



A Review on Smart Water Bottles

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Abstract: The way individuals remain hydrated and keep track of their water intake is being revolutionized by smart water bottles. These cutting-edge bottles communicate with mobile applications to provide goal tracking and real-time updates. In the below literature survey, we can see the different varieties of developing smart bottles using trending tech like IoT and fingertip software and acquaint features they can hold within themselves to ensure human wellness. They are perfect for people who have trouble staying hydrated since they provide ongoing reminders to drink water. Smart water bottles are popular with people who are concerned about their health.

Keywords: IoT(Internet of things), Smart water bottles, Wellness device.

I. INTRODUCTION

The foremost necessity for any human being is to lead a happy and healthy life. We all know, as the common saying goes, "Prevention is better than cure", we have taken a step toward a healthier future by simply reminding them to stay hydrated by having in mind that small steps make significant differences. Smart water bottles are a huge breakthrough for those trying to be healthier (and sometimes failing). They track your water intake & sync the data with a mobile phone app to keep your hydration cues updated in real-time and to chart your goals. The Bottle is one of the best smart water bottles for those who need constant reminders as it constantly reminds you to keep drinking water. According to experts, Water is critical for your heart health because your heart is constantly working, pumping about 2,000 gallons of blood a day. Because the heart compensates for dehydration by pumping faster, dehydration can force the heart to work harder. Sometimes you can feel the heart beating for people with heart disease, harder work for the heart can cause chest pain. By staying hydrated – that is, by drinking more water than you are losing – you are helping your heart do its job. Also, more than one million plastic bottles are consumed worldwide every minute, but every time you choose to refill aqua bottles, you're choosing not to generate more plastic waste.

Smart water bottles will predominantly appeal to those who take their health and fitness seriously and see hydration as another part of their well-being. You can check your progress and also know how much more you have to drink to achieve the daily goals that are set. This analysis will encourage a happy and healthy lifestyle by prompting users to drink water regularly. Given that 70% of the human body is water, which is fundamental for human health, the initiative places a strong emphasis on prevention as a vital component of overall well-being. This type of smart bottle can promote incremental improvements in hydration, which will lead to a healthier future.

II. LITERATURE SURVEY

J LAXMI LAHARI et al., [1] The Smart Interactive Water Bottle tracks daily intake and sends reminders in an effort to help people consume water consistently. It connects a Waterproof Ultrasonic Sensor to a NodeMCU that has been programmed in order to measure water use. The Adafruit Io application provides monitoring and analysis of water intake behaviors, and a buzzer warns the user to drink water. Users of this smart bottle can maintain adequate and controlled hydration for a healthy lifestyle.

Emil Jovanov, Vindhya R Nalla Thumma Reddy Gari, Jonathan E. Pryor et al., [2] IoT and tiny wearable biosensors have grown quickly, creating new opportunities for customized eHealth and mHealth services. This study focuses on a smart water bottle that integrates physiological sensors to track user activity, fluid levels, and physiological characteristics. Integration into a personal body sensor network and a cloud-based device are two system topologies that are being assessed. The prototype device's system architecture and initial field testing outcomes are presented in the publication.



Nam Eui Lee, Tae Hwa Lee, Dong Heui Seo and Sung Yeon Kim et al., [3] This study focuses on the significance of water intake for elderly people who frequently are unaware of correct water consumption practices. The study uses questionnaires and interviews to identify barriers to and patterns of water intake among seniors. The study suggests using a smart water bottle equipped with IoT technology to advise and promote regular and appropriate water consumption among older patients in hospital settings in order to address these difficulties.

Angga Edwin Wijanarko, Maman Abdurohman, Aji Gautama Putrada et al., [4] This study introduces an IoT and fuzzy logic-based smart water bottle system. The system calculates water consumption levels using input data from temperature and water level sensors. Drinking requirements are divided into three groups by the Fuzzy Inference System: Low, Medium, and High. To reliably anticipate water consumption, fuzzy logic is used, and the results are delivered to a server as a drink reminder signal. The study puts the system to the test using a 3-hour notification window and shows how well it can forecast water use. The outcomes demonstrate the smart water bottle system's potential for precisely monitoring and forecasting water intake.

Rachel Cohen, Geof Fernie & Atena Roshan Fekr et al., [5] In this study, four commercially available smart bottles for tracking fluid consumption are tested for usefulness and performance. H2OPal, HidrateSpark Steel, HidrateSpark 3, and Thermos Smart Lid were the bottles that were put to the test. For each bottle, one hundred intake events were recorded and compared to actual weights taken on a high-resolution scale. The H2OPal demonstrated the lowest Mean Percent Error (MPE) and uniformly dispersed mistakes over several sips. The HidrateSpark 3 showed the lowest per sip error and consistently dependable findings. By minimising individual errors, linear regression increased MPE values for HidrateSpark bottles. Due to its sensors not extending through the full bottle, the Thermos Smart Lid had the lowest accuracy, which led to missed recordings.

Bhojraj Agarwal et al., [6] An overview of IoT-enabled water bottles that can communicate with their surroundings is given in the article. These "smart" bottles make use of sensors to continuously track fluid levels, activity levels, and physiological traits. Utilising actuators, the analysed data is used to carry out the necessary operations. People who are concerned about their health will benefit from this technology, which also has potential uses in the healthcare sector.

A F Akbar and P Oktivasari et al., [7] Due to poor water awareness, a sizable section of the population in Indonesia experiences dehydration. This problem is addressed by the Smart Bottle application, which offers tailored daily water intake advice based on user profiles. The Waterflow Sensor is used to precisely determine water usage. Automatic water consumption calculation and push notifications to remind users to drink water are both features of the hybrid Android application that was created using the Ionic Framework and Laravel. It uses Firebase Cloud Messaging to transmit notifications. In general, the Smart Bottle app aids users in their busy life by keeping them hydrated and preventing dehydration.

