WATER ATM (DISPENSER)

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Abstract : Water scarcity is one of the major problems which many cities are facing across the world. We designed this project of "WATER ATM (DISPENSER)" to eliminate this problem of water distribution. In this proposed system we are providing small amount of drinking water at very affordable cost which can reduce the wastage of water. In this system, when coin is inserted, it is recognized by the system whether it is 1 or 2 rupee coin and then accordingly predefined amount of water will dispense. Similarly when RFID card is detected, predefined amount of water will dispense. It also provides rationing of water. So wastage of water can be reduced. By using the Water ATM (DISPENSER), people will get the drinking water at low cost and at any time.

Index Terms – **Automatic water dispense, Image Processing, Coin Recognition, RFID Detection.**

I. INTRODUCTION

In today's world, water has become commercial product. If anyone wants only one glass of water, he/she has to purchase a 1 liter water bottle. After the use of required water, remaining water is of no use or it is waste. By considering this situation, water dispensers came in market which were providing drinking water but operated manually by means of switches which takes long time to process and these are not automated. Automation is the use of control system and information technologies to reduce the need for human work in the production of goods and services. So Automation is necessary for better handling of user which does not need any manual work. Taking in account these all factors, we have designed a "Water ATM Dispenser" system, which provides drinking water but operates automatically. This system also provides payment methodology such as coin as well as card, where nominal cost is applied for water access so that people will use water with sense and do not waste it.
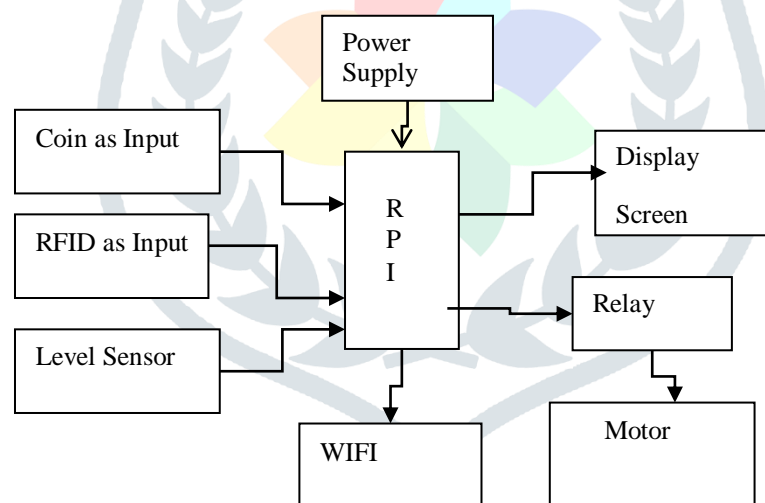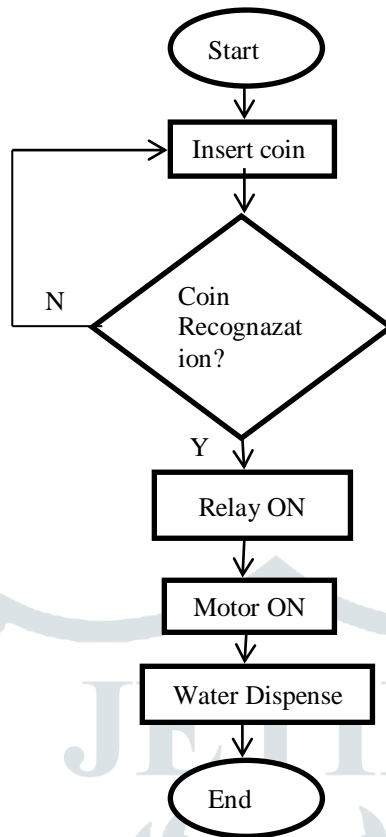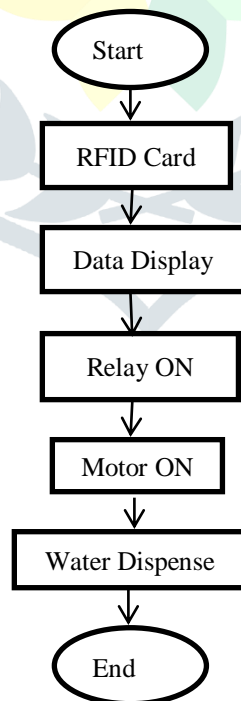
II. PROPOSED SYSTEM

figure 1.proposed system block diagram

Proposed system works for both coin as well as RFID card. System includes coin detection when coin is inserted and after the recognition of coin whether it is 1 or 2 rupee coin, relay gets ON, motor gets ON and predefined amount of water starts dispensing. This all process is done through Rpi. System also detects the RFID card. After detection of RFID card, data stored on that card is displayed on the screen, relay gets ON, motor gets ON and predefined amount of water starts dispensing. Parallely data monitoring is done through Rpi using Wi-Fi and it is updated every time to the owner of the system so that the owner can know how many coins are inserted and how much water is dispensed by the system.. Level sensor is also used to sense the water level of the tank.

