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# IOT Enabled Social Web Framework for Water Consumption Monitoring

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**Abstract: Water is one among the foremost essential parts of life. Water quantity is one of the big problems to the world In order to ensure the safe supply of drinking and use water for different purposes, the water should be monitored. The system is designed to monitor the supply of water to a particular area which can detect the quantity of water supplied through that pump. This system design real-time monitoring of the quantity of water in using some sensor and software. The system having several sensors is used to measuring the physical of the water. The measured values from the sensors are often processed by the controller. Arduino model can be used as a controller. Finally, the sensor data can be shown on the internet using a WI-FI system. A system was configured as data analysis. Using Elastic search, when the data reach the specified limit of water consumption specified, an alert on the excessive usage of water can be notified. Elastic designed to assist users take data from any sort of source and in any format and search, analyze, and visualize that data in real time**.

**Keywords: Arduino, Internet using a WIFI- System, Elastic Stack, system design real-time monitoring of the quantity of water,sensor and software.**

## 1 Introduction

Throughout the years, the world is facing a water crisis that leads to water shortage due to climate change, population increase, improvement in living standards, and also increasing industrial demand.The amount of water consumption suggested by the World Health Organisation (WHO) is 165 liters per capita per day, however the average water consumption in Malaysia is higher than the recommended amount which is 210 liters per capita per day. As the country grows, water consumption among the public community will also grow too. Water wastage can be avoided if consumers use water prudently. Hence, one of the solutions is to limit the unnecessary usage of water in their daily chores. The daily, yearly as well as Monthly water consumption can be monitored and triggered by the Water Department head. Looking at the current situation, Our World is full of technologies the water is the basic and most important need for our lives. Currently, the water department is using the water pump to measure the supply of water to particular areas and societies. In which, the pumps are fitted on the ground and

according to the measure is counted as per month. But in the process, the officers have to personally visit the area to take the reading of the meter. By using this technology, we can send the reading to the authorized officer without personally visiting the area. The report can be generated the usage of water and the quantity of water consumed in a day. The waterworks also can utilize the system to automate polling the meter reading for monthly billing of water consumption in their client houses. This helps to prevent late and inaccurate manual billing due to human error. Hence, obtaining information on daily water consumption is vital in order to control and analyze water supply and usage. The waterworks also **can** utilize the system to automate polling the meter reading for monthly billing of water consumption in their client houses. This help to stop late and inaccurate manual billing thanks to human error. Furthermore, the water consumption between the most piping to domestic houses piping also can be monitor to reinforce the water utility company maintenance capability in detecting water leakage that occur between water utility provider main piping and consumer piping. Hence, obtaining information of daily water consumption is vital in order to control and analyze water supply and usage. At present, water utility management is monitored manually by the Malaysian water companies. The company will monitor any of the water infrastructure by schedule or through complain from consumer. Thus, the upkeep and repairing process takes a extended time. Besides, it's necessary to supply an automatic system for monitoring the buyer daily water usage since the present manual meter reading sometimes isn't accurate thanks to systematic error such as equipment and observation error. Apart from that, the monthly water billing also takes time to be generated and it is not suitable for the purpose of water consumption estimation.

One of the characteristics of a sensible city is managing the town assets by using urban informatics and technology which incorporates management of water system network. This will shift Malaysia towards becoming a developed and modern country like Japan and South Korea . An efficient water system network are going to be achieved through integration of smart devices and equipment for monitoring and measuring water. In this process, consumer and waterworks provider collaborated where client is responsible of their conduct while provider monitor and maintain the network. At consumer side, the devices provide daily consumption report with forecasts of the projected savings for the current month base on changes in consumption habits. As a provider, they utilized the system to supply automatic monthly billing to stop late and inaccurate billing. It also enhances the corporate maintenance capability through pressure and leakage management. This paper presents the development of water consumption monitoring and alert system (WCMAS) has been proposed to collect real-time water consumption data in consumer daily usage. By using IoT system, the water usage level are going to be sent to the IoT Cloud infrastructure and display on IoT dashboard. The collected water consumption data is also analyzed by using Elastic Stack and an alert is sent for any excessive water usage into home owner smartphone. The smartphone is listed in Elastic Stack Event via internet connection. The remainder of the paper is organized as follows. Section II describes water consumption monitoring and alert system development and style approach in term of hardware and software component. Section III discussed the development result of the water consumption monitoring and alert system. Finally, section IV draws our conclusions and means the ideas for future extension of this work. Elastic Stack Monitoring Service: The Elastic Stack Monitoring service extends our

commitment to improving product usability and quality of support by providing you with a fanatical monitoring cluster to host your Elastic Stack monitoring data. Why this service? 1. Gathering various cluster information to diagnose the problem. And also needs to get a snapshot of your historical cluster monitoring data, and then manually restore it to diagnose the issue. 2. Now, with the Elastic Stack Monitoring Service, has direct access to your historical monitoring data as well as other relevant cluster information. This streamlines the diagnostic process and allows us to jump right into the more in-depth questions. 3. The Elastic Stack Monitoring Service, you'll not got to create and manage a fanatical monitoring cluster on your own, which may greatly simplify your daily workflow and management. How will this service work? By opting in for this service, the Elastic Support team will create an Elastic Cloud cluster, and then send you the instructions for configuring your production Elastic search cluster to send its monitoring data to the Elastic Cloud cluster.

