IOT Based Child Safety Monitoring System from Water and Fire

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This Report Presented in Partial Fulfillment of the Requirements for
The Degree of Masters of Science in Computer Science and Engineering

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APPROVAL

This Project titled **"IOT Based Child Safety Monitoring System from Water and Fire"**, submitted by **Sagar Gosh** to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of M.Sc. in Computer Science and Engineering (MSc.) and approved as to its style and contents. The presentation has been held on 06-07-24.

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We hereby declare that, this thesis has been done by us under the supervision of **Dr. S. M. Aminul Haque, Professor & Associate Head, Department of CSE** Daffodil International University. We also declare that neither this thesis nor any part of this thesis has been submitted elsewhere for award of any degree or diploma.

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ABSTRACT

The Internet of Things (IOT) promotes technology that can be used for such inventions the article analyzes the conceivable of IOT for various applications, including child safety, water level monitoring, and fire alarms. In our country, the child death rate has been in great trouble. This Internet of Things development project is intended for those with no prior knowledge of digital technology. The important function that water monitoring systems play in preventing floods and detecting fires is also covered in this article, which may guarantee that parents are aware of their children. To incorporate Wi-Fi and Bluetooth capabilities, this system makes use of an ESP32, an Adriano Uno, soil moisture, a jumper wire, a power adapter gaps sensor, and a batterer holder. Here we use Adriano Uno which helps to increase the transferee and contain a large memory. Here we use GPS Sensor which allows us to track the location of and as a result, parents can easily find their child. In this system, we use Jumper wire which connects remote electric Circuits used for printed circuit boards. Compared to many IOT-based systems, this one is more capable.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Children's safety and security have always been of utmost importance to parents, guardians, and society at large, especially in unexpected surroundings like water bodies and fire-prone places. Children worldwide lose their lives in horrific drowning accidents or fire-related events on a yearly basis. Technological developments, especially in the field of the Internet of Things (IOT), provide interesting options to improve kid safety and avert such regrettable incidents in response to this urgent issue. Something that can identify where your system is located is called a kid safety locator. You receive a location alert from the system if your youngster goes missing and is found close to the pond. An education program on water awareness is crucial. To deal with flood situations, it is very important to have a water monitoring system, it provides early warning to the people so that people become aware. This thesis looks at the creation and use of an Internet of Things-based kid safety locator system intended to reduce risks related to fire and water dangers. This system uses the Internet of Things to deliver preemptive warnings and real-time monitoring to caregivers, facilitating quick action and perhaps preventing circumstances that might be fatal. In this system, we use ESP32 which build in Wi-Fi and Bluetooth capabilities. In addition, we use a GPS sensor which allows us to track the location. Most vigilant guardianship can be compromised by human mistakes and unanticipated events, even if careful oversight is still necessary. For example, when the whole family goes out somewhere or goes for a picnic, their eyes are not always on the children, at that time if the children go near a pond, and Parents can save their child by using an Internet of Things (IOT) based Kid Safety Monitoring System, which notifies them of the situation. Consequently, adding Internet of Things (IOT) technology to kid safety protocols adds an extra degree of security by utilizing automated monitoring and quick communication to support human supervision.

1.2 Objectives

- Child is the backbone of our nation. There is no mother who doesn't love her child.
- A mother alone can truly understand the hard involved in giving birth to child. It is very awful if a child pass away in front of the mother.

- Parents and society are both quite concerned about this accident. To protect our future generation we must lower the child death rate.

1.3 Motivation

We are driven to work on our project for a variety of reasons. Explain below:

A tragedy for humanity is a youngster drowning in a river and catching fire. The accidents and the parents' subsequent lack of care and concern. So far, our goals have been to stop child deaths and raise parental awareness. Additionally, we decided to develop a gadget that provides vital information about children so that parents may save their children after we witnessed youngsters drowning to death in front of us. The urgent need to improve kid safety, especially in settings with high risk of fire and water, is the driving force behind this initiative. Every year, terrible events involving kids happen, sometimes with disastrous outcomes like drowning or fire injuries. Such incidents highlight how crucial it is to take preventative action to reduce dangers and guarantee children's well-being. According to the World Health Organization, Bangladesh has one of the highest rates of drowning among children under the age of five worldwide [3]. These, in essence, are the primary motivations for this endeavor.

