

## DESIGN AND FABRICATION OF WATER REHYDRATOR

T. Yugandhar<sup>1</sup>, Pranahith Babu Yarra<sup>2</sup>, K.Bhargav Sai Ram<sup>3</sup>, Sai Suraj Karra<sup>4</sup>,

S. Madhava Reddy<sup>5</sup>

<sup>1-4</sup>Dept. of Mechanical Engineering (Mechatronics), Mahatma Gandhi Institute of Technology

<sup>5</sup>Professor of Mechanical Engineering (Mechatronics), Mahatma Gandhi Institute of Technology

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**Abstract** - Water is an important element for human body. Many people tend to forget to drink water. As human being gets older, the sensation of thirst decreases, kidney function decreases due to the medication older people take and the amount of muscle cell also decreases. This device is a hydration device that encourages people to drink water frequently. The hydration reminder will remind the user to take sips of water throughout the day with light, vibration and phone notification reminders. This paper is dedicated to keeping users hydrated and remaining moisture in order to achieve their daily water withdrawal goals. how is it? When the user sets the goal and puts the water bottle on this device, it divides the goal into several different intervals and informs the user through the led lights around the base. Initially, when the device needs to be hydrated, the device displays a colour. If the user does not drink water or lift the bottle from the base after a period of time, it means another colour. This instruction produces the psychological effect of prompting the user to drink water. In this paper includes health apps, smart water bottles, desktop water heaters, physical IoT devices, medical devices and UX case studies to maintain healthy habits without the hustle and bustle. Aim of this paper is to bring the aspect of the app to a user-friendly device, which will be more like a smart home device. However, smart devices that do not work alone are cost-effective.

**Key Words:** Water remainder, Water importance, IoT, Medical, Arduino

### 1. INTRODUCTION

This Human adult body is composed of water up to 60 per-centage. According to H.H. Mitchell, Journal of Biological Chemistry 158, human being brain has collection of 94% water, lungs are 91 percentage, blood is 83 %, muscles are 76 percentage, and bones are 22 percentage water. From the stated facts, it is seen as an essential part for everyone to keep their bodies hydrated for health purposes. But hydration also helps

to keep up human body composition, mental focus, sleep and recovery. Water is also the key constituent of blood, which supplies cells with oxygen and nutrients and transports waste out of the body, Water regulates internal body temperature, Water lubricates joints, water cushions vital organs. Intake of enough water is very important for everyone. Several of us are aware of the usefulness of adequate water intake in our bodies. But every day we end up drinking less water than we should. There is also a universal rule to calculate your water requirement, like for every 20 kilos of human body weight, you must drink a liter of water. So, on a average we must consume 2 liters of water. During climatic change, our daily water requirement is much more than 2 litres. Our project concentrates on keeping the users hydrated as well as remainder to complete their daily water intake targets. How? When the user sets a target and place a water bottle on our device, it splits the target into several different intervals and notifies the user by a LED light around the base. Initially, the device shows a color when it is the time to be hydrated the device indicates another color. If the users don't drink water after a period of time or lifting the bottle from the base, it will indicate another color. This indication creates a psychological effect urge for the user to drink fluids. With many water drinking reminder apps around, the importance of drinking enough water has never been emphasized more than today. We found they are just reminders and not able to detect if we had taken one sip in the assigned hour. So, we provided a load cell from which the certain weight is derived. Creating a true remainder and physical presence of our device can't be bypassed unless the user drinks or tampers the bottle. In the case of dehydration headaches, dizziness, fatigue and in some cases, fainting can be seen. If the body suffers through a water deficiency, the lymphatic system, the system that helps maintain fluid balance, makes sure essential cells stay hydrated at the cost of damage to less important ones, causing your body to perform less efficiently. So, our basic ideology of the proposed project is to create a solution to enhance and

supremely enable anyone who is dehydrated or has issues drinking water properly. We can easily extend this device into other projects and can monitor other parameters. As we generally tend to forget to drink water, this device can be helpful one to view their daily total water intake while you are on the desk. The implementation of IFTTT services for notification is also a further help when the user is away from the desk.

