

# Survey on IoT Enabled System for Water Monitoring and Distribution

**Syeda Roshni Ahmed<sup>1</sup>, Dhanush K Vijay<sup>2</sup>, Goutam Narasimha Hegde<sup>3</sup>, Manoj S<sup>4</sup>**

Assistant Professor, Department of Information Science & Engineering,

Atria Institute of Technology, Bengaluru, India<sup>1</sup>

Student, Department of Information Science & Engineering, Atria Institute of Technology, Bengaluru, India<sup>2,3,4</sup>

**Abstract:** In the busy world around us where people are in a hurry state most of the times leading to lack of time for small things yet important are missed aren't concentrated upon. These minor activities can be automated and help the society. Our survey presents on to manage and plan the usage of water which can be easily installed in residential societies and can be integrated with the water supply system. This system requires the use of sensors placed in the tanks which continuously transmit the water level on real-time. The sensor data can then be communicated through the cloud and used efficiently. This makes the data available to the users by using their mobile phones through which they can have a visualized idea of the water quality and its usage.

**Keywords:** Water monitoring, IoT, Smartphone, Home Assisting Devices

## I. INTRODUCTION

Internet of Things (IoT) is a leading technology integrates various devices and objects to make them smart and connected resulting in data exchange and enhancing the lifestyle of an individual. Things enabled with IoT can help in commanding the various devices connected through voice or action. So by using this technology devices are developed which can monitor water quality and help in easing the life of an individual.

## II. RELATED SURVEY

Socio-economic processes have led to an exponential rise in the need for water resulting in scarcity due to over exploitation. One of the major drawbacks faced in India is water availability which is fit for consumption, i.e the quality of the supplied water and its right usage. There requires a well-managed system for monitoring and distribution of the water. It requires the usage electric pulses generated by the flow sensors which assist in calculating the water usage. Automated turn on/off of the motor is enabled to ensure the main tanks store a good amount of water for supply and is controlled through the use of control valve [1].

Water acts as the most important entity for human and the other living things in the nature without which its existence isn't possible. Enormous efforts with respect to proper utilization of water are being executed by the government bodies and NGOs by creating various schemes for ending up in efficiently using it. Focus is on larger area such as apartments and gated-communities to save water and efficiently using it. The water levels are monitored continuously and are communicated through use of IoT and embedded system [2].

Water being one of the most significant and important resource for the human existence, due to the enormous increase in population and urbanization the necessity of water has raised. It also requires a constant vigil on the quality of water being supplied or consumed. Sensors for quality monitoring such as pH sensor are used. The distribution of water uses flow sensor, control valve using which amount of water supplied can be known. Through the integration of this, the system would be able to distribute the water for consumption and have a check on the quality of water which is being consumed [3].

Automation is a main attribute in the growing era of IoT technology. Automating things helps in increasing the living status by providing comfort and thereby people can live conveniently. This automation can be provide with regards to water supply and the motive being usage of water judiciously and so that water management systems developed using IoT (Internet of Things) are equipped in the residences and their knowledge are transferred. This kind of automation is unduly required in the future use in managing water sustainably the same way as government has made mandatory for solar and rain water harvesting in houses [4].

The increase in population and urbanization in order to find jobs and to lead a better lifestyle people have had a role in destructing the aquatic ecosystems by construction of apartments in poached lands, water pollution due to dumping of garbage and releasing toxic effluents into the water bodies, air pollution by release of toxic gases from vehicles and engines using fossil fuels, global warming due to release of effluents such as CFC from refrigerators and air

conditioners. The water cycle had also had an impact to these effects due to land coverage area changes during urbanization which resulted in increase of layers of concrete and natural factors which have been altered such as rainfall due to often change in climate hence creating shortage of water supply, low ground water level. To overcome this issue, it is required to work on solutions to develop technologies for systematic use of water in urban areas and balance the water cycle with use of information technology infrastructure and sensor technologies. Quantitative analysis of usage of water and the impact on water cycles and thereby having a track on the impact on the ecosystem is concentrated upon by gathering data from the sensor technology and studying them over a period of time and therefore to have a proper system to use water judiciously in urban areas [5].

Planning and managing the usage of water is much required to be installed in residential societies. This can be achieved by using IoT technology which are integrated with devices, these devices use the sensors placed in the tank which continuously gathers the current levels of water present in the tank. This data is then communicated to the rest of the devices connected by updating on to the cloud and then rendered on the android application. The updating of the values on to the cloud makes it possible to be accessed by a smartphone from anywhere over the use of internet and creating visuals of the water level. Monitoring the water level in the tank the automatic functioning of motor is controlled, when the water level is low the motor gets turned on automatically and it cuts off when the water level is full [6].

Management of water and its distribution in large campuses is required in order to save water and this can be achieved with the use of IoT technology. Ultrasonic sensor and water level sensors can be used in order to achieve a low cost based wireless network to connect the sensors and water monitored campus using these two components in the system, These sensor networks are able to achieve a large distance which are suitable for installation into overhead tanks and the ground sumps. The network which gathers the data wirelessly gets updated over the gateway by uploading the data online which can be communicated over to the application later to display visualization of the water levels [7].