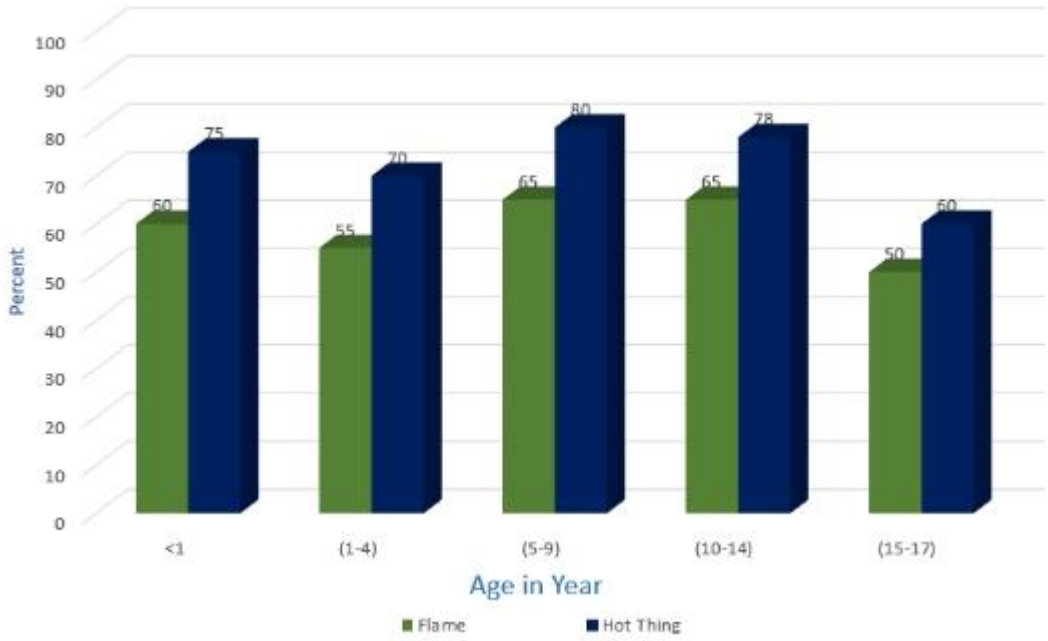
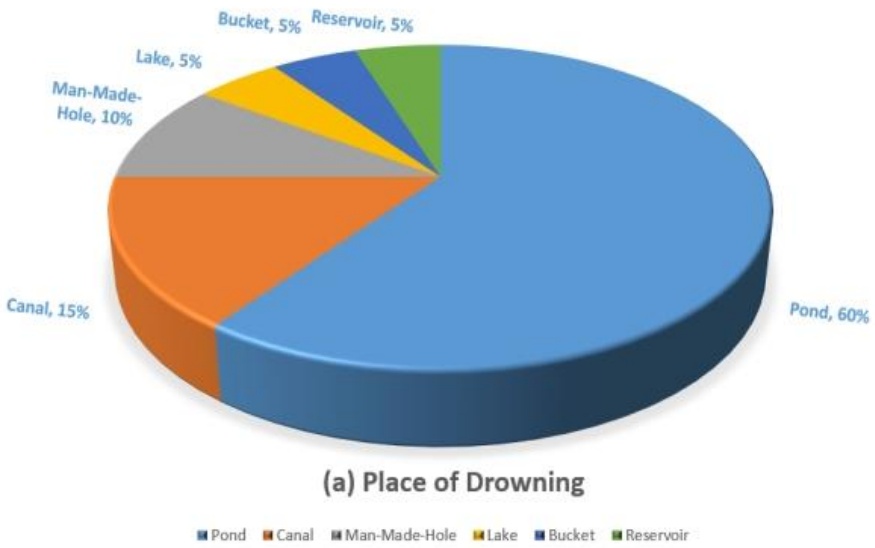


Fig 1.1: Statistics show that fire death rate of children burning

This graph shows the annual death rate in our nation. The biggest percentage of flame-related deaths occurs between the ages of 5 and 9 (almost 65%). we see the death rate is much lower in the age between 15 to 17 Younger children are more vulnerable because of the extreme not thing. The rate is higher in comparison to other childhood years. Regretfully between the ages of 5 and 9 The rate increases significantly.



