WhatsApp Based Notification on Low Battery Water Level Using ESP Module and TextMeBOT

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ABSTRACT

Purpose: *Nowadays, we can not imagine any day without electricity. In suburban areas, frequent power cuts happen. Most of the time, electricity is unavailable in the village area to balance the demand and available power supply. So we install the power inverter in our house for an uninterrupted power supply. This high-power inverter runs using a wet-cell battery, the widespread domestic power inverter field battery. The only drawback is we need to fill the battery with water when it goes low. It gets damaged if we keep the battery at a low water level for a long time. In our busy schedule, most of the time, we forget to check the battery water level. In most scenarios, the battery is inside the enclosed trolly. Every time, it is not possible to open the trolly and check the water level. Using the IoT technology, we can solve the problem nicely. So here we provide a procedure to get informed through WhatsApp when the battery water level goes down.*

Methodology: *This project uses several electronic components. The heart of the project is the ESP module, a low-cost wifi controller. We operate six infrared(IR) modules for measuring battery water levels. This module is connected to six digital inputs of the ESP module. We use a one-cloud service, TextMeBot, to send the message to WhatsApp. Cloud services are responsible for transmitting the message to the given Whatsapp number. When the system starts, it will establish communication with the internet through a Wi-Fi router using the provided credentials. Once the connection is established, it is ready to send the message. When the water level is below average, it triggers the esp module. It senses the controller and sends the message to the predefined WhatsApp number.*

Findings/Result: *the frequent power cut is the current electricity issue. Due to the heavy electricity demand, sometimes a power cut happens. For the uninterrupted domestic electricity, we install an inverter. The wet cell battery provides good power capacity and low cost. The water, after a couple of months, goes empty. This system protects us from battery damage due to low water levels. We installed it in the practical field, running for years without issues.*

Originality/Value: *We generally check the battery water level by observing the level indicator that comes with the battery by default. We check the water just after certain month intervals. If empty, we fill the water. But in busy life schedules or inaccessible places, we cannot check the water frequently, so the battery generally gets damaged. So, using this system will protect us from severe damage to the battery from low or empty water. So, this system provides value to us.*

Type of Paper: *Experimental-based Research.*

Keywords: Battery water level notifier, WhatsApp Notification for low battery water level, Event notification system using WhatsApp.

1. INTRODUCTION :

Problem statement: Electricity is essential nowadays. Every gadget needs power to run. So sometimes, the electricity board can only provide electricity in some corners of the coverage area due to heavy demand. They cut the power at some times for specific regions. Especially in the evening, we need

power compared to other times. In the evening, the student prepares for their study. To overcome the load-shedding issue, we install the inverter inside our sweet home to keep the power uninterrupted. This inverter battery uses a wet cell. There are other variants, but the water-based is popular, cheap, and durable. We need to fill the water in the battery within the couple of month interval. Else, the battery got damaged. One person must be responsible for checking frequently. Here, we demonstrate a procedure to automatically send a notification to WhatsApp when the water level goes low.

Indication of methodology: The heart of the project is the ESP module. The six IR sensors are connected to the ESP module's digital input. The connected digital input goes low when the battery water level is low, and the ESP module senses it. Then, it sends the WhatsApp notification to the predefined mobile number.

Essential findings of others in this field: Numerous researchers are researching the water level detection field. Here, we include a couple of research works. The researcher Wijaya et al. (2024). [1] Developed an Early Warning System Using Social Media for Flood Disasters. They use Arduino IDE and IoT. Anggara et al. (2022). [3], in their paper, describe an automatic Hand Sanitizer and Body Temperature Measurement System with Low Liquid Hand Sanitizer Condition Notification. BV et al. (2020). [6] made an intelligent rainwater level indicator using an arm cortex m3 microprocessor. The research work (Sivasubramanian et al. (2022). [20]) is an Innovative Solution for battery-draining in 5G Devices Using an Alternate Routing Model. Aguirre et al. (2016). [34] Implement context-aware e-health environments based on social sensor networks.

What study is done in this paper: here, we study the procedure to implement the battery water level monitoring using a notification system. For this procedure, we replace the six battery caps with our e-cap. From all caps, the wire is connected to the ESP module. Usually, the battery water goes low after a couple of months, depending on the use and frequency of the power cut. We study how the system efficiently works in a real-world scenario.

Principal conclusion: power cuts are common nowadays. There are so many reasons to cut the power sometimes. We install the inverter to continue our work. We must frequently fill the water when the battery is below average. If we fill it correctly, the costly battery will be protected, which ensures a considerable cost. Here, we demonstrated how to get notifications in WhatsApp when the water level is low. Using IoT technology, we can bring the notification. We use NodeMCU to control the operation and use a “TextMeBot” for the WhatsApp messaging service.

2. REVIEW OF LITERATURE/ CURRENT STATUS :

Here, we included some research projects where we found good work already done in water level detection and notification through messaging systems. Table 1 lists a couple of research works and using technology in their research work.

Table 1: List of research work and technology used in level detection and notification.

