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SMART WATER BOTTLE – A REVIEW

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ABSTRACT

As water is the basic need of humans, therefore its proper consumption is also very important. So to keep it in check, water bottle can be assisted with various features such as temperature sensor, led lights, sanitizer, etc. which may help in reminding people to have proper intake of water and at regular intervals. With the help of Internet Of Things, these features can be easily devised into the bottle which makes it one of a kind. The material used in the bottle is SUS 304 stainless steel. Temperature sensor is also installed into the cap of the bottle which displays the temperature of the fluid inside. Bluetooth speakers is also a great feature provided on the surface of the bottle in order to create the atmosphere which varies from person to person. LED lights gives the indication of the range of temperature of fluid inside the bottle. So this bottle is a complete package for the consumers which can be used for various purposes

Keywords: Temperature sensor, Speakers, LED lights.

1. INTRODUCTION

Smart water bottles are a huge breakthrough for those of us trying to be healthier. They track your water intake, typically connects with mobile phone via Bluetooth or aux cable to provide pleasant music experience along with how much amount of water you drink can be measured easily. As the name suggest SMART, so it must have something special and different from an ordinary water bottle. The main application of water bottle is to keep the person hydrated ensures that your body is running properly, increases brain function, aids in digestion, maintains weight loss goals, increases energy and cleanses the body from harmful toxins, but behind all this, the thing which really matters is "What type of water we are drinking". Hence, we are coming with an idea that we must do some innovations in our water bottle to increase its productivity. The main benefit of this bottle will be for the ones who regularly workouts and go to parks or for jogging to places, this bottle can be carried along with them as it will refresh them. This bottle has various function:

Water level scale will measure the amount of water present in the water bottle so that the person using is aware of how much quantity he\she has drunk. High base Bluetooth speakers- this bottle also consists of speakers which we can connect through mobile phones via Bluetooth so that when the person goes to parks or trips, he\she can enjoy listen songs. Temperature indication panels- these panels will help us to measure the water temperature inside the bottle. As soon as the water is poured into the bottle the temperature of the water inside the bottle will be displayed. Lighting panels- this. bottle also contains lighting panels along its sides which will make the innovative, attractive and impressive. Sanitizer - as we all know that Sanitizer is very important in today's era of time so well have include Sanitizer at its base so that when we press the bottle toward the ground, we can sanitize our hands to provide good hygiene

This bottle is cylindrical in shape with a length of 25cm, a base diameter of 6.5 cm, 500 ml quantity, 200 gm in weight and 3-layer coating of steel and carbon (so that the water temperature inside the bottle can't increase or decrease) and a temperature display at the top of screen. a USB cable slot (300 mAh battery).

2. DISCUSSION- WORKING OR FUNCTIONING OF SMART WATER BOTTLE

After going through a detailed analysis of different 24-25 Water bottles invented. We can conclude the best functionality of Smart Water bottle depends upon their usability and affordability. The common function of this smart is that it tracks your water intake, typically connects with mobile phone via Bluetooth or aux cable to provide pleasant music experience along with how much amount of water you drink can be measured easily. As the name suggest SMART, so it must have something special and different from an ordinary water bottle. The main application of water bottle is to keep the person hydrated ensures that your body is running properly, increases brain function, aids in digestion, maintains weight loss goals, increases energy and cleanses the body from harmful toxins, but behind all this, the thing which really matters is "What type of water we are drinking". Hence, we are coming with an idea that we must do some innovations in our water bottle to increase its productivity. The main benefit of this bottle will be for the ones who regularly workouts and go to parks or for jogging to places, this bottle can be carried along with them as it will refresh them

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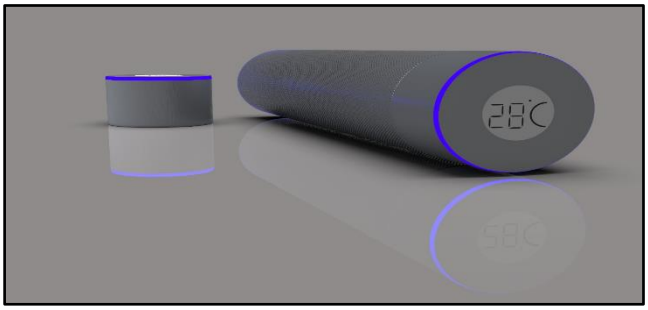

