IOT BASED SMART WATER MANAGEMENT

A project report submitted in partial fulfillment of the requirements for the degree of B.E-Computer Science and Engineering

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SMART WATER MANAGEMENT

PHASE-2: INNOVATION

*** Innovative in smart water Home**

*** Innovative solutions to water scarcity**

INNOVATIVE IN SMART WATER HOME:

In recent years, the smart home market has experienced rapid innovation, from clever doorbells that make your home more secure to smart thermostats that save you money on your energy bill.

New innovations for the 'smart water home' mean consumers can now reduce their water consumption, get real-time data on water quality and better safeguard their properties from sudden leaks and unexpected burst pipes.

But with water demand on the rise and the prediction that by 2025, two-thirds of the global population is expected to live in water-stressed areas, could these new innovations help reduce our water use? We take a look at four innovations that are making their way into homes.

Water security and safety:

When it comes to water issues in the house, there are few cases worse than a burst pipe. Water damage to a property is expensive to fix and up until a few years ago, was difficult to predict and prevent.

Now, the smart water home can save you from having to rip up the floor.

"If the smart water valve detects an issue it will alert users through the app so they can fix it before that issue causes damage."

One of the latest innovations for water security is Flo by bathroom and kitchen giant, Moen. The smart home water security system features a suite of products to protect homes from water damage and leaks.

The Smart Water Shutoff monitors the entire water supply system for leaks and vulnerabilities, while the Smart Water Detector senses leaks and

moisture outside of the pipes, such as overflowing drains, appliance failures, or weather-related issues.

If the smart water valve detects an issue, it will alert users through the app so they switch off their water supply remotely, before it causes damage.

In-home water recycling:

One company that is making a name for itself in the smart water home space is Dutch start-up Hydraloop and its decentralised water recycling products.

“Its decentralised products, the H300 and H600 are able to reuse up to 85 per cent of total in-house water.”

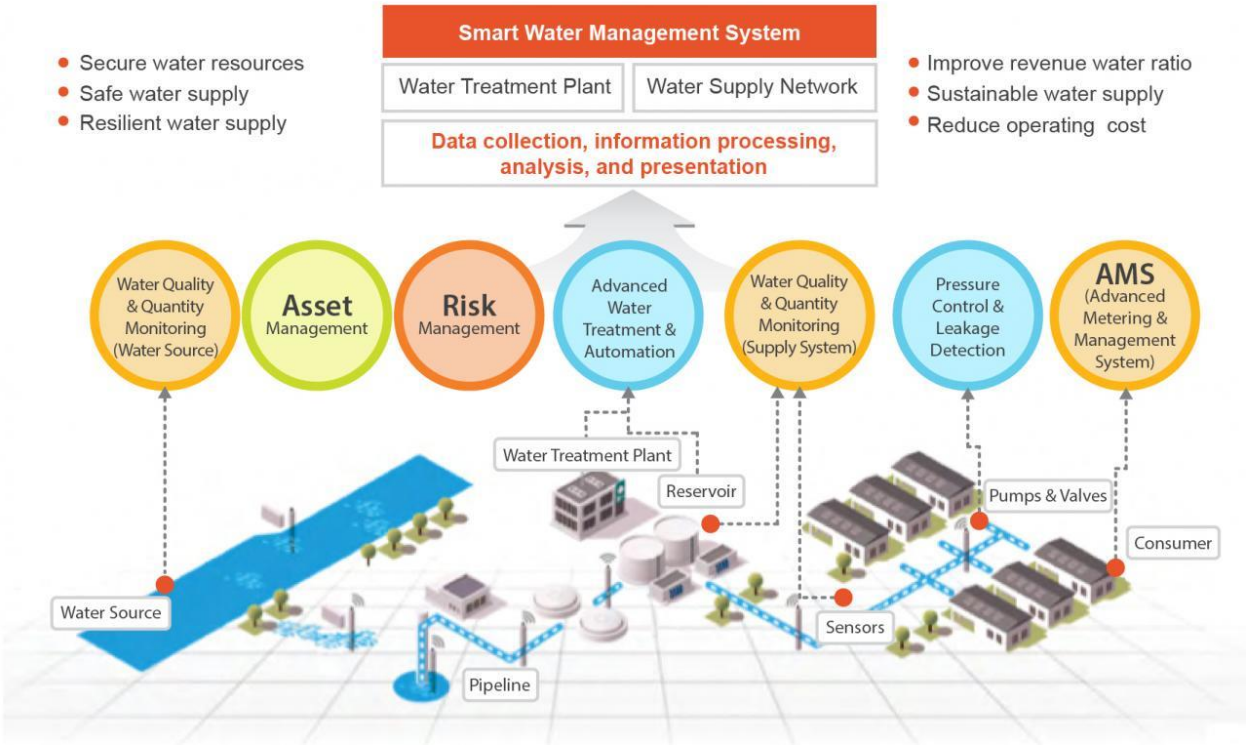
Financially backed by Dutch multinational Rabobank and manufacturer Niverplast, the company provides a solution that enables shower, bath, washing machine and sink water to be recycled.

