AquaSense

Water Supply Network Monitoring System

Water Supply Challenges

1. Insufficient raw water
2. Poor quality surface water
3. Inequitable distribution

Wastage and Economic Impact

1. 3% safe water
2. 40% estimated loss in distribution
3. 66% people may face shortage in near future

Smart Water Management Solutions

1. Real time monitoring
2. Consumption measurement
3. Dynamic regulation
4. Leakage control

INTRODUCTION

Jal Jeevan Mission

Jal Jeevan Mission was launched with the vision of providing drinking water in adequate quantity of prescribed quality on regular and long-term basis to every rural household. A cost-effective technology is required for providing web/ mobile based tool for mapping of water supply network through creating geospatial database of all major structure of Water supply system with provision with grievance redressal.

Literature Survey

1. <u>System to monitor water supply in Delhi</u>
   - How Delhi implemented water supply monitoring system

2. <u>Smart Water Management Technologies: A Way Forward for Achieving Sustainable Development Goals in India</u>
   - Role of SCADA, PNMA and GIS in Promoting Efficient Water Management Practices

3. <u>A risk-based soft sensor for failure rate monitoring in water distribution network via adaptive neuro-fuzzy interference systems</u>
   - Gheibi, M., Moezzi, R., Taghavian, H. *et al.* ; *Sci Rep* 13, 12200 (2023).
   - Modelling different statistical distributions for the evaluation of failure rates based on effective parameters

4. <u>Decision support systems for leak control in urban water supply systems: A literature synopsis</u>
   - Thabane H. Shabangu, Yskandar Hamam, Kazeem B. Adedeji,
   - Procedia CIRP, Volume 90, 2020, Pages 579-583, ISSN 2212-8271

5. <u>City Water Supply Networking Monitoring Solution (2017-12-05 Author :Baima PV :4411)</u>
   - Real-time monitoring of urban water supply networks through unmanned remote systems.

6. <u>Public Utilities Board Singapore. Managing the water distribution network with a Smart Water Grid.</u>
   - Public Utilities Board Singapore ; Smart Water 1, 4 (2016).