Sumit Kor, Rohit Shinde, Amol Bhosale, Dr. Vijay R. Sonawane et al., [8] IoT's explosive expansion has created new possibilities for customised eHealth and mHealth services. The IoT-based smart water bottle that precisely analyses the hardness and temperature of the water inside is the subject of this case study. A smart bottle coupled to a personal body detection network and a cloud-based device are the two system configurations that are being studied. Water is essential for human health since it gives the body minerals and vitamins and keeps it hydrated. The purpose of the smart water bottle is to remind users to drink water when they should, with a focus on the elderly who may not understand the value of regular hydration. The study suggests an IoT-based sustainable business model for water intake in healthcare.

Sonali Vishwakarma, Anushree Goud et al., [9] The paper gives a general overview of how to make a smart water bottle utilising IoT (Internet of Things) technology. Water quality can be affected by a number of circumstances, and it is essential for human life. The smart bottle uses sensors to track these variables continually and in real time. The system processes the data that has been acquired, and if necessary, it uses actuators to conduct the appropriate actions. The healthcare industry, where precise care is crucial, can also use this technology, which is advantageous for health-conscious people. Overall, the article emphasizes how IoT has the ability to produce creative water monitoring and management solutions.

III. SUMMARY AND OBSERVATION

A literature survey on smart bottles using IoT technology involves a comprehensive review of academic research papers, conference proceedings, patents, technical reports, and other relevant sources of information. The survey aims to identify and analyze the key themes, research trends, and technological advancements in the field of smart bottles, while also examining the practical implementations and potential future directions. The literature survey of smart bottles using IoT



technology begins by exploring the fundamental concepts of IoT and its application in the context of bottles. It investigates the integration of various sensors, connectivity options, and data processing techniques that enable these bottles to collect, transmit, and analyze data in real time.

Furthermore, the survey investigates the role of cloud computing, edge computing, and data analytics in managing and interpreting the vast amount of data generated by smart bottles. Moreover, the literature survey delves into the applications of smart bottles in different sectors, such as healthcare, fitness, sports, and logistics. It examines how these intelligent bottles can monitor hydration levels, track medication adherence, measure and analyze liquid intake, provide personalized recommendations, and facilitate efficient inventory management. The survey also explores the potential environmental benefits of smart bottles, such as reducing plastic waste through improved reusability and recycling.

In addition, the literature survey highlights the challenges and limitations associated with smart bottles using IoT technology. It investigates issues related to data security, privacy concerns, power management, interoperability, and user acceptance. Furthermore, the survey analyzes the existing solutions and research efforts aimed at addressing these challenges and enhancing the overall performance and usability of smart bottles. Overall, a literature survey on smart bottles using IoT technology provides a comprehensive overview of the state-of-the-art research and developments in this field. It helps researchers, engineers, and industry professionals to identify research gaps, formulate new research questions, and devise innovative solutions for creating intelligent bottle systems that revolutionize various industries and improve the lives of individuals.

IV. CONCLUSION

The smart water bottle is an innovative innovation that uses a combination of technologies to improve hydration experiences. Overall, the smart water bottle is an exciting development in connected devices and personal wellness.

REFERENCES

- [1] **Jalagam Laxmi Lahari**, 2021. IoT Based Smart Water Bottle. Available at SSRN 3919060.
- [2] **Jovanov, E., Nallathimreddygari, V.R. and Pryor, J.E.**, 2016, August. SmartStuff: A case study of a smart water bottle. In 2016 38th annual international conference of the IEEE engineering in medicine and biology society (EMBC) (pp. 6307-6310). IEEE.
- [3] **Lee, N.E., Lee, T.H., Seo, D.H. and Kim, S.Y.**, 2015. A smart water bottle for new seniors: Internet of Things (IoT) and health care services. *International Journal of Bio-Science and Bio-Technology*, 7(4), pp.305-314.
- [4] **Wijanarko, A.E., Abdurrohman, M. and Putrada, A.G.**, 2019, April. A Fuzzy Logic Based Internet of Things (IoT) for Smart Water Bottle. In 2019 5th International Conference on Computing Engineering and Design (ICCED) (pp. 1-6). IEEE.
- [5] **Cohen, R., Fernie, G. and Roshan Fekr, A.**, 2022. Monitoring fluid intake by commercially available smart water bottles. *Scientific Reports*, 12(1), p.4402.
- [6] **Bhojraj Agarwal**, A Review Study on Smart Water Bottl. **International Journal of Innovative Research in Computer Science & Technology (IJIRCST)** , Vol-9, Issue 3., May 2021, ISSN 2347 – 5552
- [7] **Akbar, A.F. and Oktivasari, P.**, 2019, April. Smart bottle work design using water flow sensor based on Raspberry Pi and Android. In *Journal of Physics: Conference Series* (Vol. 1193, No. 1, p. 012007). IOP Publishing.
- [8] **Kor, S., Shinde, R., Bhosale, A. and Sonawane, V.R.** IOT SMART WATER BOTTLE. *International Research Journal of Modernization in Engineering, Technology, and Science* Volume:04/Issue:06/June-2022
- [9] **Sonali Vishwakarma 1*, Anushree Goud 2.** A Literature Review on Smart Bottle using IOT. *International Journal of Computer Sciences and Engineering* Vol. 7(6), Jun 2019, E-ISSN: 2347-2693