The topic of management of water is a major cause and debatable topic since the existence of mankind on earth. The management of water supply is extremely challenging when residential communities such as apartments and gated infrastructure are considered. To have a sight on this, systems can measure the water flow and monitor the levels of water and later update on the mobile application, later this can be used to control the motor and fill the tank based on the water level and check water status continuously. The smartphones can create an established communication in managing and distribution of water [8].

Water is precious and has to be conserved. Since the available fresh water on earth is just 3% of the total reserves of water on the whole planet, it is important to use it very carefully and ensure it's not wasted and be judicious. Since wasting water in the current world scenario is due to overflow of tanks and results in water bills getting higher since conventional tanks neither can monitor nor can control the water level leading to a larger amount of wasting of usable water which flows into drainage. Water level monitoring can be controlled by using IoT technology with android applications. Hence by the usage of these methods an efficient and economical solution can be provided which is the main focus [9].

Water being an important aspect in living beings existence, it is a crucial part of everyday life. As an effect of global environmental factors there has an outbreak on the water management and conservation which is vital source for human survival. There are huge needs of products having humanitarian needs for consumers which are developed using technologies such as IoT (Internet of Things). This proposes an Internet of Things based system for water monitoring that could measure the level of water on real-time basis. Water level monitoring is of more concern when used in disaster prone areas where floods occur and when these kinds of devices are used, it is possible to detect the desired parameter and if that parameter called threshold is reached then signals are generated in real time to the social networks. These measurements of water level can be displayed on remote dashboards. This can also be updated on cloud server and communicated long distances as required.

## CONCLUSION

We hereby conclude after surveying the published papers that, monitoring and distribution of water in urban areas where people are in a rush life is very much important to conserve water and the current billing division system is necessary to be upgraded. And the controlling of water levels is required on an automated basis based on the real time availability. There is also a necessity for letting the users know the quality of the water they use or consume every day and it is important to keep an intimation of the same through use of smartphones which are now common in the hands of people.

**REFERENCES**

- [1] S. Joseph, A. Menon, P. Akash and P. Bharath, "Intelligent Water Distribution and Monitoring System," 2021 7th International Conference on Advanced Computing and Communication Systems (ICACCS), 2021, pp. 1110-1113, doi: 10.1109/ICACCS51430.2021.9442031.
- [2] N. Rapelli, A. Myakal, V. Kota and P. R. Rajarapollu, "IOT Based Smart Water Management, Monitoring and Distribution System for an Apartment," 2019 International Conference on Intelligent Computing and Control Systems (ICCS), 2019, pp. 440-443, doi: 10.1109/ICCS45141.2019.9065369.
- [3] M. M. Srihari, "Intelligent Water Distribution and Management System Using Internet of Things," 2018 International Conference on Inventive Research in Computing Applications (ICIRCA), 2018, pp. 785-789, doi: 10.1109/ICIRCA.2018.8597325.
- [4] K. Gupta, M. Kulkarni, M. Magdum, Y. Baldawa and S. Patil, "Smart Water Management in Housing Societies using IoT," 2018 Second International Conference on Inventive Communication and Computational Technologies (ICICCT), 2018, pp. 1609-1613, doi: 10.1109/ICICCT.2018.8473262.
- [5] H. Lim, W. Kim and J. Jung, "Integrated Water Cycle Management System for Smart Cities," 2018 2nd International Conference on Green Energy and Applications (ICGEA), 2018, pp. 55-58, doi: 10.1109/ICGEA.2018.8356311.
- [6] S. Wadekar, V. Vakare, R. Prajapati, S. Yadav and V. Yadav, "Smart water management using IOT," 2016 5th International Conference on Wireless Networks and Embedded Systems (WECON), 2016, pp. 1-4, doi: 10.1109/WECON.2016.7993425.
- [7] P. Verma et al., "Towards an IoT based water management system for a campus," 2015 IEEE First International Smart Cities Conference (ISC2), 2015, pp. 1-6, doi: 10.1109/ISC2.2015.7366152.
- [8] M. S. Bennet Praba, N. Rengaswamy, Vishal and O. Deepak, "IoT Based Smart Water System," 2018 3rd International Conference on Communication and Electronics Systems (ICES), 2018, pp. 1041-1045, doi: 10.1109/CESYS.2018.8723969.
- [9] P. P. Shah, A. A. Patil and S. S. Ingleshwar, "IoT based smart water tank with Android application," 2017 International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud) (I-SMAC), 2017, pp. 600-603, doi: 10.1109/I-SMAC.2017.8058250.
- [10] T. Perumal, M. N. Sulaiman and C. Y. Leong, "Internet of Things (IoT) enabled water monitoring system," 2015 IEEE 4th Global Conference on Consumer Electronics (GCCE), 2015, pp. 86-87, doi: 10.1109/GCCE.2015.7398710.