S. No.	Focus/Subject	Technology/Algorithm/ Module/Components	Reference
1	Development of an Early Warning System Using Social Media for Flood Disaster	Arduino IDE, IoT	Wijaya et. al. (2024). [1]
2	A smart environmental monitoring system for data centres using IOT and machine learning	IoT	Okello,W. (2023). [2]
3	Automatic Hand Sanitizer and Body Temperature Measurement System with Low Liquid Hand Sanitizer Condition Notification	MLX90614, wilio bot integrated with WhatsApp, PHP MySQL	Anggara et. al. (2022). [3]
4	IoT-based smart poultry farm in Brunei	IoT	Hambali et. al. (2020).[4]
5	IoT-based lava flood early warning system with rainfall intensity monitoring and disaster communication technology	IoT	Suwarno et. al. (2021). [5]

6	Iot based intelligent rainwater level indicator using arm cortex m3 microprocessor	IoT	BV et. al. (2020). [6]
7	Rancang Bangun Sistem Monitoring Kateter Pasien Berbasis Iot (Sismoniterin) Pada Rumah Sakit Mitra Medika Medan	IoT	Banjarnahor, W. S. A. (2022). [7]
8	Effect of Mobile-Based Educational Program through Bluetooth and WhatsApp	Bluetooth, WhatsApp	Khalil et. al. (2020). [8]
9	Smart Intravenous Infusion Monitoring and Alert System using IoT-based Force Sensitive Resistor and Whatabot API	IoT-based Force Sensitive Resistor and Whatabot API	Sreekumar et. al. (2023). [9]
10	Iot based smart water quality monitoring: Recent techniques, trends and challenges for domestic applications	IoT	Jan et. al. (2021). [10]
11	A secured mobile enabled assisting device for diabetics monitoring	cryptographic security, IoT	Saravanan et. al. (2017). [11]
12	Forecasting and communication key elements for low-cost fluvial flooding early warning system in urban areas	ZigBee and LoRaWAN	Acosta-Coll et. al. (2021). [12]
13	Smart Watering System Based on Internet of Things for Urban Planting	Internet of Things	Yaddarabullah et. al. (2023). [13]
14	Design Concept of an Automated Irrigation System for Simulating Saltwater Intrusion in a Mesocosm Experiment	solenoid valves, system core controller (Arduino)	Xu, C. (2023). [14]
15	Environmental monitoring systems: review and future development	binary protocol, http, ftp	Šećerov et. al. (2018). [15]
16	Using WhatsApp for co-creation of learning resources: A case of a South African university	WhatsApp	Rambe et. al. (2020). [16]
17	WhatsApp in health communication: the case of eye health in deprived settings in India	WhatsApp	Maitra, C. (2021). [17]
18	Temperature and Humidity Monitoring System in Internet of Things-based Solar Dryer Dome	IoT, Temperature(DHT22), Humidity(DHT11), LCD 16x2	Ma'arij et. al. (2023). [18]
19	Why should I use a multi-hazard app? Assessing the public's information needs and app feature preferences in a participatory process	abstract	Dallo et. al. (2021). [19]
20	An Innovative Solution for Battery Draining in 5G Devices Using Alternate Routing Model	abstract	Sivasubramanian et. al. (2022). [20]
21	Low-cost Edge Computing devices and novel user interfaces for monitoring pivot irrigation systems based on Internet of Things and LoRaWAN technologies	Internet of Things and LoRaWAN	Matilla et. al. (2022). [21]
22	Advance warning and alert system for detecting lightning risk to reduce human disaster using AIoT Platform—A proposed model to support rural India	AIoT Platform	Nerella et. al. (2023). [22]

23	Development of An Internet of Things Based Oil Spill Incident Early Warning System	Internet of Things	Pradana et. al. (2024). [23]
24	Coproducing weather forecast information with and for smallholder farmers in Ghana: Evaluation and design principles	smartphones and apps	Gbangou et. al. (2020). [24]
25	Media access is associated with knowledge of optimal water, sanitation and hygiene practices in Tanzania	linear regression analyses	Alexander et. al. (2019). [25]
26	Sophistication with Limitation: Understanding Smartphone Usage by Emergent Users in India	Smartphone	Gupta et. al. (2022). [26]
27	IoT Based Remote Poultry Monitoring Systems for Improving Food Security and Nutrition: Recent Trends and Issues	IoT	Mazunga et. al. (2023). [27].
28	The Urgency of Information Literacy in Curriculum Development and Online Learning During the Covid-19 Pandemic	Abstract	Susilawati, S. (2022). [28]
29	AgriEdge: Edge Intelligent 5G Narrow Band Internet of Drone Things for Agriculture 4.0.	5G Narrow Band, Internet of Drone Things	Bhattacharya et. al. (2021). [29].
30	Implementation of the C4. 5 Algorithm in the Internet of Things Applications	Internet of Things Applications	Angdresey et. al. (2023). [30]
31	Moving beyond market research: Demystifying smartphone user behavior in india	smartphone	Mathur et. al. (2017). [31]
32	From technical innovations towards social practices and socio-technical transition? Re-thinking the transition to decentralised solar PV electrification in Africa	Abstract	Boamah et. al. (2018). [32]
33	Use of low-cost acquisition systems with an embedded linux device for volcanic monitoring	embedded Linux	More et. al. (2015). [33]
34	Implementation of context-aware e-health environments based on social sensor networks	wireless body area networks	Aguirre et. al. (2016). [34]
35	Innovative city infrastructure management system using IoT	IoT	Ramamoorthy et. al. (2020). [35]
36	Lessons learned from natural disasters around digital health technologies and delivering quality healthcare	digital health technologies	Lokmic-Tomkins et. al. (2023). [36]
37	Prototyp notifikačno-monitorovacího nositelného zařízení	CPU , Bluetooth , nRF51822	Füzesséry, E. (2018). [37]
38	Obstacles to the adoption of secure communication tools	Abstract	Abu-Salma et. al. (2017). [38]
39	Optimal Monitoring of Server Rooms with Home Assistant Platform	Abstract	Șuvar et. al. (2022). [39]
40	investigating more secure and discreet mobile interactions via active camouflaging	Abstract	Pearson et. al.