Figure 1: CAD model

The complete Smart bottle includes the following activities-

- Temperature sensor at the top of the display
- Lighting Panel
- Bluetooth Speakers
- Cheap and effective

3. FEATURES OF SMART WATER BOTTLE

3.1 Temperature Sensor

Temperatures sensor chips are semi-conductors or packages that have build-in temperature detectors. The water bottle uses intelligent display temperature which shows the temperature of the water. This display works on touch control. Intelligent display temperature is provided on the top of water Lid. The bottom of the temperature display has a temperature sensor chip which measures the correct temperature, it saves power for very long time and there is no need to change the battery.

3.2 Bluetooth Speakers

It consist of a wireless Bluetooth speaker that will allow you to listen to music anywhere.You can enjoy the crispy and deep song. The in-built 300mah battery works for long hours. You can charge it with USB to enjoy uninterrupted music. It has a resistance of 8 OHM and RMS 0.5W. Bluetooth chipset is perfectly compatible with any IOS and android device. Bluetooth transmit distance over. It has a waterproof design and 360-degree surround stereo sound.

3.3 Lighting Panel

This bottle will be surrounded by the lighting panels with multiple colour combinations. This bottle will glow to remind you about drinking water. The colour of the bottle will change after fixed time so that you can remember drinking more water. Use this bottle as the best way to stay hydrated and healthy. Basically the change in colours indicated the change in temperature of the water. This is a unique way to let you develop the habits of drinking water in a fun-filled way

3.4 Nylon Billet

It is the outermost covering of the bottle. As we mentioned earlier that we are sealing a normal bottle with some accessories. So to wind them properly, we have created this layer in order to get a better design.

4. RELATED STUDIES OR MARKET SURVEYS

4.1 Market Adherence

Dana De Meo and Michael Morena have worked to solve one of the major problem in healthcare center, that is patients not taking medicines/pills at prescribed time and missing it due to various reasons which causes delay of results in treatment. Around 60% of the people face this problem and have trouble in getting well. This bottle can be connected to the cloud and transfers data about the quantity content inside and also the cap open/close timing. Lights and chimes are activated at the right/correct/prescribed time of intake. These signals can be easily visible and audible. It can also be customized according to the industry and customer as per the usage.

4.2 Hydration Reminding Smart Bottle: IoT Experimentation

Dr. P. B. Pankajavalli, Mr. R. Saikumar, Mr. R. Maheswaran have proposed the model of a water bottle which reminds humans to intake water after certain interval of time so that the person doesn't feel dehydrated. The Water Float Sensor present in the bottle detects the level of water as low or high. RS232 chip decides the type of message to be sent and then instructs the GSM Modem that provides voice and data related services to communicate with the electronic device e.g., mobile phone after which the person receives message in the form of SMS on the mobile screen reminding him/her to drink water and stay hydrated. Also the power consumed for this proposed model was 5v.

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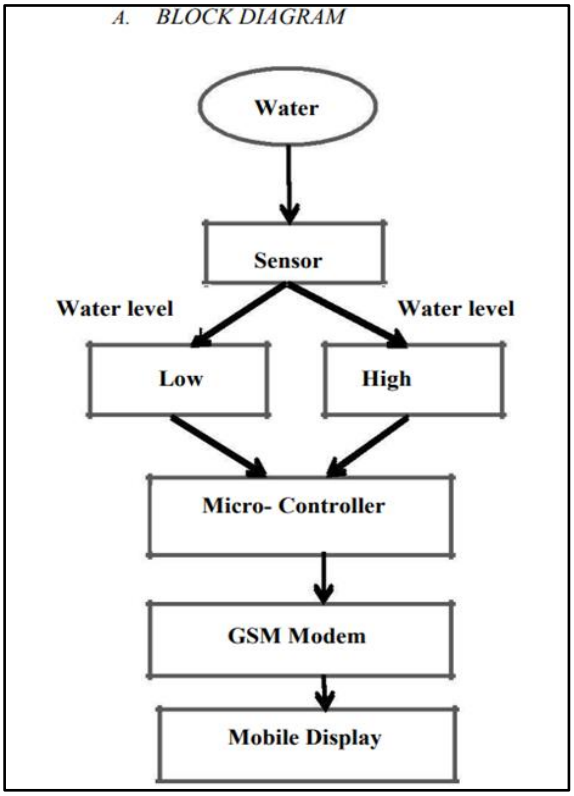