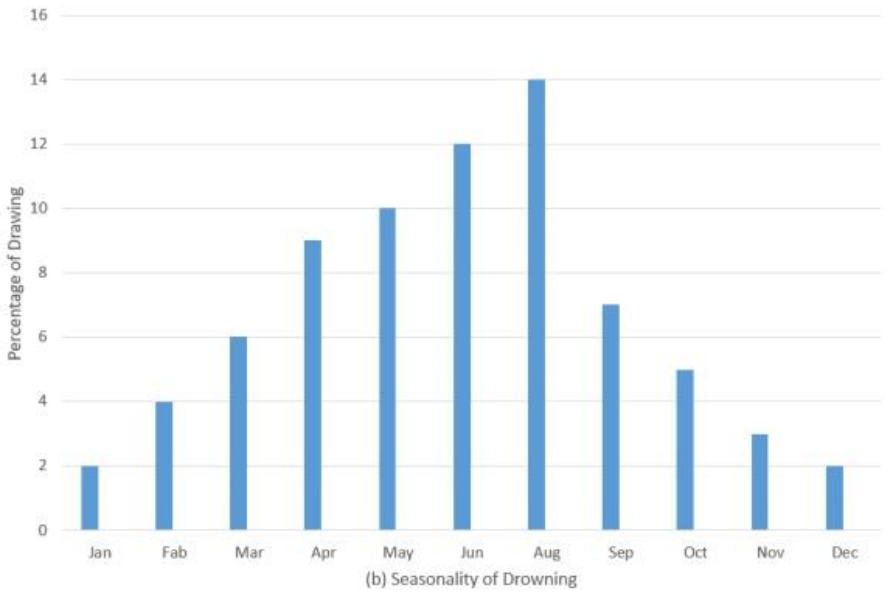


Fig 1.2: Statistics on child drowning deaths

The pie chart and graph Show the drawing's percentage death rate and seasonality. 40% of children drown in canal, Lakes, man-made holes, buckets, and reservoirs. Compared to 60% who drown in ponds. We know the year's wettest months are June, July, and August. The pond's water level rose at this period as a result child deaths are increasing in this time.

1.4 Research Question

1. How can a comprehensive kid safety monitoring system that guards against fire and water threats be made using an efficient integration of IoT sensors?
2. What are the main design factors (such as sensor positioning and network connectivity) that affect how successful these systems are?
3. What do caregivers think about the usefulness and dependability of Internet of Things-based kid safety monitoring systems?
4. What are the financial advantages and disadvantages of putting in place Internet of Things-based kid safety monitoring systems to stop fire and water accidents?
5. How can the lifetime and efficacy of these systems be increased by the application of predictive maintenance models?

1.5 Expected Output

- These gadgets assist parents in monitoring their children's whereabouts in real-time.
- To minimize infant mortality.
- Can avert mishaps by swiftly informing parents.
- To spare parents from concern.
- Important in strange places, giving parents piece of mind by alerting them if their child gets too close to a potentially hazardous location, like a pond.
- To sell it for a cheap price to everyone.
- Should prioritize the safety of the appliances we use the most.

1.6 Report Layout

Chapter 1: In this chapter, we spoke about the project's goals, motivation, and anticipated results.

Chapter 2: In this chapter, we've covered the project's origins, relevant work that is comparable to it, and the difficulties we encountered.

Chapter 3: Essentially discusses use case diagrams and business process modeling, or BPM. The primary focus of this chapter is the use case.

Chapter 4: Everything regarding the website's design, implementation requirements, and associated activities are covered in this chapter.

Chapter 5: The testing, analysis, and findings are all included in this chapter.

Chapter 6: concludes the project and includes information on its benefits, drawbacks, uses, and next tasks.

CHAPTER 2

BACKGROUND

2.1 Introduction

In addition to discussing a few related works, this chapter provides background information on Using GPS Modules and Node MCU for IOT-Based Child Safety Locators from Water and Fire. Effective discussion on the project's ideal result has been place here. Day by day technology has improved more than before. The modern world is advancing rapidly due to the use of technology. Humans have made many impossible tasks possible now with the use of technology. They continue to research in the hope of inventing something new. Authorities raised a lot of money because they expected their project to provide better results. As a result, they have access to the most sophisticated technology. IOT is an enhanced kind of technology utilized for innovation. Because we are engaged in some kind of project, we thus need to be aware of some of these works. It aids us in achieving our objectives. This campaign aims to save children's lives from drowning and fire.

2.2 Relevant Work

This section covered a few related, comparable works that are relevant to this project.

1) The focus of Mahgoub ET al.'s article was on using IoT to fire alarm systems. The primary goal of the experiment was to use Wi-Fi to notify users and fire personnel. As a server system, they employed Raspberry Pi. They also employed smoke sensors to detect their surroundings. (6).

2) The goal of Swarnadeep Majumder ET. Al.'s paper was to instantly give a safe escape path and alert residents and emergency officials to the location of the fire. It recommends utilizing route planning algorithms and a mesh network of smart fire alarms to provide these essential services. (7).

3) ET. Al. Ravi Kishore Kodali. This study presents the usage of an IoT modular architecture to build an emergency response system for fire dangers. A smoke detector with an inexpensive WiFi module (ESP-32). Through the transmission of the danger location to the cloud-service to which all are connected, the sensors identify the threat and alert nearby emergency response organizations, including police and fire departments [8].

4) ET. Al. Aziz Alotaibi. This research proposes an effective and precise detection method that employs a single picture to identify and classify drowning items in order to prevent

drowning accidents. The suggested architecture uses transfer learning and the Internet of Things (IoT) to offer a clever and automated solution for pool safety monitoring during off-peak hours [9].