## 2. METHODOLOGY

### 2.1 Designing base

The base should idle to be place on any desk or computer table and also it should provide enough surface area. So, that various size and capacity of bottles, fluid containers, cups and jars could be placed. So, we came up with an enlarged coaster design. As we have several software's to design, we choose solidworks to design. So, that it can be used for further reference to project various views and generate 3d printed model as well. The calculated area of the base was supposed to be 50.26cm<sup>2</sup>. But as the components took much volume the final area became 176.71cm<sup>2</sup>. The average base diameter of any water bottle or beverage bottle is 19.63cm<sup>2</sup>, which would perfectly fit any bottle or drinking glass.

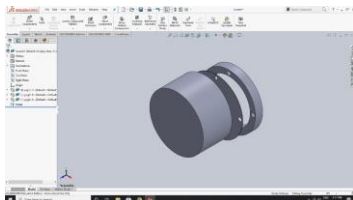


Figure 1: - Design of base

### 2.2 Circuit Diagram

The below is the working of the product, Explained with the help of a circuit diagram. The Loadcell is connected with an Analog to Digital converter known as HX711, which is directly connected to Arduino Microcontroller, which is the control unit of the project. The 3 LEDs are connected to the controller to react to the amount of water which is placed on the Loadcell. A buzzer element is used as the alarming unit for the user.

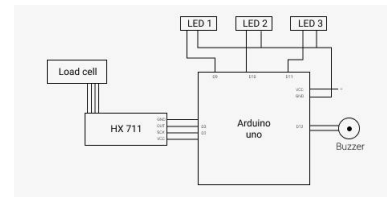


Figure 2: - Circuit diagram

## 3. SELECTION OF LOAD CELL

The main component in the project is the loadcell. So, a Suitable loadcell needs to be selected for easy and convenient weighing of the water bottle unit. Strain gauge load-cell is one of the most economical load-cell and also has wide variety of load carrying capacity. Main Reasons for taking Strain Gauge load cell into considerations are: -

- They are compact in size than any other load cell in market.
- These have wide range of load sensing capacity.
- Very reasonable and easily available in the market.
- Easy to use and Very easy to connect with any Micro-Controller (in our-case Arduino).

### 3.1 Why are we using Arduino UNO as the Controller?

The Arduino Uno is one amongst the foremost common Arduino boards obtainable, and it's some easy options, together with giant two. 54 mm pitched sockets for connecting to external devices, associate degree aboard light-emitting diode, inherent power handling (such as associate degree external DC power jack), and an oversized USB B connector for connecting to a laptop. The Arduino Nano has most of constant options (with the exception of a smaller USB port and no DC power jack), however it's higher suited to comes exploitation breadboards. This makes it best for United Nations agency those that people who are already electronic-savvy and who have already got bread board circuits prepared. The Nano is additionally terribly tiny (18mm by 45mm), and it's ideal for things wherever movability is very important.

The above circuit defines the connection of Loadcell to HX711 (ADC) to Arduino. Loadcell is connected with 4 Jumper wires onto HX711,

- RED E+ → GND
- BLACK E- → DT
- WHITE A → SCK
- GREEN A+ → VCC

Whenever loadcell is activated, which is nothing but the bridge sensor being activated, this activated bridge sensor sends the analog input to the HX711 loadcell amplifier, the HX711 takes this analog input and converts it into a micro-controller understandable digital input. This digital output will be an input to the Arduino UNO and will enable a communication between the Loadcell, HX711 and Arduino UNO. Here comes the feedback mechanism, each and every time the bottle is lift from the base the weight is compared before and after the bottle is put back on the base, so through our IOT smart communication we will check if the user has drunk enough water according to his daily quota.

### 3.2 IFTTT App Creation Implementation

IFTTT descends its name from the programming conditional statement “if this, then that.” The company provides a package that connects applications, electronic devices and facilities from different developers in order to trigger one or more mechanizations involving those apps, devices and services. Now let us see how to create the applet step-by-step.