## 2 Literature Review

1.IoT based water management : Published in: 2017 International Conference on Nextgen Electronic Technologies: Silicon to Software (ICNETS2) Authors : 1. Chanda Rajurkar Embedded System, VIT Chennai Campus, 600127, India 2. S R S Prabaharan School of Electronics Engineering, VIT Chennai Campus 600127, India 3. S. Muthulakshmi School of Electronics Engineering, VIT ChennaiCampus,600127,India. Review : The main aim of this project is to monitor the use of water by one block of house in a flatsystem, where at the partition of pipeline at the point where the water gets diverted to various sections of a block. Analysis: Among which Oceans has approximately 96% and 5% is considered to be freshwater, again out of which only 2% is accessible direct to humans.. From this it states that only 5% is available as fresh water for human being to make use for drinking, , cooking, sanitation, manufacturing, agriculture, etc 1. Findings: According to scientists and organizations as IPCC state has come, since a long time, where water management as such implies to maximizing use of water and minimizing the wastage of water and thus preventing the domino effect cycle arises as wastage of water. The water usage data will be sent to cloud using the IOT space. This cloud data will be sent to the concern resident's person's mobile app reporting the water used and alerting the user to limit the water use if it gets extended to the limit usage set by organizations.This will be real time operation. The objective of this project is to find limiting and minimizing the usage of water for an average of per person. And, the cloud data will be used as statistic data for use of water at every seasons that is winter, summer and monsoon so that measuring steps for water

2.Monitoring of Industrial Water Usage by using Internet of Things. Published in: 2018 International Conference on Information , Communication, Engineering and Technology (ICICET). Authors: 1.Sourabh Jadhav Center for P.G. Studies, Visvesvaraya Technological University, Belagavi 2. Sneha Vijay Patil Center for P.G. Studies, Visvesvaraya Technological University, Belagavi 3. T.C. Thanuja Center for P.G. Studies, Visvesvaraya Technological University, Belagavi 4. M.P. Shivu FluxGen Engineering Technology, Bangalore 5. Ganesh Shankar FluxGen Engineering Technology, Bangalore Review: This paper focuses on

analyzing the amount of usage of water in the generates report of the daily water usage in each processing section. The system keeps track of the purchased water, water in reservoir areas and total use of water. The flow sensors will sense the flow of water in each pipe which ultimately tells the usage of water at one block ideally. The level sensor senses the level of water in the reservoir and tells the availability of water into the reservoir. This water usage data would be sent to the cloud using the Internet of Things (IoT) space. The cloud data is computed and is used to generate a pattern of data input and provides a detailed water consumption chart on the desktop as well as mobile devices. Industrialization impacts directly on the development of the country. Water is important for industries. Industrial water usage keeps on rising and in the year 2030 to 2060, it will reach around 9.5% and 11% of the total water. Use of water in the industries for many purposes such as fabricating, washing, cooling, processing; take in water into a product, etc. Compare to other industries, consumption of water is high in the food sector. Hence, housekeeping and awareness among both employees and management is also required. Analyzing water use is the regular collection of information about the total amount of water from all sources for any use during a given period. For the water-consuming industries it is important to analyze use of water for planning to spread awareness of water use.

3.Smart Water Monitoring System using IoT. Published in:International Research Journal of Engineering and Technology (IRJET e-ISSN: 2395-0056 Volume: 05 Issue: 10 — Oct 2018. Author: Gowthamy J, Chinta Rohith Reddy, Pijush Meher, Saransh Shrivastava, Guddu Kum Review: Currently drinking water is very prized for all the humans. In recent times water levels are very low and water in the lakes are going down. So it is very important to find the solution for water analysing and control system. IoT is a solution. In recent days, development in computing and electronics technologies have triggered Internet of Things technology. Internet of Things can be describe as the network of electronics devices communicating among them by the help of a controller. The IoT is a collection of devices that work together in order to serve human tasks in a efficient manner. It combine computational power to send data about the natural resources. These devices may consist of sensors, appliances, iot devices. The following paper presents a low cost water monitoring system, which is a solution for the water wastage and water quality. Microcontrollers and sensors are used for that system.Controllers are used in 40%-75% of projects. Ultrasonic Sensor is used to measure the water level across various platforms. The following system can make the use of flow sensor which is used to measure the water flow and if necessary, it can also check quantity of water flow through the pipeline then water flow will be stopped. Analysis we can do by this process, how much water is used in any particular time.

