

Avoid Wastage of Water through Smart System

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Abstract: *Many parts of India is still dying with water scarcity, which could be drinking or usage water. Only few people enjoy 24 hours water supply but many remote villages still depend on the rivers which are getting slowly disappeared due to land occupation or environmental imbalance. Even many governments tried their best still the drinking water issue is not solved in majority places. People still commute to faraway places to get drinking water, at the same time many of them shifted their living place itself. This water scarcity is due to wastage of water in many urban areas. As urban society people may or may not be aware of the problems of water scarcity. In this paper, an idea is proposed in developing smart water tap system which could sense the filling up of container depending on the sound that comes out from the filling vessel. Probably this smart system would address the water scarcity problem to some extent and try to prevent most of the water from wastage. Internet of Things (IoT) which played a major role in bringing out many Smart systems is also behind this proposed idea.*

Keywords: Sensor system integration, service functions and management, Smart Storekeeper, Wi-Fi, MQTT, cloud, Raspberry Pi

1. Introduction

The Internet of things (stylised Internet of Things or IoT) is the internetworking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings and other items—embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. In 2013 the Global Standards Initiative on Internet of Things (IoT-GSI) defined the IoT as "the infrastructure of the information society." (A. Laya, V. I. Bratu, and J. Markendahl et al, 2013) The IoT allows objects to be sensed and/or controlled remotely across existing network infrastructure (H. Schaffers, N. Komninos, M. Pallot, B. Trousse, M. Nilsson, and A. Oliveira et al, 2011) creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, smart health, smart homes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure.

However, such a heterogeneous field of application makes the identification of solutions capable of satisfying the requirements of all possible application scenarios a formidable challenge. This difficulty has led to the proliferation of different and, sometimes, incompatible proposals for the practical realization of IoT systems. Therefore, from a system perspective, the realization of an IoT network, together with the required backend network services and devices, still lacks an established best practice because of its novelty and complexity. In addition to the technical difficulties, the adoption of the IoT paradigm is also hindered by the lack of a clear and widely accepted

business model that can attract investments to promote the deployment of these technologies.

Taking into account the drought conditions of the crop which is affecting the farmers, the drinking water scarcity at many remote villages affecting survival of people, scarcity in general water which is making the people opt different place to live. This Smart Water Tap System would definitely improve the scarcity conditions. Generally people living in urban areas due to their hectic life style or work-life schedule tend to forget to close the water tap which is made open, as the person wanted to fill a tumbler or bucket or drum. So this results lot of water wastage since the tap is not closed even after the container got filled up. Also kids tend to play with water for a longer duration as they are unaware of the wastage of water, and the current scarcity conditions being faced by many people. This can be addressed by educating the child about water wastage side effects or installing a smart water tap system. The object of the paper is to discuss about the architecture of the smart water tap system along with the blue print of the model. Nowadays many governments are promising about 24 hours water supply, at the same time should be also talking up the responsibility of educating the people about the values of water storage and after affects in water wastage. The following are the topics which will be covered, section II : Smart Water Tap System Concept and Services section III:Smart Water Tap System architecture, section IV: Advantages of Smart Water Tap System and section V: Conclusion.

2. Smart Water Tap System Concept And Services

Smart Water Tap System is an application that prevents wastage of water. By doing so, it indirectly improves the living conditions of many backward areas that are facing trouble due to water scarcity.

Smart Water Tap System – In India, there are two types of living conditions 1) who enjoy life to the extent without any

imbalance in living conditions like rain dance, not closing taps, wasting power and many more. This could be due to laziness or impact of the living style. 2) suffer for proper food, water and living conditions. So this imbalance is kept on continuing for centuries, as governments are failing in filling up the gap. But definitely one day even the urban areas will have to face the situation of water scarcity if water is not properly stored. Already most of the towns and cities are currently facing this drought situation, where in which they are getting the daily usage water through water tankers and purchasing drinking water from vendors. Even the industry sector is currently facing this drought situation. In order to prevent this condition from going too worse this smart water tap system is proposed. The water tap with the help of a sound sensor will close the tap automatically. If a container is kept under a tap to fill up, then the tap gets operated depending from the sound that it is receiving from container. When the container is total empty initially then depending on the sound that the sensor receives the tap valve is kept open, but when the container is half filled then the tap valve get closed by one-fourth. Since the sound that the half filled container generates due water falling into it is quite different when compared to water falling into an empty container. Then when the container is closing near to totally filled condition then the sound that comes out from the container varies from the half filled one, at this situation the tap valve gets totally closed automatically. After the valve got closed automatically a message will be sent to the user's android phone with the text that the tap got closed. So if incase the house has some n number of taps then the taps will be numbered unique accordingly in this application. The message that is sent to the user about the closure of the valve of the tap will be also having the tap number, which would help the user tap identify the tap in the home that got closed. So this is taken care of without human intervention. Since it can be a house wife or a working woman, man due to their busy schedule they generally tend to forget or take more time to close the water valve once they open thinking it's going to take more time for the container to fill up and so they turn up with lot of delay. By the time lot of water gets wasted. In hotels, malls and other places users would have come experienced the water taps with time sensor. That is after a particular time duration the water tap valve gets closed. But this will not work in case of filling up huge containers or buckets or drums, as it results in lot of human intervention. So with this smart water tap system users can look at their other work stuff without a worry whether the container got filled up or not. The below figure justifies the explanation with some statistical figures about water scarcity throughout India.

