colored wire is attached to pin number 2 on the Arduino board. As a single coin acceptor, the coin sensor is set up to take just one coin. The programme jumps to checking for the existence of an object when the coin is correctly inserted. (Here it is a glass). A separate driver circuit for the IR sensor has an output linked to an LED. The LED begins to glow when the object is positioned in its path, indicating that the output is positive at this point (glass is present). A water pump receives a signal and begins to move water.

When the RFID tag is inserted in the system the working process typically involved following steps:

1.RFID Reader Module Detection: When an RFID card is inserted into the embedded device, it is recognized by an RFID reader module.

2.Card authentication: It involves reading the RFID card's distinctive identification number and comparing it to a list of authorized cards that is kept in the system's memory. The system advances to the following stage if the card is authorized. The system rejects the card and shows an error message if the card is not authorized.

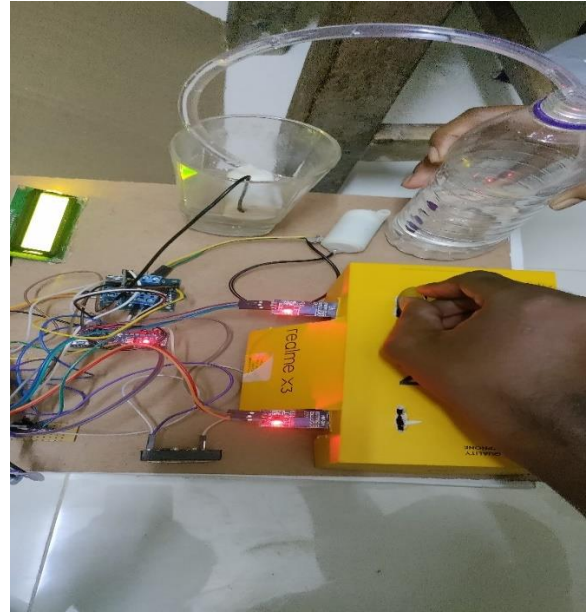
3.Water Dispensing: If the card is approved, the system initiates the water dispensing mechanism and provides the user with the requested quantity of water. Using a flow sensor, the system can also determine how much water is being dispensed and deduct that quantity from the user's consumption.

4.Updating Users Account Balance: Based on the volume of water dispensed, the mechanism updates the user's account balance. The account balance is kept in the system's memory, where the administrator can access it to keep track of water consumption.

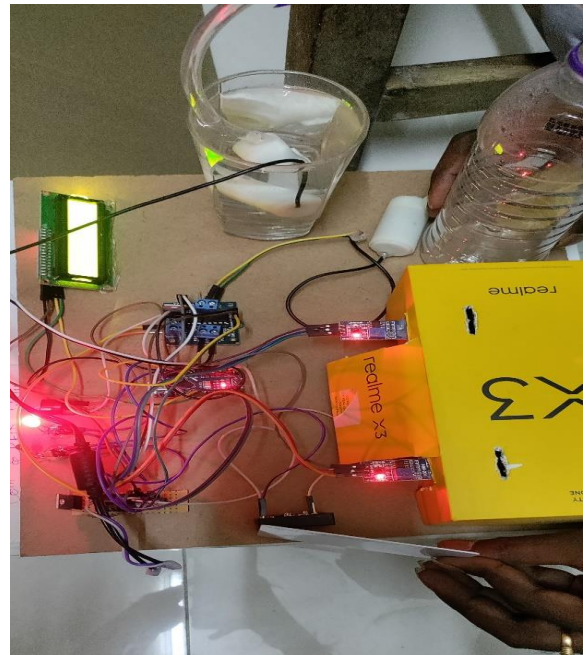
5.Displaying Users Account value: The device uses an LCD screen or a string of LEDs to show the user's account value. By doing so, users can monitor their account amount and prevent running out of credit.

V.RESULT & DISCUSSION

This project has proposed the idea of automated water dispensing that can support efficient and secure Provision of water in a cost-effective manner and convenient, while using sustainable water resources. Automated water distribution services are offered in a safe and practical way using coin- and RFID-based water dispensers. These containers are designed to replace manual water dispensing techniques, which can be labour-intensive and ineffective. Instead, users can quickly and easily access water using coins or RFID tags, making the system especially attractive to those who are constantly on the move, like students, workers, and travellers. By allowing accurate measurement and monitoring of water usage, the system is also used to encourage effective water management. This can help to reduce waste and ensure a more sustainable use of water resources.



Label(a): Water dispensing when the coins are inserted.



Label(b): When the RFID card is inserted the system dispense water.

NUMERICAL REPRESENTATION OF PROJECT

COMPONENT	INPUT	OUTPUT
IR sensor-1	1 Rupee	The system starts dispensing water into bottle up to 10 secs.
IR Sensor-2	5 Rupee	The system will stats dispensing water into bottle up to 30secs.

RFID Tag	RFID Card	The system will also starts dispensing water into bottle up to 30 secs.
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VI. CONCLUSION

This research paper introduces a water dispenser that uses both RFID and coins to function. To create an effective dispensing system, a number of devices, including a coin sensor water pump and a regulated power source, are incorporated. The system can be configured to accept various coin kinds. To provide people with water at a low cost, the dispenser can be placed on roads (highways), railroad stations, and other public locations.

VII. ACKNOWLEDGEMENT

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