In Table 2, we included a couple of our projects that use various notifications through IoT technology. For the research work, we mainly used various ESP modules. For the notifications, we used various cloud platforms like AWS, Sinric Pro, etc. Our researcher can explore the research below to understand IoT and notification systems better.

Table 2 lists the author's research on IoT, Data saving to the cloud, and sensors.

S. No.	Focus/Subject	Technology/Algorithm/ Module/Components	Reference
1	A Practical Approach To GIT Using Bitbucket, GitHub and SourceTree	Bitbucket, GitHub and SourceTree	Chakraborty et. al. (2022). [41]
2	How to make IoT in C# using Sinric Pro	C#, Sinric Pro	Chakraborty et. al. (2022). [42]
3	Virtual IoT Device in C# WPF Using Sinric Pro	C#, WPF, Sinric Pro	Chakraborty et. al. (2022). [43]
4	MVVM Demonstration Using C# WPF	C# WPF	Chakraborty et al. (2023). [44]
5	Let Us Create An IoT Inside the AWS Cloud	IoT, AWS	Chakraborty et. al. (2023). [45]
6	Let Us Create a Physical IoT Device Using AWS and ESP Module	AWS, ESP Module	Chakraborty et. al. (2023). [46]
7	Let Us Create Multiple IoT Device Controller Using AWS, ESP32 And C#	AWS, ESP32 And C#	Chakraborty et. al. (2023). [47]
8	Let Us Create Our Desktop IoT Soft-Switchboard Using AWS, ESP32 and C#	AWS, ESP32 and C#	Chakraborty et. al. (2023). [48]
9	Let Us Create an Alexa Skill for Our IoT Device Inside the AWS Cloud	AWS, IoT	Chakraborty et al. (2023). [49]
10	Let Us Create A Lambda Function for Our IoT Device In The AWS Cloud Using C#	C#, AWS Lambda	Chakraborty et. al. (2023). [50]
11	Industrial Automation Debug Message Display Over Modbus RTU Using C#	Modbus RTU, C#	Chakraborty et. al. (2023). [51]
12	Modbus Data Provider for Automation Researcher Using C#	C#, Modbus	Chakraborty et. al. (2023). [52]
13	IoT-Based Industrial Debug Message Display Using AWS, ESP8266 And C#	AWS, ESP8266 And C#	Chakraborty et. al. (2023). [53]
14	IoT-Based Switch Board for Kids Using ESP Module And AWS	ESP Module And AWS	Chakraborty et. al. (2023). [54]
15	Let Us Create an Alexa-Enabled IoT Device Using C#, AWS Lambda and ESP Module	C#, AWS Lambda and ESP Module	Chakraborty et. al. (2023). [55]
16	Alexa Enabled IoT Device Simulation Using C# And AWS Lambda	C# And AWS Lambda	Chakraborty et. al. (2023). [56]
17	Smart Magnetic Door Lock for Elderly People Using AWS Alexa, IoT, Lambda and ESP Module	AWS Alexa, IoT, Lambda and ESP Module	Chakraborty et. al. (2023). [57]
18	Let Us Manage BP Monitor Data Using WordPress Server and C#	WordPress Server and C#	Chakraborty et al. (2024). [58]

19	Communication Channels Review For ESP Module Using Arduino IDE And NodeMCU	Arduino IDE And NodeMCU	Chakraborty et al. (2024). [59]
20	Let Us Build a MQTT Pub-Sub Client In C# For IoT Research	C#, IoT	Chakraborty et al. (2024). [60]

3. OBJECTIVES OF THE PAPER :

Description for Objectives.

(1) To study the feasibility of WhatsApp-based notifications.
(2) To compare the performance of the various alarm systems in the market for the notification.
(3) To evaluate the performance of the system
(4) To test the performance of third-party messaging service performance.
(5) To prove the efficiency of the WhatsApp-based notification service.
(6) Design a notification system for the battery's low water level.
(7) To interpret the flow of the WhatsApp-based notification system.

4. METHODOLOGY :

Figure 1 depicts the project block diagram. If we observe the figure, the esp module is the active component. It is the heart of the project. When the system is powered up, it tries to connect to the internet through the wifi router using the added router credentials. We need to get the API key from the "TextMeBot." The API key comes in the registered email. For the trial, it is valid for two to three days. Once it is over, the API key becomes invalid. We have different email IDs to get another valid key for another two days. The best way is to subscribe to a key if we continue to work. How to reach the API key is described in the experiment section.

Fig. 1: The project block diagram

The ESP and IR sensor modules are now available from an online store in the hardware section. The link is available in the recommend section. All sensors are connected to the ESP module. One is ground (GND), and the other is VCC(+5V). In the battery, 5V is not directly available so that we can use a 5V adaptor or 12V-5V DC to DC converter. Every sensor has one OUT pin connected to a NodeMCU-free GPIO pin. A potentiometer controls the sensor trigger sensitivity level in the IR sensor module. It is adjusted after installation on the cap.