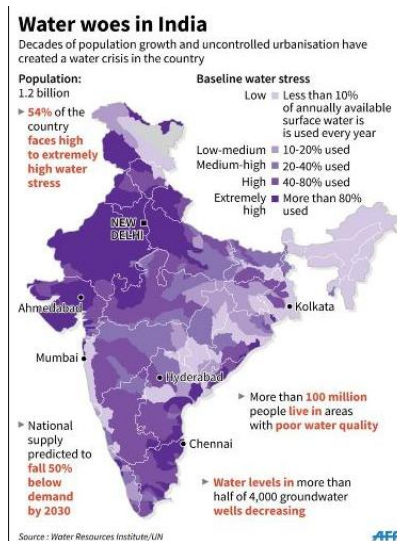


Figure 1: Water scarcity in India

Some of the reasons for this water scarcity are cited as decrease in wells due to decrease in rains. Majority of cosmopolitan cities have started facing the trouble. At least now the people should stop enjoying with water for fun purposes. Some more reasons of water scarcity could be no methods being followed for water conservation, polluting fresh water. The below images tells about the amount of water that is being wasted due to irresponsibility of human being towards water in daily life activities. The figures shown in the below image could be approximates but some times more as well.

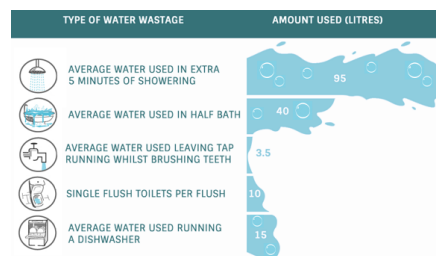


Figure 2: Wastage of Water in daily life activities

3. Smart Water Tap System Architecture

Smart Water Tap System: The below figure Fig.3 depicts the architecture of the Smart Water Tap System. The tap valve gets operated automatically with the help of sound sensor present at the tap. The sensor should send data to the cloud using MQTT over Wi-Fi through Raspberry Pi by using the logic present in the python script through Ethernet medium. The data present in the cloud can be shared through Amazon AWS IoT using Dynamo DB. This data is further sent to various devices using Android. So the users using the Android phone or devices would get a message about the closure of the tap valve along with the tap unique identification number. This tap unique identification number would the help user to distinguish between various in the home.

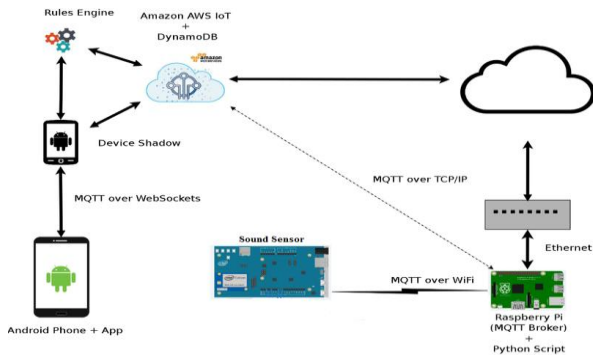


Fig 3: Smart Water Tap System Architecture

As and when the user installs this application in the android phone and links all the taps to the application, then the user can start using this application. Since nowadays human being is filled with lot of activities in the day schedule and the brain is overloaded with lots of commitments. So it's a quite human error that one many tend to forget to close the tap that was kept open. Each and every drop preserved by this approach will for sure lead to saving gallons of water thus by saving the country from water scarcity problem to some extent. If the user left home for some work, need to worry about the closure of the tap because the message in the android phone confirms the user about the closure of the tap.

4. Advantages of Smart Water Tap System

This latest IoT app would definitely result in many advantages like:

- 1) It reduces water from wastage scenario at many instances which indirectly helps in the water preservation.
- 2) Users need to worry about the open taps, as the application with the help of sensor closes the tap valve automatically and the same is communicated to user by a message to the android phone.
- 3) Water preservation currently to be followed by every citizen, since not only India many other foreign countries are too facing the trouble due to lack of water.
- 4) Due to the automatic closure of tap valve the user will be saved from running out of water situations, when incase if the user forgets about the open tap and leaves for work.
- 5) Also the idea behind water preservation may be helping out indirectly one or more families with the availability of water.
- 6) This is saving mother earth from water scarcity problem there by reducing the death toll rates due to lack of water.

5. Conclusion

This application would definitely lend a helping hand to the society by reducing water scarcity problems. The Internet of Things which emerged in this latest advanced technology is definitely making surroundings manage in a smart way.

In present scenario of managing both work and life one will always opt for leading a smart life with smart devices which are making the surrounding smarter. The idea present in the paper which was drafted needs to be implemented which would be the future scope of this paper.

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