4. Internet of Things (IoT) enabled water monitoring system Published in: 2015 IEEE 4th Global Conference on Consumer Electronics (GCCE) Date of Conference: 27-30 Oct. 2015 Date Added to IEEE Xplore: 04 February 2016 INSPEC Accession Number: 15756668DOI: 10.1109/GCCE.2015.7398710Publisher: IEEE Conference Location: Osaka, Japan. Authors : Thinagaran Perumal Universiti Putra Malaysia,Md Nasir Sulaiman Universiti Putra Malaysia,C. Y. Leong Catrina, Malaysia. Water is always a crucial part of everyday life., water management and conservation are vital for human survival. In recent times, the need for consumer-based humanitarian projects that could be rapidly developed using Internet of Things (IoT) technology. In the following paper, the following makers have proposed an IoT-based water monitoring system that measures the water level in real-time. This particular prototype is based on the idea that the level of the water can be a very important parameter when it comes to flood occurrences, especially in disaster-prone areas. A water level sensor is used to detect the specific parameter, and if the water level reaches a particular level, the signal will be fed in realtime to social networks like Skype, etc. A cloud server was configured as the data

repository. The water levels are displayed in a given remote dashboard. This system is found to be effective in such projects involving water monitoring tasks. Cloud technology can be very effective in such tasks and hence it can also be included in projects involving IoT.

5.IoT Based Water Usage Monitoring System Using LabVIEW: IEREK Interdisciplinary Series for Sustainable Development. DOI: 10.1007/978-3-030-01659-3 23 In book: Smart Technologies and Innovation for a Sustainable Future (pp.205-212) Arun Mozhi Devan Panneer Selvam Universiti Teknologi PETRONAS Pooventhan Kurunthachalam Sri Ramakrishna Engineering College. C. Mukesh Kumar Sri Ramakrishna Engineering College. Wireless communication devices development has a considerable impact on several fields like healthcare industry and various applications. Amongst these, the significant usage is the improvement of monitoring system for various functions. Water utilization monitoring system proposes an effective manner of controlling the wastage of water at different locations by the use of LabVIEW software and Wireless technology. This proposed water utilization and monitoring system allows the individuals, colleges, hospitals, industries, department shops, malls and motels to keep a track on their water bills and allows the government and authorities to accomplish/control the water supply.This process is used in 60%-80% of such tasks. Cloud technology can also be implemented in this project.The analysis is done using various tools which are available across all online platforms.

## 3 Proposed System Working

System working:
**Monitoring Module:** It determines the reading of the water sensor and sends the data by using the wifi module to the dashboard.
**Elastic stack:** Visualizing the data and making a dashboard for the water department.
**Water Department**: The administrator receives status information from the monitoring module to their dashboard and maintained by the organizationn in real-time.
**ThingSpeak:** It is an open-source IoT app that is available across all platforms and very accessible. It can also be used as an API to store and retrieve data from HTTP and MQTT protocol over the Internet or LAN.
**Water flow sensor:** This particular sensor is used to measure the flow of water.
**Arduino Uno:** Arduino is a small-scale hardware device on which various small-scale projects which be performed, it has input and output digital PINs which are interfaced to various expansion boards and circuits.
**Wi-fi module:** The ESP8266 WiFi Module is integrated with various protocols that can give any microcontroller access to your LAN network.

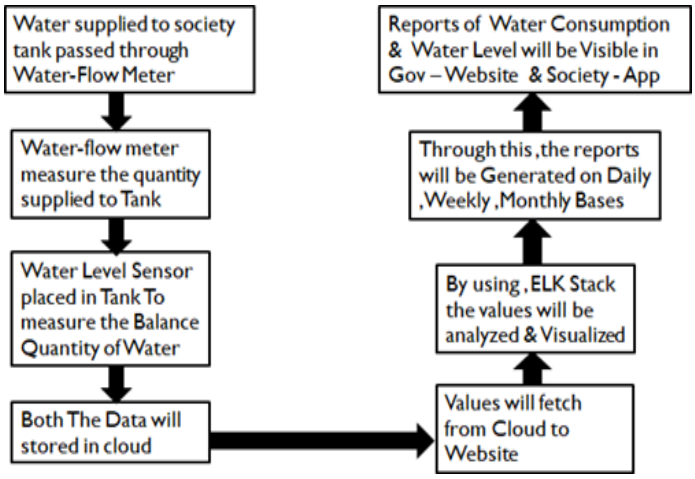


Fig 1. Flowchart Working of Framework

## 4 Conclusion:

The Internet has changed the size of life involving virtual interaction. IOT has the potential to feature new dimensions enabling smarter objects communications. The proposed system is a water level monitoring system with different levels indicated. System design and architecture which has been implemented in our project is very cost effective, a simple strategy to monitor the water level system. Future Work can involve the analysis of water level during a particular area in order that the wastage of water is prevented. In future we are also planning to add PH scale to find out the quality of water, the quality of water, etc. It also symbolysis when the water level is as per requirement below or low.

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