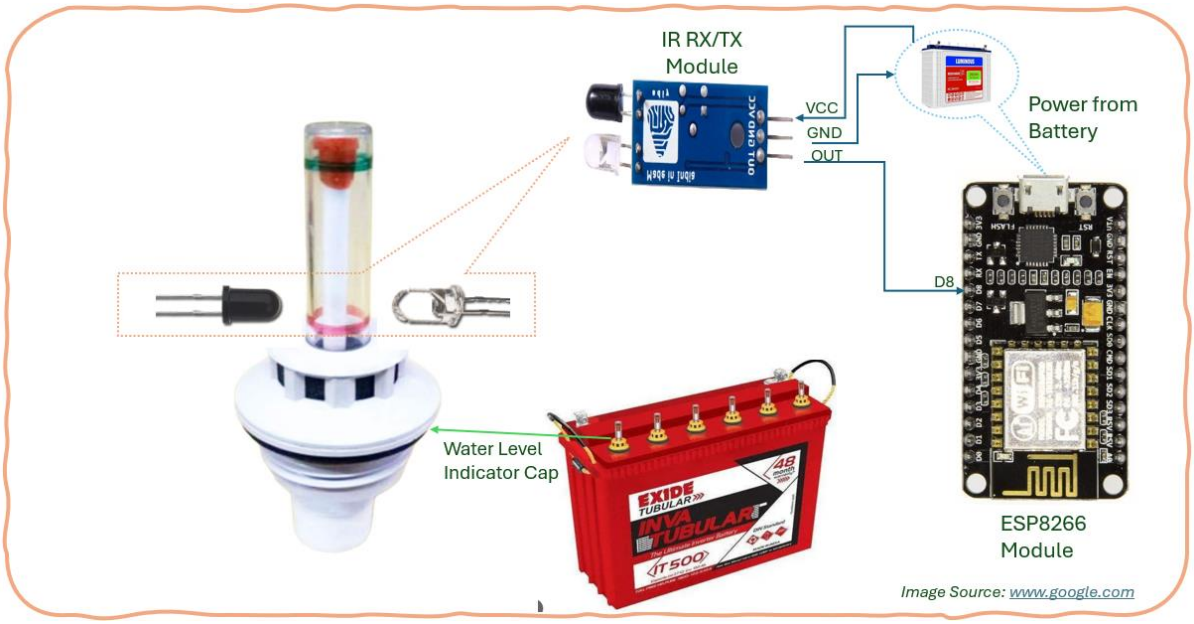

Fig. 2: The IR sensor connection with NodeMCU

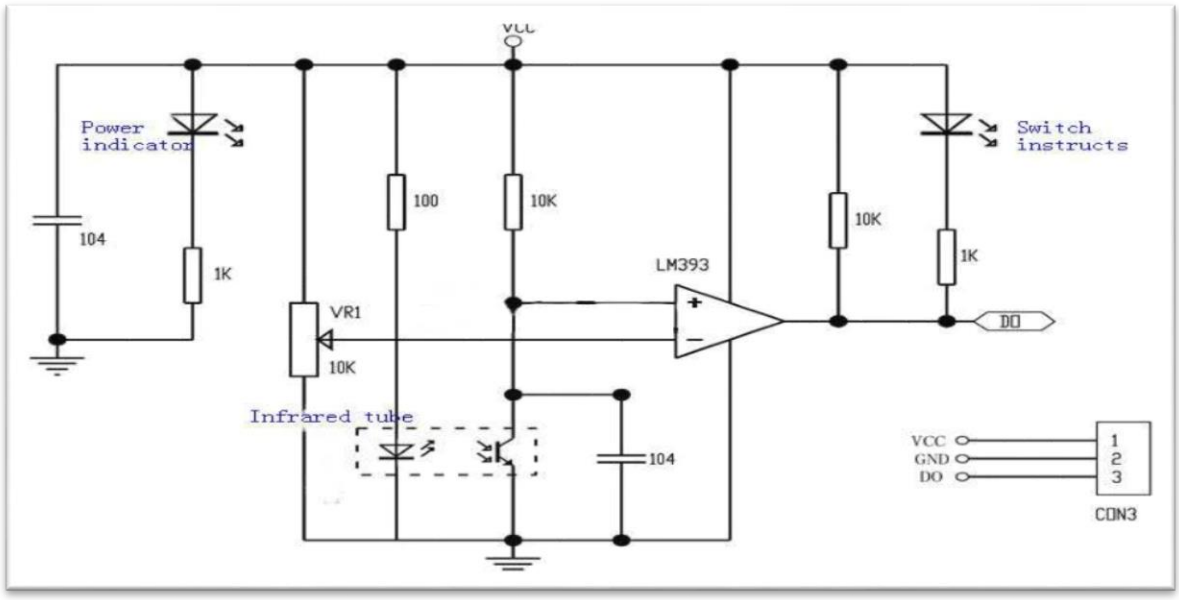

Fig. 3: The Sample IR module circuit diagram

Figure 3 depicts the IR module circuit diagram, taken from https://www.playembedded.org/blog/wp-content/uploads/2016/04/art_019_circuit.jpg. For hardware connection, we need some experience with electronics. The new researcher can get help from an electronics engineer. Once the hardware connection is over, the next thing is to write firmware. After firmware writing, then test the project. Forcibly, we cannot lower the battery water level, so remove the cap and move upward and then the sensor will activate, and we should get the notification in the WhatsApp app. If it does not work as expected, we must debug it correctly.

5. ABCD ANALYSIS :

Identifying, analysing and evaluating Advantages, Benefits, Constraints, and Disadvantages (ABCD) of a concept/system/material/strategy, etc is important for its use in society. ABCD analysis has four levels of analysis that include ABCD listing, ABCD stakeholder analysis, ABCD factors and elemental analysis, and ABCD quantitative analysis [61-70]. Here we have listed some of the advantages, benefits,

constraints, and disadvantages of WhatsApp Based Notification On Low Battery Water Level Using ESP Module And TextMeBOT.

5.1 Advantages:

(1) it prevents severe battery damage.
(2) It ensures the battery keeps the water level constant.