III. ALGORITHM (USING COIN)

```
          ┌─────────┐
          │  Start  │
          └─────────┘
               │
      ┌──────────────────┐
  ───▶│   Insert coin    │
  │   └──────────────────┘
  │            │
  │         ╱──────╲
  │        ╱  Coin  ╲
  N ──────╱Recognazat╲
          ╲   ion?   ╱
           ╲────────╱
               │ Y
       ┌──────────────┐
       │   Relay ON   │
       └──────────────┘
               │
       ┌──────────────┐
       │   Motor ON   │
       └──────────────┘
               │
       ┌──────────────┐
       │Water Dispense│
       └──────────────┘
               │
          ┌─────────┐
          │   End   │
          └─────────┘
```

IV. ALGORITHM (USING RFID)

```
          ┌─────────┐
          │  Start  │
          └─────────┘
               │
       ┌──────────────┐
       │  RFID Card   │
       └──────────────┘
               │
       ┌──────────────┐
       │ Data Display │
       └──────────────┘
               │
       ┌──────────────┐
       │   Relay ON   │
       └──────────────┘
               │
       ┌──────────────┐
       │   Motor ON   │
       └──────────────┘
               │
       ┌──────────────┐
       │Water Dispense│
       └──────────────┘
               │
          ┌─────────┐
          │   End   │
          └─────────┘
```

V. RASBERRY PI3 B

The Raspberry Pi is a credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python. In this proposed system, Rpi is used to process the task of coin recognition, RFID detection and accordingly dispensing predefined amount of water. Data Monitoring is also done by using inbuilt Wi-Fi in RPi.

VI. RFID CARD

Radio-frequency identification (RFID) uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically stored information .Unlike a barcode, the tag need not be within the line of sight of the reader. RFID is one method of automatic identification and data capture (AIDC).In this proposed system, RFID provides water rationing by dispensing predefined amount of water.

VII. COIN DETECTION TECHNIQUE

For coin detection, a desired threshold value is set as a standard and then a grey image is converted into values of 0 and 1, which is called as "binarization processing" where black is 0 and white is 1. By using this process it is possible to focus on only the object of inspection, and conduct various analyses. The method of analyzing an image which has undergone binarization processing is called "Blob Analysis". Blob analysis is image processing's most basic method for analyzing the shape features of an object, such as the presence, area, length of coin image.

1. Presence or absence of object: It can be determined whether or not objects for inspection exist in the image.
2. Size: The area of objects for inspection in the image can be measured (unit = pixels).
3. Measuring: The length, area, and so on of objects for inspection in the image can be measured (unit = pixels).
4. Inspection: Objects for inspection in the image can be treated as defects and inspections can be performed on them using the shape features above, etc..

VIII. ADVANTAGES

1. Save Water: waste of water will be less.
2. Low cost system: we can easily implement anywhere.
3. Reliable.
4. User friendly.
5. Provide rationing.

IX. LIMITATIONS

1. Dummy coin can be detected as original coin.
2. 1 and 5 rupee coin can be detected as the same.

X. RESULT & DISCUSSION

table 1.input parameters accuracy

Sr.No.	Parameters	Accuracy
1.	1Rs coin	75%
2.	2Rs coin	80%
3.	RFID	99%

Table 1 shows input parameters and their accuracy. 1 rupees coin has 75% accuracy. 2 rupees coin has 80% accuracy. Here 1 and 5 rupee coin can be detected as the 1 rupee coin because of the diameter of the coin, which is approximately the same. RFID accuracy is high i.e. 99%. RFID is detected accurately with its data displayed on the screen.

Table 2.use cases and its response type

Sr.No.	Use Cases Parameters	Positive Response	Negative Response
1.	Paper or dummy coin detection	✓	
2.	Glass sensing		✓

Table 2 shows use cases parameters and their response type whether parameter gives either positive or negative response to the proposed system. Paper or dummy coin can be easily detected as original coin by the system. So this parameter gives positive response to the system. Glass sensing is not done by the proposed system. So without taking into account whether there is glass present or not system dispense water. Hence this parameter gives negative response to the system.

XI. CONCLUSION

The system can perform the task of water dispensing , which can be used in rural areas or public places. This provide us knowledge of use of water, importance of water, avoidance of plastic pollution, avoidance of human power , avoidance of water wastage, providing water at low cost and most important is automation that need to be considered while designing a product based on water dispenser .

XII. ACKNOWLEDGEMENT

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