OBJECTIVES
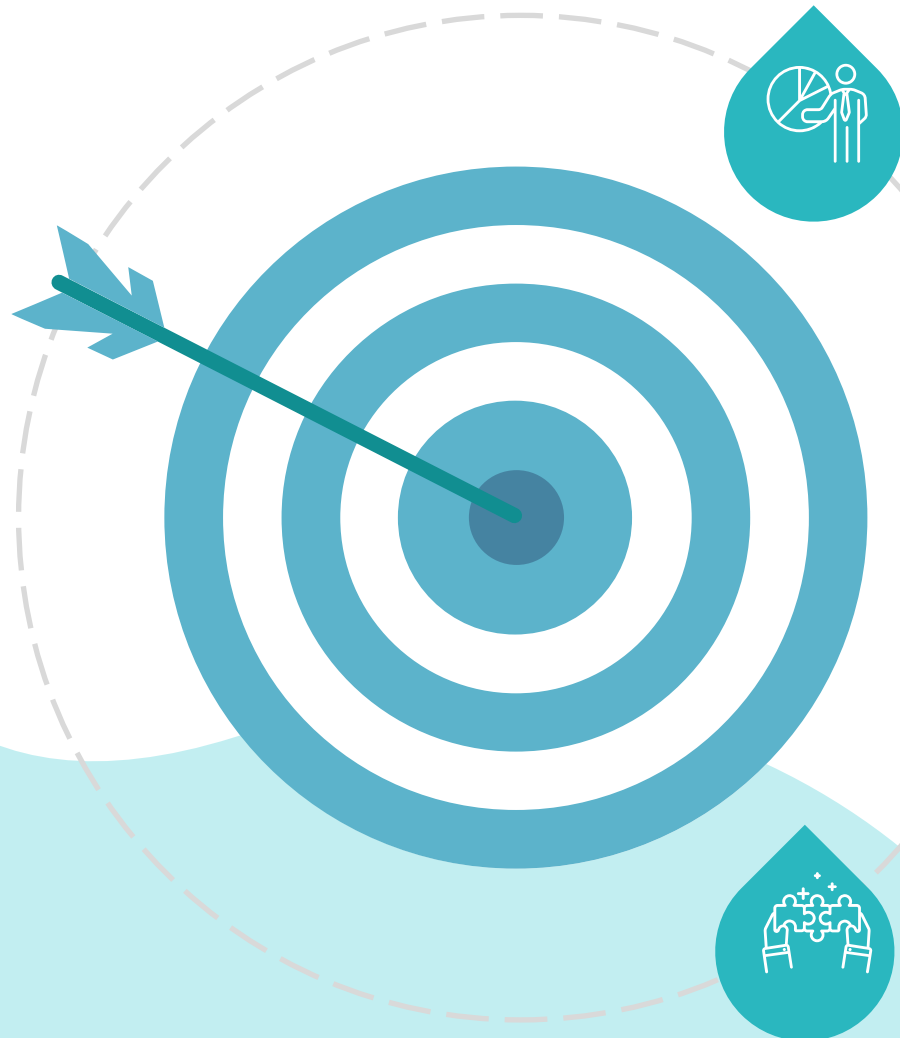
Transparency

Improve the transparency of all the processes in the water sully chain.

Immediate response

Identify or even predict issues and respond to minimize the damage.

Automation & optimized use of human resources

Partially or fully automate life cycle of providing water to consumers.

Sustainability

Technologies are no longer a source of savings and higher efficiency only, but the means to reach different environmental goals.

Purpose

01 **Platform to revolutionize water supply network management**

02 **Monitor water supply infrastructure effectively**

03 **Enhance visibility and accessibility**

04 **Build awareness about water conservation and responsibilities**

Features

1 Real-time Monitoring

2 GIS Integration

3 Analytical Insights

4 Grievance Redressal
Community Engagement

5 Alerts
Notifications

6 Usage Tracking
Automatic Billing

7 Accessibility
Scalability
Compatibility
Security
Privacy

and much more ....

Practical Aspect and Viability

User-centric Approach

The web application is designed with user-friendliness in mind. Intuitive interfaces ensure that individuals of varying technical expertise can easily navigate and utilize the platform.

Swift Fault Reporting

The platform enables users to promptly report pipeline issues by submitting images and location data. This streamlined reporting process ensures quick responses from maintenance teams.

1 **2** **3** **4** **5**

Solving Real Problem

The project addresses a critical issue: inadequate access to clean water in rural areas. By creating a digital platform, it offers a tangible solution to improve water supply management.

Visualizing Infrastructure

Users can interactively explore the water pipeline network through maps and simulations. This feature provides a clear visual representation of the infrastructure, enhancing understanding.

Data-driven Decision Making

Robust analytics offer deep insights into fault frequency, water supply timelines, and usage patterns. This information empowers decision-makers to allocate resources more efficiently.

Market Potential

01 Government Initiatives

Government bodies worldwide are increasingly focusing on improving water supply infrastructure and management.

02 Environmental Concerns

Growing environmental awareness emphasizes the need for responsible water usage and conservation.

03 Technological Advancements

The integration of advanced technologies, such as GIS, and data analytics, in water supply management is gaining traction.

04 Regulatory Compliance

Stringent regulations regarding water quality and supply necessitate advanced monitoring and management systems.

05 Infrastructure Development Projects

The construction and expansion of water supply networks, especially in rapidly urbanizing areas, create a demand for effective management tools.