5.2 Benefits:

(1) the battery runs for a long time.
(2) the battery be maintained at the proper time

5.3 Constraints:

(1) Sometimes, the float sensor does not work as expected.
(2) The alarm cannot be triggered if the internet is unavailable.
(3) the overall system is made of electronic equipment, so it has some life cycle. It incurs some recurring costs.
(4) The device needs some maintenance. It needs to be checked occasionally to ensure that the system is working.
(5) needs to take time to develop the firmware programming.

5.4 Disadvantages:

(1) there is some initial cost to install the device.
(2) recurring costs for internet connectivity.
(3) the system runs on battery power. It reduces the offline delivered power to the home.
(4) electronics make the system. The failure time cannot be predictable.
(5) the recurring cost incurred for messaging services to the WhatsApp number.
(6) There is no privacy for WhatsApp accounts. The TextMeBot needs a WhatsApp login, which violates privacy. There are several alternatives, like Twilio, for more privacy and protection.

6. EXPERIMENTS :

Now we can do some experiments. We can follow the below steps for the experiment.

1) The project is available from GitHub: https://github.com/sudipchakraborty/WhatsApp-Notification-On-Low-Battery-Water-Level-.git
2) Download and open in Arduino IDE.
3) We need to request API tokens. To do so, open the link in the browser: **https://textmebot.com/.** At the top right side of the page is a "Request Apikey" label button, depicted in figure 4. Click on it.

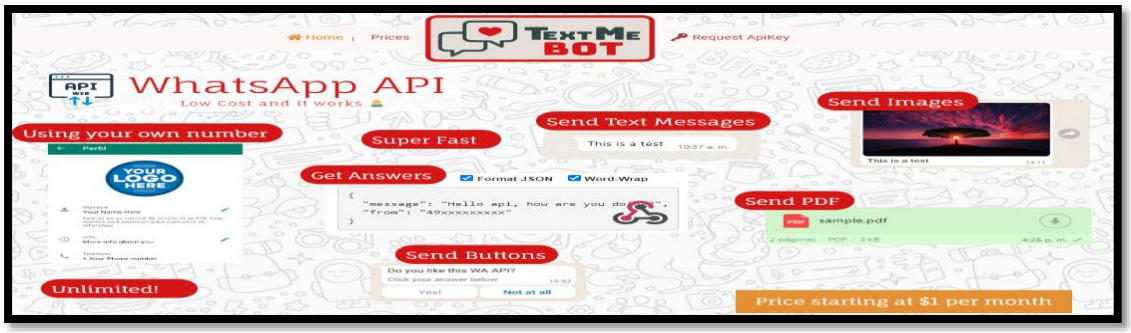

Fig. 4: The TextMeBot Interface

4) Now, we need to enter your email ID. As depicted in Figure 5, we will receive a notification that the API key was sent to our email.

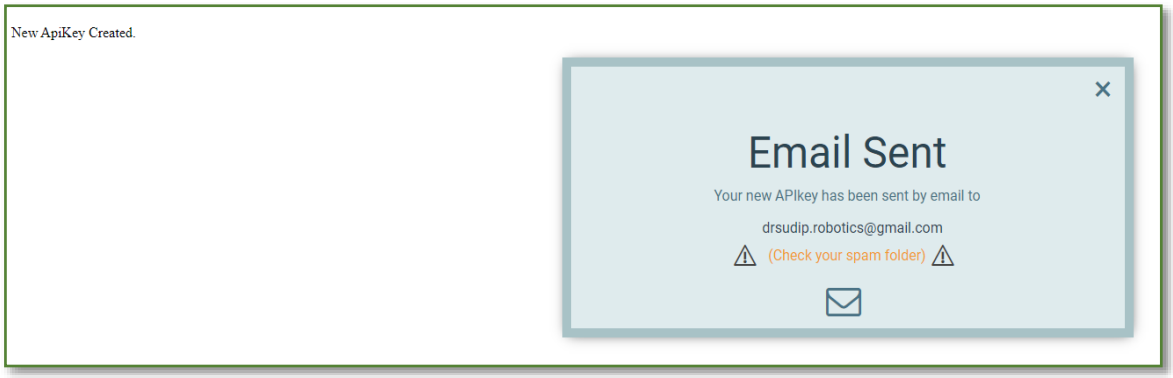

Fig. 5: The email sent a notification for the API key

5) In Figure 6, the email contains the API key, which will be used in the firmware.