Figure 2: Block Diagram of GSM Modem

4.3 IoT BASED SMART WATER BOTTLE

J Laxmi Lahari proposed the idea of a smart water bottle which can

help us in keeping track of the amount of water we drink daily or the last time we drank. It also reminds to refill the water bottle and assists the consumer to improve his water drinking habits. An ultrasonic sensor is installed inside the cap of the bottle which is waterproof in nature. It will help in determining the water level inside the bottle for which the outputs will be shown in Adafruit IO feeds. Its data changes with change in the level of water. The buzzer rings whenever the water level is zero inside the bottle and stops once the bottle is refilled. It also rings to remind the consumer to drink water if he hasn't drank for more than 2 hours.This idea combines technological and health related aspects and also promotes a healthy lifestyle.

4.4 A Self-monitoring Water Bottle for Tracking Liquid Intake

Bo Dong, Ryan Gallant, and Subir Biswas have worked on a water bottle which target the intake of water regularly as it is the basic need of human body and it is needed for its normal functioning. They basically made a band and attachment which can be attached to any normal water bottle and make it a smart Bottle by tracking the intake of fluid of the user. It is a Bluetooth based device which will send all the details about drinking habbit of the user to their respective smartphones when connected and remind them to drink if the intake is low at regular interval of time. It basically works on the detection of volume of fluid/water inside the bottle.The best part about it is that we don't need the whole bottle we just need a band and can attach it to any regular water bottle and make it a smart one.

4.5 GROW: A Smart Bottle that Uses its Surface as an Ambient Display to Motivate Daily Water Intake

Gul Kaner, Deniz Erdogan, Huseyin Ugur Genc developed a smart water bottle named 'grow'. It is a conceptual to encourage users to drink water. As we know water is a basic requirement for human body. However, individuals ignore drinking water due to their busy schedule. So they created a bottle which would help people to meet their daily water requirements. This bottle is embedded with liquid level sensor and uses bottle surface as an ambient display to track and monitor daily water consumption of an individual. A bottle also contains a thermo-chromic print over the surface of bottle, so that by heating different parts of print, bottle gives positive, aesthetic and non-intrusive feedback.

4.6 Accuracy of daily fluid intake measurements using a “smart” water bottle

Borofsky MS et al. have worked on water bottle which helps to measure the intake of fluids by the person using it, specially used for high intake for kidney stone patients. It uses touch sensing and measures the level of water inside. It can all be watched/viewed over the smart phones with all the data day wise using an application. Survey was also done on people for 2 weeks to check bottles pros and cons. It came out to be efficient within 3% range. It can be a great and cost effective measure to reduce decrease like kidney stones without any medication just by helping the person to intake right amount of fluid per day.

4.7 Smart Eco-Usb Charger Water Bottle

Mohd. Rizwan Bin busmah, Mohd. Yuzaimee bin mohd, discovered a bottle named "smart eco-USB charger water bottle".They were aware with the fact that now everyone's life is surrounded by electronic device. So they came up with the idea to promote active lifestyle among people means consumer of the bottle can save their time electricity to charge their gadgets. This bottle is suitable for people's in every phase of their life. This bottle is embedded with LED stroke strip, low profile tact switch, mini water turbine & LCD display. The bottle is made from low density polythylene. This bottle is full of great features, price is reasonable and most importantly no physical energy is used.