Work Flow

GitHub

Using GitHub for collaboration, task management and tracking progress
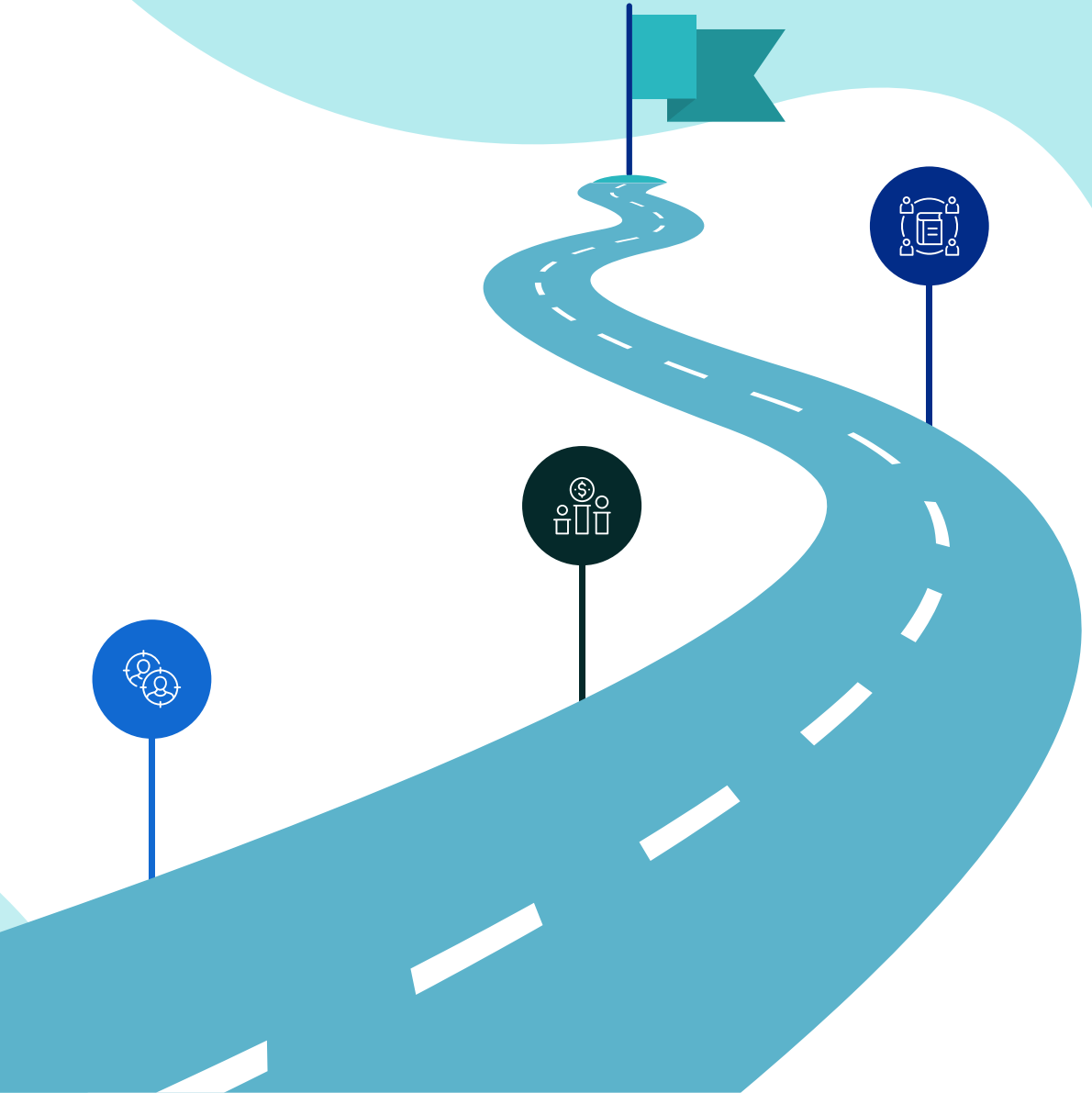
Front-end, Back-end

Parallel development of interface as well as server side and building APIs and document each step

Testing and Debugging

Module wise integration and troubleshooting

(Dummy) Deployment and Maintenance

Make it public and monitor the system with different simulations to check performance

Work to be done on

O1

O2

O3

Risks
- Data Accuracy
- Reliability

Challenges
- Geospatial Data Acquisition
- Maintaining User Engagement

Dependencies
- Data Providers / IOT devices
- Technological Infrastructure
- Collaborations with Authorities