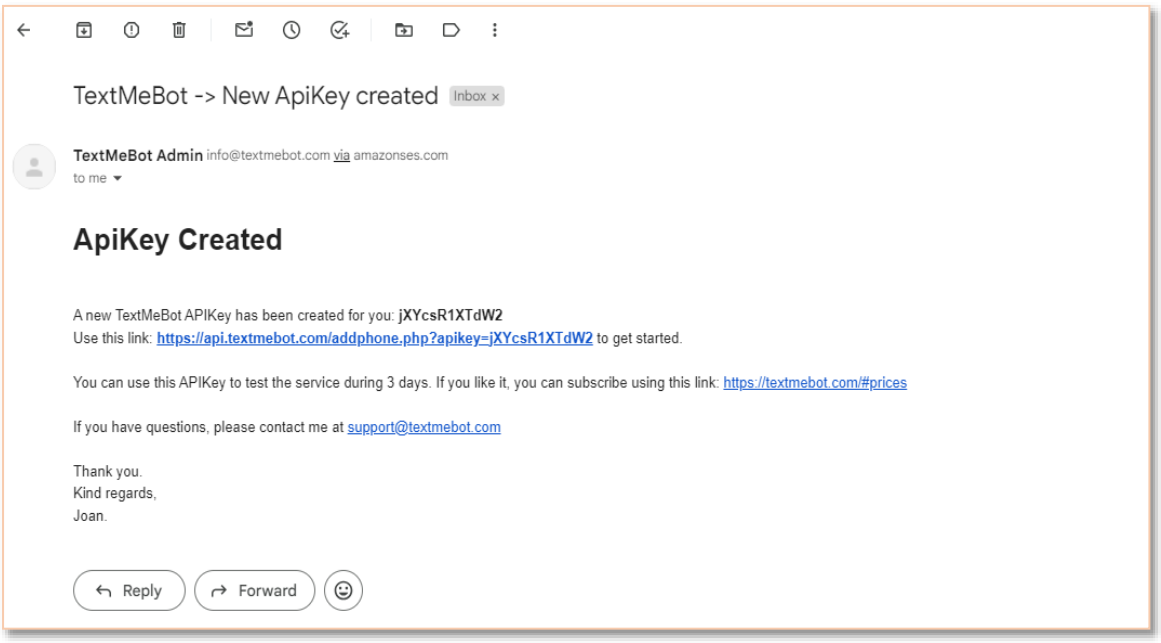

Fig. 6: The sample email for API key

6) we need to set the phone number with the API key. In the browser, copy and paste the below code. Change the phone number and API Key
7) https://api.textmebot.com/send.php?phone=+**917003034313**&apikey=**jXYcsR1XTdW2**&text=xxx.
8) The browser will display one message, as shown in the figure below.

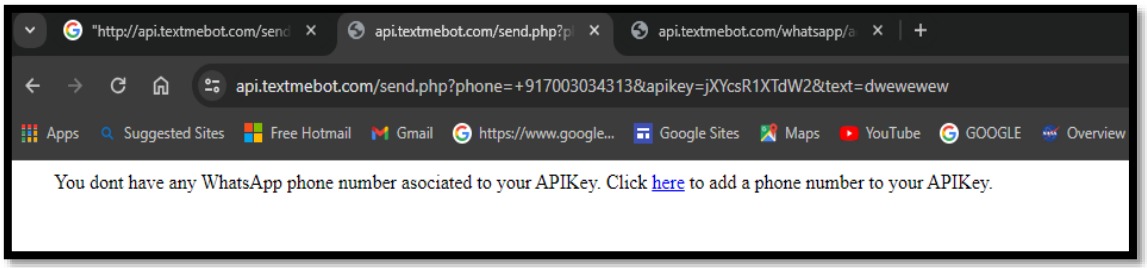

Fig. 7: The browser text to set phone number with API key

9) Click on "**here**." Another interface will be shown, as depicted in Figure 8.

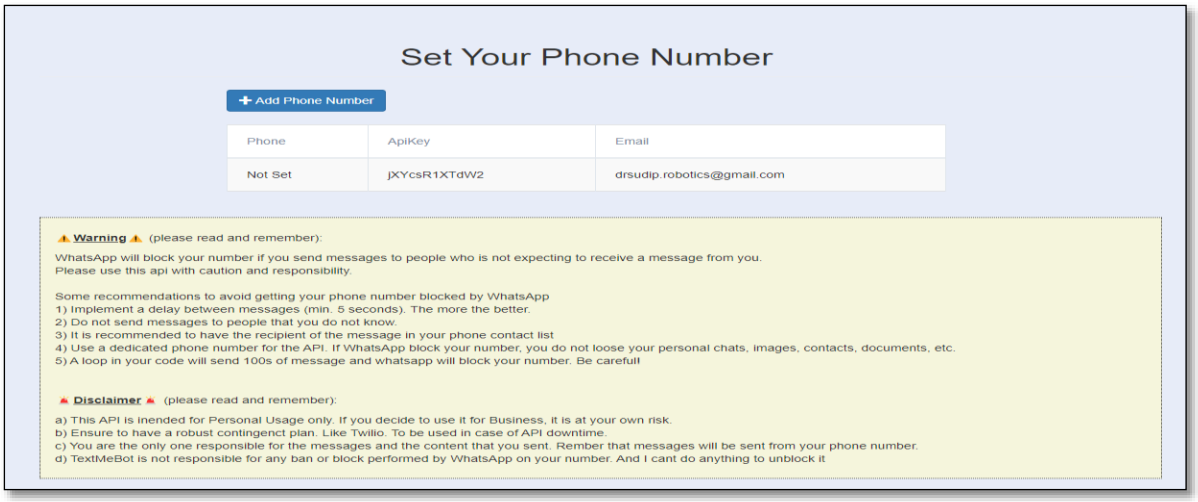

Fig. 8: The web interface to add the phone number

10) Click on the "**Add Phone Number**" button. This will open another interface, which is depicted in Figure 9.

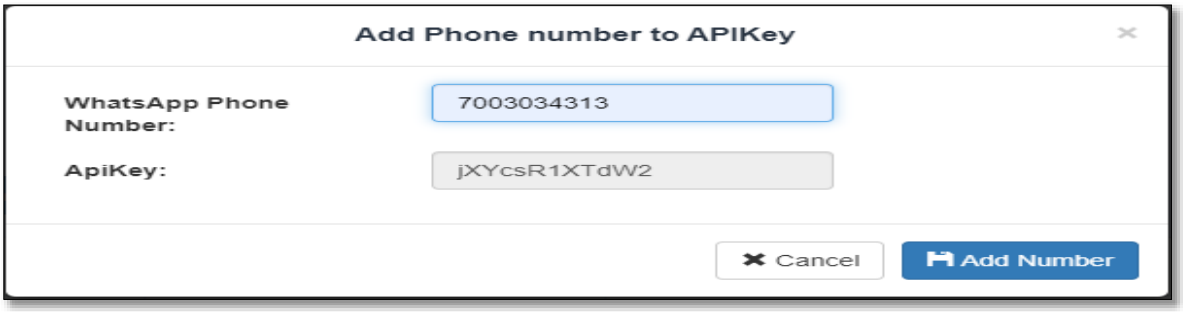

Fig. 9: The browser interface to add the phone number corresponding to the API key

