Smart IOT Based Water Bottle

Siddhart Sivananda-19BEC0835

Akshad Patel-19BEC0836

Anmol Narain-19BEC0838

Aryan Malik-19BEC0839

***Abstract*—This report document is a description about our IOT J component review, the "Smart IOT Based Water Bottle". It talks about the methodology, thinking and implementation of the project stated above.**

I. Introduction

The rapid growth of Internet of Things (IoT) have generated new opportunities for personalized eHealth and mHealth services. Smart objects equipped with sensors can provide robust monitoring of activities of daily living and context for sensors. We present a smart water bottle model that smartly and accurately measures water level and temperature of the water you drink and sends that information to your water-tracking app. This will help the user track how much water he/she drinks and the temperature of the same.
A bigger version of the same model will also help in chemical industries for different chemicals where they need constant real-time analysis of the temperature and amount of chemical inside.

II. Components Required

A. HC-SR04

It is an ultrasonic distance sensor which provides 2cm to 400cm of non-contact measurement functionality with a ranging accuracy that can reach up to 3mm. Each HC-SR04 module includes an ultrasonic transmitter, a receiver and a control circuit. This one acts as a transmitter which converts electrical signal into 40 KHz ultrasonic sound pulses. The receiver listens for the transmitted pulses. If it receives them it produces an output pulse whose width can be used to determine the distance the pulse travelled.

B. MLX90614

It is an infrared thermometer for non-contact temperature measurements. Both the IR sensitive thermopile detector chip and the signal conditioning ASIC are integrated in the same TO-39 can. Integrated into the MLX90614 are a low noise amplifier, 17-bit ADC and powerful DSP unit thus achieving high accuracy and resolution of the thermometer. The user can configure the digital output to be PWM. As a standard, the 10-bit PWM is configured to continuously transmit the measured temperature in the range of -20 to 120 °C, with an output resolution of 0.14 °C

C. ESP32

It is a MCU with integrated Wi-Fi and Bluetooth connectivity for a wide-range of applications. ESP32 is capable of functioning reliably in industrial environments, with an operating temperature ranging from –40°C to +125°C. Powered by advanced calibration circuitries, ESP32 can dynamically remove external circuit imperfections and adapt to changes in external conditions.ESP32 is highly-integrated with in-built antenna switches, RF balun, power amplifier, low-noise receive amplifier, filters, and power management modules. ESP32 adds priceless functionality and versatility to your applications with minimal Printed Circuit Board (PCB) requirements.

D. Firebase

It is Google's mobile application development platform that helps you build, improve and grow your app. It is a Backend-as-a-Service (Baas). Firebase is categorized as a NoSQL database program, which stores data in JSON-like documents. It provides developers with a variety of tools and services to help them develop quality apps, grow their user base, and earn profit. It is built on Google's infrastructure.

