

H2OConnect”- An IoT enabled Smart Card and QR Code based Secure Water ATM

1. Major Area:

The major area of this project is the creation and implementation of the "Smart Water ATM" solution, aimed at tackling the global water crisis by transforming the way people access clean and safe drinking water. The project leverages advanced technologies and secure distribution methods to enhance water accessibility and address fundamental challenges related to water quality and distribution.

2. Problem statement:

How might we develop a solution to combat global water depletion by creating an efficient water distribution network? The solution involves implementing a cloud-based dashboard for analytics, improving service, enhancing repair efficiency, reducing leakage, enabling GIS mapping, and overcoming deployment constraints for accurate water supply line assessment.

3. Total Cost – ₹50,000/-

4. College Code & College Name

9131 – Velammal College of Engineering and Technology

5. Guide Name, Designation, Mobile No. & Email id

a. Guide Name: Dr.G. Vinoth Chakkaravarthy

b. Designation: Associate professor, Computer Science and Engineering

c. Mobile No: 9994448831

d. Email id: gvc@vcet.ac.in

6. Student Team details:

Sl.No.	Student Reg. No.	Name of the Student	Branch	Mobile No.	email id
1	913120104073	Reshma S	CSE	6369589164	sreshma2112@gmail.com
2	913120104038	Janani R	CSE	9080807107	jananirajesh2702@gmail.com
3	913120104051	Mathi Alagan T	CSE	6385822078	mathialagant2003@gmail.com
4	913120104040	Jayaraman P	CSE	9345468582	jeyaram298@gmail.com

7. Project Summary:

This project is dedicated to addressing the pressing global challenge of water scarcity, with a staggering 700 million people potentially facing displacement by 2030. Introducing the "Smart Water ATM" as a groundbreaking solution, we leverage advanced technologies such as RFID and QR codes to facilitate easy access to clean water. Beyond enhancing water quality, our system ensures secure transactions through methods like UPI payments and fingerprint authentication. To augment its efficiency, the project incorporates cloud technology to seamlessly collect and store data from sensors. This cloud-based approach not only optimizes data management but also enables real-time monitoring and analysis, contributing to the project's overall effectiveness in revolutionizing access to safe drinking water and addressing a fundamental human rights challenge.

8. Proposed solution with methodology:

Proposed Solution:

Harnessing IoT, RFID, Digital Payments, and Biometrics, the Smart Water ATM ensures secure water access. With a voice assistant and H2OConnect app, it facilitates RFID card recharge and online UPI payments while displaying real-time balances. Additionally, the system optimizes data management by leveraging cloud technology. This allows seamless collection, storage, and real-time analysis of sensor data, enhancing overall operational efficiency and contributing to the project's success in revolutionizing water accessibility.

Methodology:

A. Smart Card Access:

1. Users authenticate by inserting smart cards, activating the water pump for precise dispensing.
2. Voice assistance and an IR sensor enhance reliability, improving the user experience.

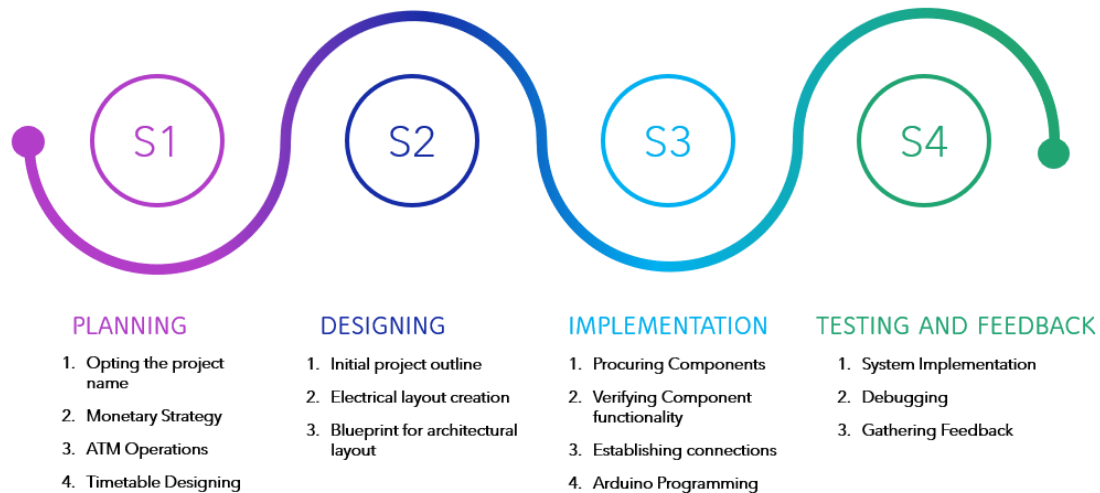
B. QR Code Access:

1. Users scan QR codes via H2OConnect, authenticate, and specify water quantity and payment details.
2. The pump, IR sensor, and flow sensor collaborate, ensuring accurate dispensing with voice guidance.

C. Operators' Authentication:

1. Operators use fingerprint recognition for requests, ensuring access only with matching stored data.
2. Stringent biometric authentication controls operations, reducing unauthorized access for responsible water ATM management.

9. Workplan / time schedule indicating the project mile stone



10. Plan of action of implementation

- Conduct a pilot Smart Water ATM installation in a targeted community.
- Collaborate with local authorities for site selection and community engagement.
- Install necessary infrastructure, including water dispensers, sensors, and biometric authentication systems.
- Integrate the H2OConnect app with the Smart Water ATM for seamless user interaction.
- Initiate a public awareness campaign about the Smart Water ATM and its benefits.
- Monitor and evaluate system performance, collecting user feedback for improvements.
- Establish partnerships with local businesses, NGOs, and government agencies for sustained support.
- Implement a regular maintenance schedule to ensure the functionality and hygiene of the Smart Water ATM.

11. List of facilities available in the college to develop the prototype of the project

The college provides state-of-the-art facilities for developing the project prototype. This includes well-equipped engineering labs with tools for IoT and sensor integration, a dedicated space for assembling and testing the Smart Water ATM components, and access to a computer lab for software development. Additionally, the college offers mentorship from experienced faculty to guide students in the successful development of the innovative solution.

12. Nature of Industry support for the project, (if any) - None

13. Details of Financial assistance required

Financial assistance of ₹50,000/- is sought for prototype development, IoT integration, and initial Smart Water ATM deployment, contributing to solving global water scarcity challenges. Funding will cover technology acquisition, testing, and implementation for a successful and impactful project.

14. Expected outcomes / results

The Smart Water ATM project anticipates the following outcomes:

- **Enhanced Water Accessibility:** Improved access to clean drinking water through innovative technologies, benefiting communities facing water scarcity.
- **Secure Transactions:** Implementation of secure payment methods and biometric authentication for reliable and controlled water distribution.
- **Technology Adoption:** Increased usage of IoT, RFID, and digital payment systems, fostering technological advancement in addressing global challenges.
- **Data-Driven Insights:** Utilization of cloud infrastructure for efficient data collection, storage, and analysis, leading to informed decision-making and improved system performance