11) Enter the Phone number and click the "Add Number" button. A new interface will then appear, as depicted in Figure 10.
12) In Figure 10, there is a button called "**Connects Number**." Click on it. Then, an interface will open, showing a 2D barcode. Open WhatsApp and link the device. Remember that WhatsApp will be logged in that server. If sensitive information is available in the WhatsApp chat, it is safe not to log it in this way because all contacts and **chat will be accessible by the server.**

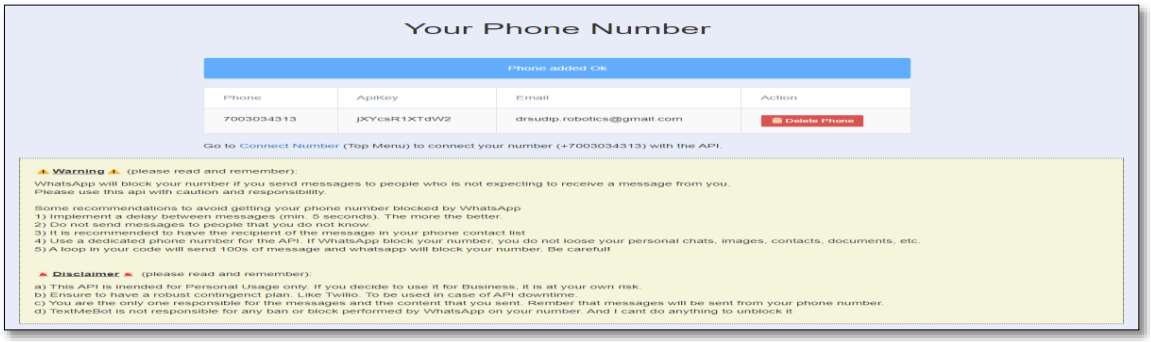

Fig. 10: The browser shows the phone added

13) After the test, please immediately log out from the WhatsApp application.
14) Once the logged in successfully with the server, it will display inside the browser depicted in Figure 11.

15) Now add the API Key inside the firmware. Build the code and power on the NodeMCU. Upload the firmware. The status message is displayed inside the console, depicted in Figure 12.

Fig. 11: The browser shows successfully Logged In

16) It will send the message to the WhatsApp number. Check WhatsApp. The test message will be displayed inside the app. Now, set the input pin we connected to the sensor. Write code so the message will trigger when any input changes state.

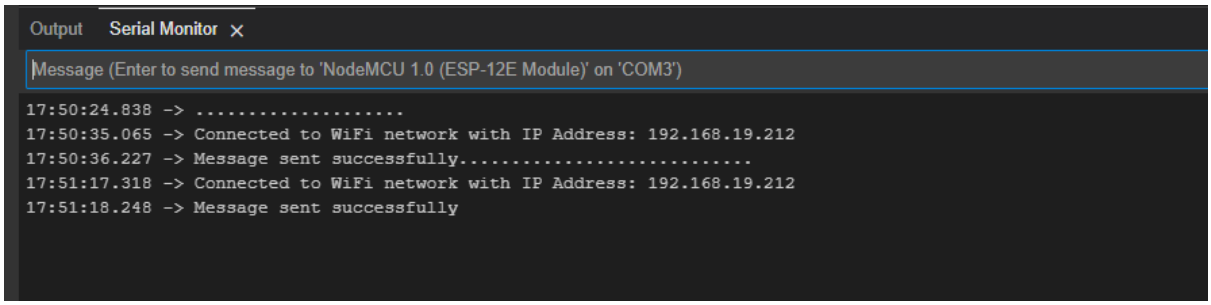

Fig. 12: The Arduino terminal windows to display the status message

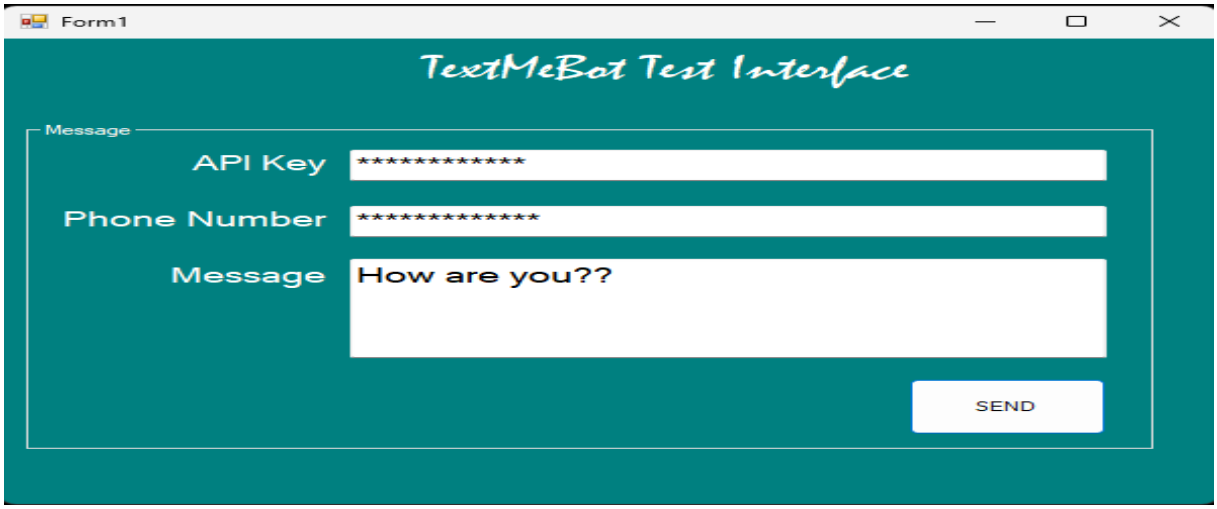

Fig. 13: The C# Interface to send messages to the WhatsApp

17) We can also test from C#. If we have no hardware or for some other purpose, we can also send the message from C# to WhatsApp. Add the provided API key in the C # application and run it. Add a phone number and enter the message. Then check WhatsApp.