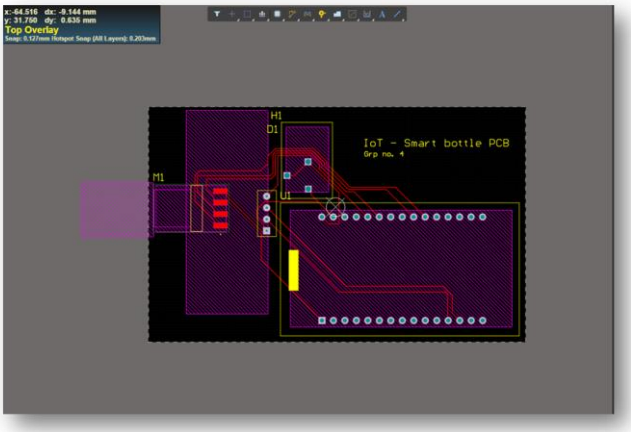
E. Arduino IDE

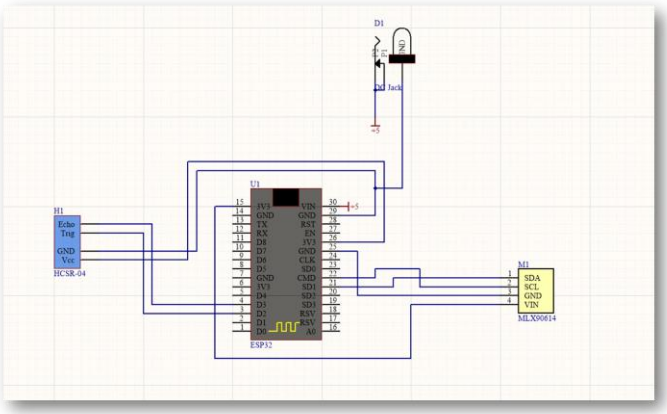
Arduino IDE is an open-source tool that makes it possible for users to write as well as upload code to a work environment in real-time. Since the written code will be moved to the cloud, it's frequently used by those who need an additional level of redundancy. Arduino IDE offers full compatibility to any Arduino-based software board. The software can easily be deployed in any Linux, Mac, or Windows operating systems. Most of its parts are written within JavaScript for seamless compilation and editing.
While the tool's main aim is based on code writing, it offers several noteworthy functionalities. The main benefits of Arduino IDE can be seen in its ability to function as an on-premise application and as an online editor, direct sketching, board module options, and integrated libraries.

F. Altium Designer Suits

Altium Designer is a PCB and electronic design automation software package for printed circuit boards. Altium Designer's suite encompasses four main functional areas, including schematic capture, 3D PCB design, field-programmable gate array (FPGA) development and release/data management. It integrates with several component distributors for access to manufacturer's data. It also has interactive 3D editing of the board and MCAD export to STEP.

XXX-X-XXXX-XXXX-X/XX/$XX.00 ©20XX IEEE





III. Methodology

HcSr04 sensor is activated first, where it calculated distance between sensor and water surface. With this, water level inside the bottle is calculated.

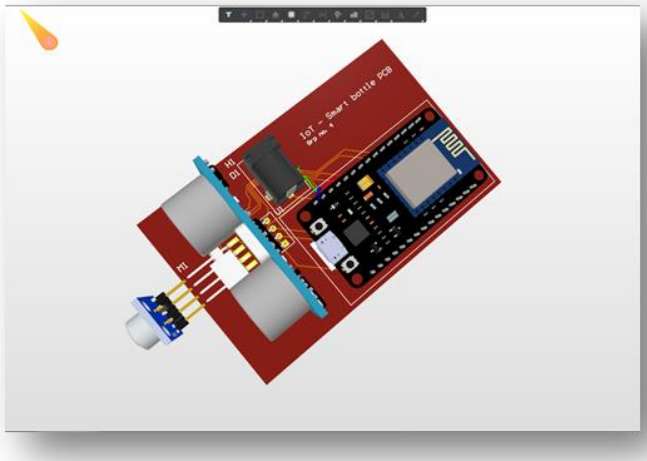
MLX90614 is activated next. It uses I2C communication protocol to send data to ESP32. It can measure ambient and object temperature reading in both Fahrenheit a degree Celsius.

After getting the two readings, ESP32 is ready to send the data to Firebase.

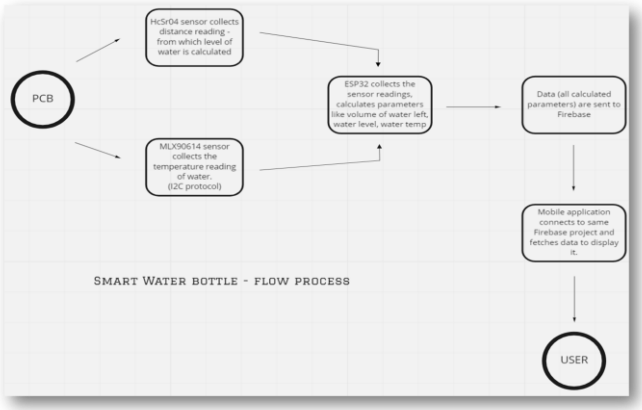
The sensor data that is collected by ESP32 is converted to Json (JavaScript Object Notation) form, so that it is convenient to push data in an understandable form.

In Firebase, under the real-time database, /test is the path set. So, the data forms separate topics under that path and then keep updating themselves.

This data is received by the mobile application by connecting to the same real-time database.