Its decentralised products, the H300 and H600 are able to reuse up to 85 per cent of total in-house water, and can easily be fitted into most homes. The treated and disinfected Hydraloop water is suitable for toilet flushing, washing machines, garden irrigation and topping up swimming pools.

INNOVATIVE SOLUTIONS TO WATER SCARCITY

Water covers 70% of our planet. If you think this figure is reassuring and wonder why should we care about such a plentiful resource, then think again.

Water scarcity is a growing issue. According to several UN reports, it will directly affect nearly 20% of the human population by 2025. By 2040, roughly 1 in 4 children worldwide will be living in areas of extremely high-water stress. This is not limited to developing countries. Indeed, **freshwater**—the one we drink, bathe, grow our vegetables with, and cook with—**is incredibly rare. Only 3% of the world’s water is fresh water, and two-thirds of that is hidden away in frozen glaciers or unavailable for use.**



According to several NGO's, **about 1.1 billion people worldwide lack access to water, and a total of 2.7 billion find water scarce for at least one month of the year**. Climate change and a growing population are the main reasons for this but they aren't the only ones: collapsed infrastructure and distribution systems, pollution, conflict, overloaded water systems, and poor management of water resources are just a few of the human factors that are increasingly denying people their right to safe water and sanitation.

The IoT has the ability to lessen this worrying picture. Smart Water Monitoring and Management Systems, based on the combination of sensors, big data and AI technologies, can provide to water utility operators, farmers and companies the ability to measure, monitor and control their water distribution networks as well as the quality of the water distributed. Less waste, less consumption, and a better management of the water's quality can improve dramatically the preservation of our planet's resources.

Let's take a look at **how Smart water Management systems can help addressing the growing lack of available fresh water…**

Benefits of Smart Water Management Systems:

Here are five specific benefits of Water management technologies and activities, and how they can help address the growing problems of water scarcity.

1. **Reducing waste of water-intensive industries**
2. **Monitoring water quality to fight pollution and diseases**
3. **Improving the efficiency of water systems**
4. **Creating awareness of household water use thanks to smart meters**
5. **Providing running water through innovative solutions all around the world**

Smart Water Management is the activity of planning, developing, distributing and managing the use of water resources using an array of IoT technologies which are designed to increase transparency, and make more reasonable and sustainable usage of these water resources. .

Agriculture, manufacturing or power production use very high volumes of water. Farming alone accounts for 70% of all water consumption. The same sector is liable for wasting approximately 60% of that water according to the UN's Food and Agriculture Organization.
Producers have to contend with increasingly erratic weather patterns which result in hotter and drier growing seasons

Smart water systems allow the collection, treatment, distribution and recycling of water. These systems, often deployed underground, can leak, freeze, or breakdown. These systems are widely deployed on infrastructures nowadays.
By monitoring the pressure, flow, moisture, temperature, time difference between points and other parameters directly within the systems, the IoT can facilitate maintenance prediction and avoid breakage, leakage, and equipment downtime.

Managing water is not just about delivering it efficiently. Sometimes it is about delivering it to all. In many developing countries, many people do not have easy access to running water. Water utility infrastructures suffer from lack of investment, lack of public water points, irregular delivery services. Chlorine pills are expensive and unreliable. As a result, **people with irregular or low incomes are faced with daily hardships in procuring water.**

Manufacturing and other human activities can be responsible for polluting rivers and the groundwater table. **Sensors and IoT technology for real-time monitoring and control can help monitor and prevent pollution and even improve the water quality.**

To do so, IoT systems connected with AI-based software are deployed to capture standard parameters for monitoring the water quality: pH, Total dissolved solids (TDS)—including Oxygen, the Oxidation reduction potential (ORP) or the Temperature of different types of water. Using machine learning algorithms, the devices can be trained to **predict the quality of water, monitor the effectiveness of a sanitizing agent or adjust the water treatment plan accordingly**

THANKING YOU