18) The code behind the C# sends a message to WhatsApp in the Figure Below. The API key is valid for 2-3 days. We need to experiment within this period; otherwise, we must subscribe.

```
54
55  public async Task send(string key, string ph, string msg)
56  {
57      using (HttpClient httpClient = new HttpClient())    // Create HttpClient instance
58      {
59          string requestUrl = Url+ph+"&apikey="+key+"&text="+msg;  // Send GET request
60          HttpResponseMessage response = await httpClient.GetAsync(requestUri: requestUrl);
61          Response=response.ToString();
62
63          if (response.IsSuccessStatusCode)  // Check if the response is successful
64          {
65              string responseBody = await response.Content.ReadAsStringAsync();// Read and display the response content
66              ResponseBody= responseBody;
67          }
68          else
69          {
70              ResponseStatusCode= "Error: {response.StatusCode}";
71          }
72      }
73  }
```

Fig. 14: The C# code to send messages to the WhatsApp

7. RESULTS & DISCUSSIONS :

The system, once installed, will work without manual interaction. It needs just internet connectivity. If the internet connection is unstable, it might cause a problem to notify on WhatsApp. The system has performed well for years without any issues. The system can be used in an unmanned place. Also, we can use it where we can not monitor at regular intervals. This project is less suitable for that scenario where we can easily monitor or see the water level. This project is perfectly appropriate if the battery is inside the trolly and seeing the water level is tedious.

8. ANALYSIS OF RESULTS :

Nowadays, without power, we can not think any day. From our pocket mobiles to smart TVs, we need electricity. So, during the power cut, we require a power inverter; otherwise, all electronic equipment will go off. There are mainly two types of batteries available for inverters. One is the need to feed water frequently. It is cheap. It is used in the domestic environment. The other one is VRLA, which is costly and does not need to feed water regularly because it uses different technology. The vapourised water precipitated again into the chamber, so feeding the water was unnecessary. (https://en.wikipedia.org/wiki/VRLA_battery). So, using the wet-cell-based inverter and this water monitoring system will get the best result for us.

9. SUGGESTIONS :

To continue the research work, we add a couple of suggestions;

(1) Here, we used the sensor, which has only two states. Either standard or low. There is no information on the intermediate-level value. We can use an analog-type sensor to get the water level information.
(2) The system is installed in an acidic environment. So, it is highly recommended to use plastic enclosures so the system can run long without affecting the acidity.
(3) The complete system wiring should be as neat and clean as possible, or it will not create a short circuit.
(4) Once a year, we need to check that the valve works correctly; otherwise, it will not trigger when the water goes to a low level.
(5) Using this procedure, we can monitor anything we need to monitor, like some status change. It may be the water level, the people in the room, or nothing.

(6) The nodeMCU available from: https://www.amazon.in/s?k=nodemcu&crid=1XDZXZNAJ0DH0&sprefix=nodemcu%2Caps%2C319&ref=nb_sb_noss_1
(7) The IR module available from: https://www.amazon.in/s?k=ir+module&crid=TBBU3LJACZG1&sprefix=ir+module%2Caps%2C280&ref=nb_sb_noss_1

10. CONCLUSION :

Nowadays, we use so many electronic gadgets in our homes. All appliances run by power. Sometimes, the power cut happens due to high demand or some reason. We use a powerline inverter in our home to continue working with the power. Most of the power inverters use wet cells to deliver the power. This cell needs to fill the water at a low level. We sometimes didn't care or forget to check the water in our busy schedules. As a result, the battery got damaged. Here, we provide the procedure to obtain a notification when the battery water is low and continue to get notifications until the water is filled up. Here, we started with the introduction. In the literature review section, we added a couple of research works using the water level detection mechanism. Like the research work by Dedelop (Wijaya et al. (2024). [1]) Develop an Early Warning System Using Social Media for Flood Disasters. Then, we added a couple of projects where we used notification technology using IoT. Then, we said the objective of the paper. Then, we describe the methodology of the project. We added the ABCD analysis of the project. We provide a couple of images for the demonstration of the project. We include a few limitations of the project. Finally, we included the research work from where we got enormous information to execute the project.

11. LIMITATIONS :

There are some limitations to the project. The limitations are listed below:

- We need to subscribe to send messages from TextMeBot, which incurs the recurring cost.
- The messaging service is dependent on the availability of the Internet. The message will not reach the mobile phone if the Internet is unavailable.
- Electronics make the complete system. Frequently, we need to check that it is working and that no damages have occurred. The device will send a keep-alive message to the whats app. If the message is not present, it may be a network failure or a device defective. Check the device first.
- The device sensor type is binary; it has only two states: either the water level is low or average. The in-between state is not available. It is a digital sensor, not an analog type. Adding an analog sensor costs more, so the project or product cost increases, which initiates a demotivation to install it for domestic use.
- The TextMeBot interface has privacy issues. The interface is logging on to their server. Consider before use.

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