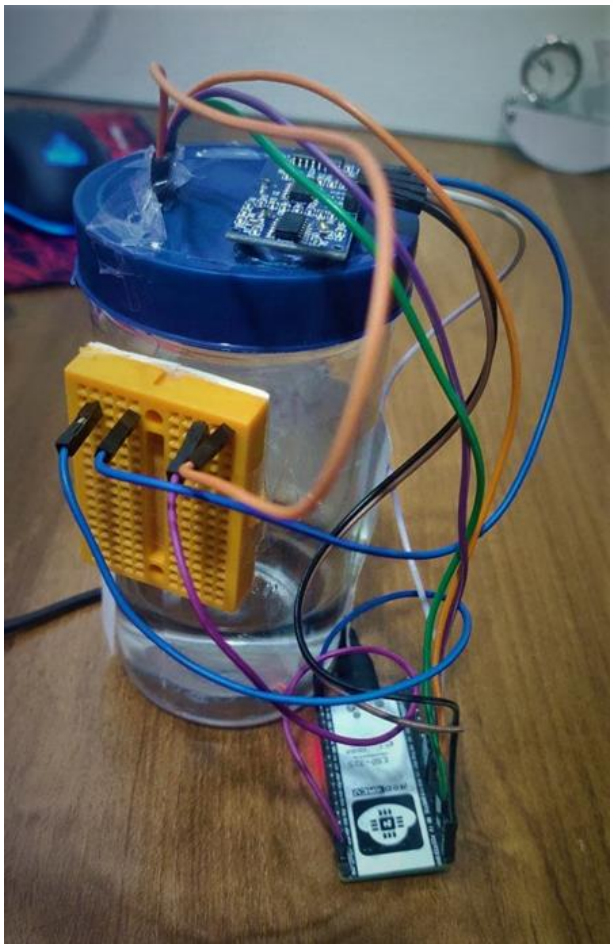


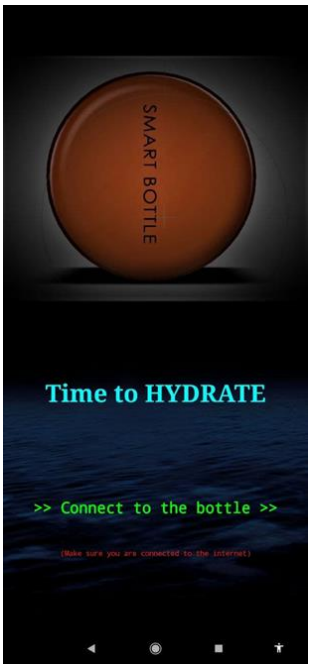
IV. Block Diagram

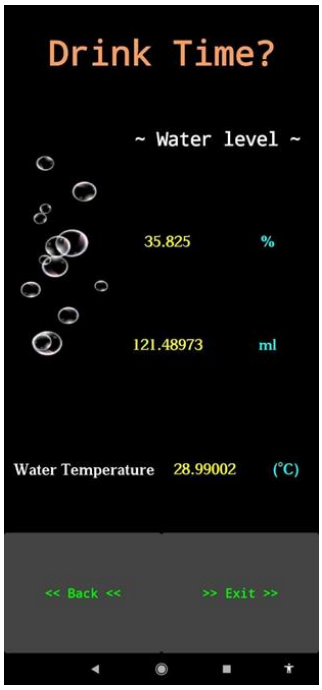


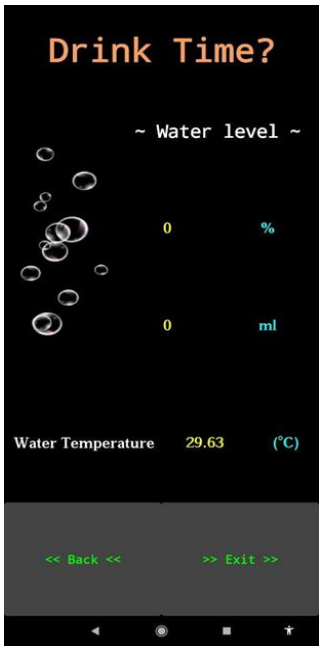
V. Circuit Diagram and Output

https://drive.google.com/file/d/1FxAXFTMMbEF3vaYggA9OxfeVUBdmc-kQ/view?usp=sharing









CONCUSION

The preferred spelling of the word “acknowledgment” in America is without an “e” after the “g”. Avoid the stilted expression “one of us (R. B. G.) thanks ...”. Instead, try “R. B. G. thanks...”. Put sponsor acknowledgments in the unnumbered footnote on the first page.

REFERENCES

[1] http://www.esp32learning.com/code/esp32-and-mlx90614-infrared-thermometer-example.php

[2] https://journalajrcos.com/index.php/AJRCOS/article/view/30198

[3] https://gvpress.com/journals/IJBSBT/vol7_no4/30.pdf