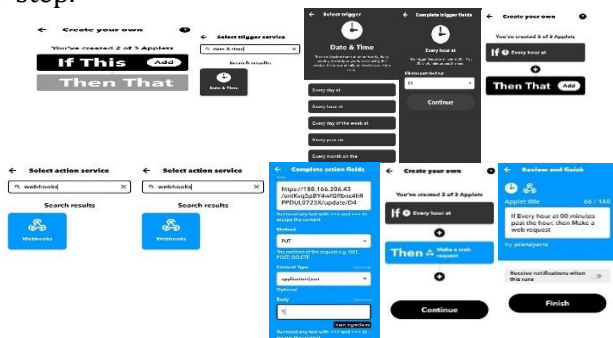


Figure 3: - Above is cumulative process of IFTTT initiative

Step – 2: - Then we select “Date Time” as our trigger service. It is because, the user needs to be reminded every hour to drink water.

Step 3 After creating “If This”, now we create “Then That” option. Here we will go with “Webhooks”. The Webhooks provision allows you to integrate other services on IFTTT with the project via simple web requests. Initially we make a web request, so the required data is IP, Authentication token. The IP is found by knowing the country IP address. The authentication token is known by initially creating a project in Blynk software. Where they will be giving us the project API link. This API link will be used to fetch the request from our IFTTT applet. Here we are using PUT method request to update an existing record in the data source. In the Body we have mentioned “1”, as we want the remainder to be alarmed every 1 hour.

Step 4: - After making the web request, we combine both “If This” “Then That” options finally finish the set up then get connected to the device

### 4. RESULTS DISCUSSIONS

Due to built-in computational power and other capabilities of Microcontrollers and Microprocessors, these can be used for assistance to elder people and the people in need of Reminder. The purpose of this product is to make water remainder system for the timely assistance of human being and in need of passive drinking. Another purpose is how to use Smartphone technology and built-in sensors for the assistance of cognitive disabled/elder people. Why do we require Remainder system?

- To make timely alarm and tell user to drink water (Which has been achieved in this project)
  - To also make them aware the water drunk (Which can be reviewed in the users mobile through an Application) According to our research, reminder systems are
  - Sticky Notes
  - Diary
  - Alarm clock
  - Pagers
  - Other electronic devices used as reminder system
- Output from The Product
- The user can check his daily consumption of water
  - The RGB colors show the user, his/her water drinking activity
  - The user can also change his/her time interval based on convivence. These outputs will be later enhanced and uplifted in future for more.

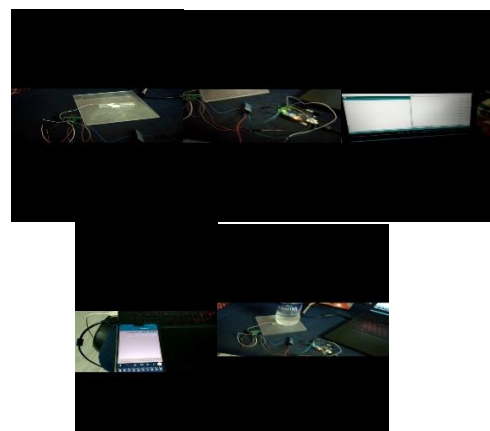


Figure 4: - This is cumulative view of the project

## 5. CONCLUSION

We can easily extend this complete setup into other projects and can monitor other parameters. Using IoT we can additionally build custom rules and can trigger commands from the cloud. We generally tend to forget to drink water, but this POC can be a helpful one to monitor your daily total water intake while you are on the desk. The hydration reminder will remind the user to take sips of water throughout the day with light, vibration and phone notification reminders.

1. Based on the user's active hours and idle amount of water that is to be consumed in a day will be notified.
2. This device also includes a medication reminder to remind elderly adults to take medication. This will enhance the way water is drunk, will be totally IoT enabled.
3. Use of AI make this more future enabled and helps in building more sophisticated device.

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