4.8 A Study Into Designing An Ambient Water Bottle That Supports Users' Water-Intake Tracking Practices

Genç, Hüseyin Uğur have worked on a (smart)water bottle which will help/motivate people to drink their water and fluids regularly by tracking the intake. Two studies were conducting before finalising anything one was about the requirement of the user and second was about the design of the bottle many people were involved and finally bottle was designed according to the conclusion taking everybody points opinions and requirements in mind. User-friendly and easy to understand display was used to remind about the intake of water at regular interval of time. Personalized feedback was also added using the colours and Graphics on the screen which will tell user about how much intake he did or how much of the target he achieved.

4.9 Galef, the Smart Bottle Companion to Achieve a Healthier Life

Midori Sanchez, Marcela Gonzales have developed a smart bottle named 'Galef' which helps the user to be healthier by reminding them to take their recommended daily ration of water, monitoring sugar level in the drinks they put in it and measure their body composition regularly in order to improve health. It also has three accessories water filter and the other two are aimed for people who would prefer water flavoured naturally instead of alone; one is a container for infusions and other is a fruit crusher. Galef differs from other smart bottles because it controls not only the amount of water consumed, but also the sugar levels in beverages the user puts in it and regularly measures the user's impedance to calculate the body composition.

4.10 A 'Smart-Bottle' humidifier assisted air-processed CuSCN inorganic hole extraction layer towards highly-efficient, large-area and thermally-stable perovskite solar cells

Sawanta S.Mali, Jyoti V.Patil and chang Kook Hong have developed a smart bottle which is long term thermally stable via low-cost extraction layer(i-HEL). The low-cost, thermally stable inorganic copper(I) thiocyanate(CuSCN) i-HEL is the best choice due to its unique diethyl sulphide solvent solubility. The developed method is most simplistic, ambient-air processed, cheapest and could be suitable for large area deposition. they came up with a fact that photovoltaic parameters are also stable for small as well as large devices after 1000 hrs. The fabrication of ultra-large area using SBHA method is underway in our laboratory.

4.11 SmartStuff: A Case Study of a Smart Water Bottle

Emil Jovanov, Vindhya R.Nallathimmareddyyari & Janathan E.Pryor have discovered a smart water bottle using a technique of iot(internet of things) & biosensor which will create new opportunities for digitalised health systems. They present a bottle specification like measuring the amount of liquid in bottle, monitoring and also physiological parameters. They came up with a fact that if objects of daily use get concatinated with the internet service and digitalisation, then new opportunitiesfor the good performance of the bottle.

4.12 Healthcare Services and a Smart Water Bottle for Early Seniors: A Design Concept Based on a GoalDirected Design Process

Nam Eui Lee, Tae Hwa Lee, Seo Dong Heui, Sung yeon kim discovered a smart water bottle and provide healthcare services to old peoples. In old people the central nerves tend to slow down due to which the body lacks water. They organise lots of surveys, insights & also provide a structure of correct water intake habits. They came with a fact that 75% of respondants are not feeling thirsty and 47% intake water intentionally for health purpose even they were not thirsty. Most of the respondants are on medication, which also affects the water intake effectively. It is not easy to form new habits. So they all created a bottle based on iot technology which is equipped with weight sensor and other functions also, to track and monitor daily water consumption of an individual a bottle also contains a thermo chromic print over the surface of bottle.

4.13 A Fuzzy Logic Based Internet of Things (IoT) for Smart Water Bottle

Annga Edwin Wijanarko, Maman Abdurohman & Aji gautama putrada discovered a smart water bottle using iot(internet of things) embedded with fuzzy logic. With the help of this method, the prediction of the consumption of drinking water for daily activity is quite accurate. They have also tested this model to predict the appropriate output. In addition to it they have also reasearched on the importance of water intake for health benefits.

5. CONCLUSION

It has been concluded that a bottle which is financially, economically feasible can be made with various features but not all that are mentioned for daily purposes which can be used by common man in day-to-day use serving basic features along with some extra enhancement which can be done in minimal cost and weight. The extra features provided in this bottle which make it

extra ordinary are the temperature sensor which detects the temperature of the liquid or fluid inside. Other than this Bluetooth speakers have been used to attract potential customers. Led lights act as indicator and its color changes based on temperature. A small portion has been provided at the bottom section of the bottle which ejects sanitizer to help protect from germs and can be used while travelling as well.

