

DESIGN OF NEXT GENERATION WATER ATM FOR DROUGHT AREAS

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Keywords:

Water ATM, RFID, ESP32, IoT, Water Management.

Introduction:

Water scarcity is a growing challenge in drought-affected regions, making controlled and equitable water distribution a necessity. To address this issue, the proposed project, "Design of Next-Generation Water ATM for Drought Areas," presents an automated and smart dispensing system that ensures regulated water access while maintaining transparency and user accountability. This system utilizes RFID technology for user authentication and prepaid balance control, ensuring that only authorized users can access water based on their available balance.

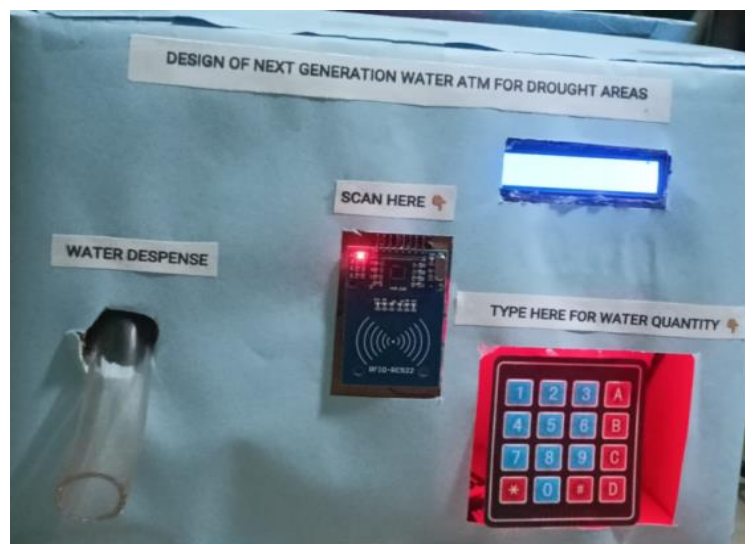


Figure 1: Next Generation Water ATM For Drought Areas.

Objectives:

1. Develop automated Water ATM system
2. Implement RFID authentication
3. Enable prepaid balance management
4. Ensure accurate water dispensing
5. Provide wireless recharge via ESP32
6. Reduce water wastage

Methodology:

The project uses RFID authentication, keypad input, and a flow sensor to dispense water based on the user's prepaid balance. The ESP32 enables wireless balance updates and sends transaction notifications, while the relay and pump control accurate water delivery.

Result and Conclusion:

In conclusion, the proposed Next-Generation Water ATM provides an efficient, secure, and automated solution for controlled water distribution in drought-affected regions. By integrating RFID authentication, prepaid balance management, accurate dispensing using sensors, and wireless communication through ESP32, the system ensures transparency, reduces wastage, and promotes responsible water usage. This smart approach supports sustainable resource management and offers a scalable model that can be implemented in rural communities, public facilities, and emergency relief environments.

Project Outcome & Learnings

- Functional Water ATM prototype
- RFID-based user authentication
- Accurate water dispensing
- Prepaid balance system
- Learned ESP32 & IoT integration
- Hands-on sensor interfacing
- Ensures fair water distribution
- Reduces water wastage
- Useful for smart cities & rural areas
- Future: App, cloud, solar, AI.

Working Model vs. Simulation / Study

- Working Model: Hardware prototype developed using ESP32, RFID, pump, and flow sensor
- Demonstrates real-time water dispensing and authentication
- Provides practical validation of system performance

Simulation / Study: Design and logic tested using theoretical analysis and coding

- Flow control and system behavior verified through program testing
- **Comparison:**
- **Simulation** : Concept validation
- **Working Model** : Real-time implementation

Conclusion: Working model confirms feasibility and effectiveness of the proposed system.

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Future Scope:

The future scope of this project includes:

1. Integration with solar power.
2. Mobile app control.
3. Cloud monitoring for scalability.