6. REFERENCES

[1] M. S. Borofsky, C. A. Dauw, N. York, C. Terry, and J. E. Lingeman, "Accuracy of daily fluid intake measurements using a 'smart' water bottle," Urolithiasis, vol. 46, no. 4, pp. 343–348, Aug. 2018, doi: 10.1007/s00240-017-1006-x.

[2] Institute of Electrical and Electronics Engineers, 2014 11th International Conference & Expo on Emerging Technologies for a Smarter World (CEWIT) : location: Melville, New York, 11747, USA : dates: October 29-30, 2014. Gyusoo Kim and Seulgi Lee, "2014 Payment Research", Bank of Korea, Vol. 2015, No. 1, Jan. 2015.

[3] Institute of Electrical and Electronics Engineers, 2017 Innovations in Power and Advanced Computing Technologies (i-PACT) : 21-22 April 2017.

[4] J. L. Lahari, "IoT BASED SMART WATER BOTTLE." [Online]. Available: https://ssrn.com/abstract=3919060

[5] F. . IEEE Engineering in Medicine and Biology Society. Annual International Conference (38th : 2016 : Orlando, IEEE Engineering in Medicine and Biology Society, and Institute of Electrical and Electronics Engineers, 2016 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) : 16-20 Aug. 2016

[6] A. E. Wijanarko, "A Fuzzy Logic Based Internet of Things (IoT) for Smart Water Bottle," 2019

[7] N. E. Lee, T. H. Lee, S. D. Heui, and S. Y. Kim, "Healthcare Services and a Smart Water Bottle for Early Seniors: A Design Concept Based on a GoalDirected Design Process," Apr. 2015, pp. 200–203. doi: 10.14257/astl.2015.88.42.

[8] B. D. Ieee, S. Member, R. G. Ieee, S. B. Ieee, and S. Member, "A Self-monitoring Water Bottle for Tracking Liquid Intake," 2014. doi: 10.0/Linux-x86_64.

[9] A. Coskun, M. Yıldız, H. Yılmazer, and H. U. Genç, "A study into designing an ambient water bottle that supports users' water-intake tracking practices," in Proceedings of the Design Society, 2021, vol. 1, pp. 241–252. doi: 10.1017/pds.2021.25.

[10] G. Kaner, H. U. Genç, S. B. Dinçer, D. Erdoğan, and A. Coşkun, "GROW: A smart bottle that uses its surface as an ambient display to motivate daily water intake," in *Conference on Human Factors in Computing Systems - Proceedings*, Apr. 2018, vol. 2018-April. doi: 10.1145/3170427.3188521.

[11] P. Z. Binti and Z. Abidin, "FACULTY OF HEALTH SCIENCES TECHNOLOGY ENTREPRENEURSHIP (ENT600) 'SMART ECO-USB CHARGER WATER BOTTLE' PREPARED FOR," 2015.

[12] S. N. Divekar, V. N. Patil, S. B. Puri, R. R. Pawar, S. A. Shinde, and M. R. Ujagare, "Portable Water Bottle Heating and Cooling System Cite this paper Portable Water Bottle Heating and Cooling System," Int. J. Sci. Res. Sci. Eng. Technol. IJSRSET Int. J. Sci. Res. Sci. Eng. Technol. IJSRSET2073111 | Accept., vol. 7, no. 10, pp. 389–393, 2020, doi: 10.32628/IJSRSET

[13] S. S. Mali, J. V. Patil, and C. K. Hong, "A 'Smart-Bottle' humidifier-assisted air-processed CuSCN inorganic hole extraction layer towards highly-efficient, large-area and thermally-stable perovskite solar cells," J. Mater. Chem. A, vol. 7, no. 17, pp. 10246–10255, 2019, doi: 10.1039/c9ta01094g

[14] M. Sanchez and M. Gonzales, "Galef, the Smart Bottle Companion to Achieve a Healthier Life," in ACM/IEEE International Conference on Human-Robot Interaction, Mar. 2018, pp. 363–364. doi: 10.1145/3173386.3177831.