5) ET. Al. Muhammad Ramdhan. When a victim is submerged in water for a lengthy length of time and the detector picks up an abnormal heartbeat, it alerts the victim's guardians (parents and lifeguards)—a mechanism known as an early drowning detection system, or EDDS. The access point forwards data to the server via an internet connection [10].

6) Zakwan Farid ET. Al. They recommended taking steps to stop this unintentional fatality from happening and to help parents watch over their kids in the pool. To assist parents in keeping an eye on their children while they are in the water, the Child Drowning Warning System was developed. This device is made up of an ESP 32 and a heart rate sensor. Children's heart rates are measured using a heart rate sensor in the water, and an algorithm is developed using ESP 32 code to differentiate between a normal heart rate and a heart rate associated with drowning [11].

1	Author(s)	Result	Contribution
2	A. Gupta et al.	Developed a system that successfully detected water and fire hazards and sent alerts to guardians.	Integrated various sensors with IoT to create a real-time monitoring system.
3	S. Kumar et al.	Implemented a prototype that reduced response time in emergencies.	Focused on home environment safety using smoke and water leakage sensors.
4	J. Smith et al.	Achieved over 90% accuracy in hazard detection.	Utilized machine learning algorithms to enhance the detection accuracy of hazards.
5	L. Zhang et al.	Demonstrated effective real-time monitoring and alert system.	Developed a mobile application for real-time alerts to guardians.
6	M. Ali et al.	Successfully created a system that monitored various hazards and notified parents instantly.	Combined multiple hazard detection sensors into a unified IoT system.
7	P. Johnson et al.	Reduced false alarms significantly through advanced filtering techniques.	Improved the reliability and accuracy of the hazard detection system.
8	K. Lee et al.	Achieved rapid detection and notification within seconds of hazard occurrence.	Implemented an efficient communication protocol to ensure timely alerts.

Fig 3.1: Relevant Work Table

2.3 Comparative Studies

It was said in the preceding discussion that IOT research and initiatives have been undertaken in a variety of areas. However, the devices developed so far are limited in their capabilities. They can detect fire And Sound and alarm but not in another place. They both detect simultaneously but only in homes, garment factories, offices, and restaurants of any kind. They can't do this outside. In our project, we use a piece of material that children wear around their wrists which detects fire and water. Also, it detects fire or water, the gadget notifies parents by phone so they can find out their child's location. On the other hand, other devices can provide parents with their kid's position, but they are unable to identify fire or water. This is the main characteristic that sets our project apart from others.

2.4 The extent of the issue

The extent of the problem has already been established. This project is thought to be useful. Just this project is one of the most valuable things in the world. However, there are issues with any endeavor. The problem that our research aims to solve is this: it's critical to save children's lives if our technology is unable to provide notifications at a certain moment. An important problem can occur if ever the SIM balance is over. If a child or elderly is in contact with fire or water no notification or call will go to the parent's phone due to lack of balance. Also due to network problems, there may be a delay in notification to parents. As a result, parents may delay in reaching the location and may not save their Children's lives. Also, no notification will reach parents if the device somehow comes into contact with children and if they break it. Then you may face a big problem. Another problem is battery backup. Its device, so make it an electrical a battery is needed to work. Informing the parents in the case of a dead battery is not possible. Since the battery is rechargeable, it should be all right for parents who carefully look at it.

2.5 Challenges

We have encountered several obstacles and issues in the process of making these project. The biggest obstacles in this system are design and execution provides. We put our best effort into designing this product so that the average person could utilize it more easily. There are still many places in Bangladesh where there is no good network connection. If the user's connection is poor then they cannot know their location. If they virtually download it from a Google Map then users can view their location offline. We don't have enough knowledge to create a project of the highest caliber. Setting up the entire system presented several challenges when we first

started working. Many several pieces are lost during work by testing. We have to face many obstacles due to loose connection problems such as when we touch certain portions we get shocked. Occasionally defective parts are invented. The cost of the financial investment is another issue. Having to buy a part twice due to breakage is a waste of money. It would make an excellent prototype for an innovation if we could bring this concept to market as a business.

CHAPTER 3

SPECIFICATION OF REQUIREMENTS

3.1 The proposed system's Flowchart Structure

In this flow chart graphic, we can observe how our system will operate and it starts first. Then it will read the fire and water sensors. In the next step, the sensor will detect fire and water when they come into contact with fire and water. Then if it detects a fire it will send a fire alert to the database. If it detects water, it will send a drawing alert to the database. If water and fire are not detected at that location then it is back to read the fire and water sensor. Then it will be stored in the database after sending the fire and drawing alert. Then the call will go to the parents and will show the location through the GPS sensor. If the parents do not receive the call, the call will go again. This is how the process ends.

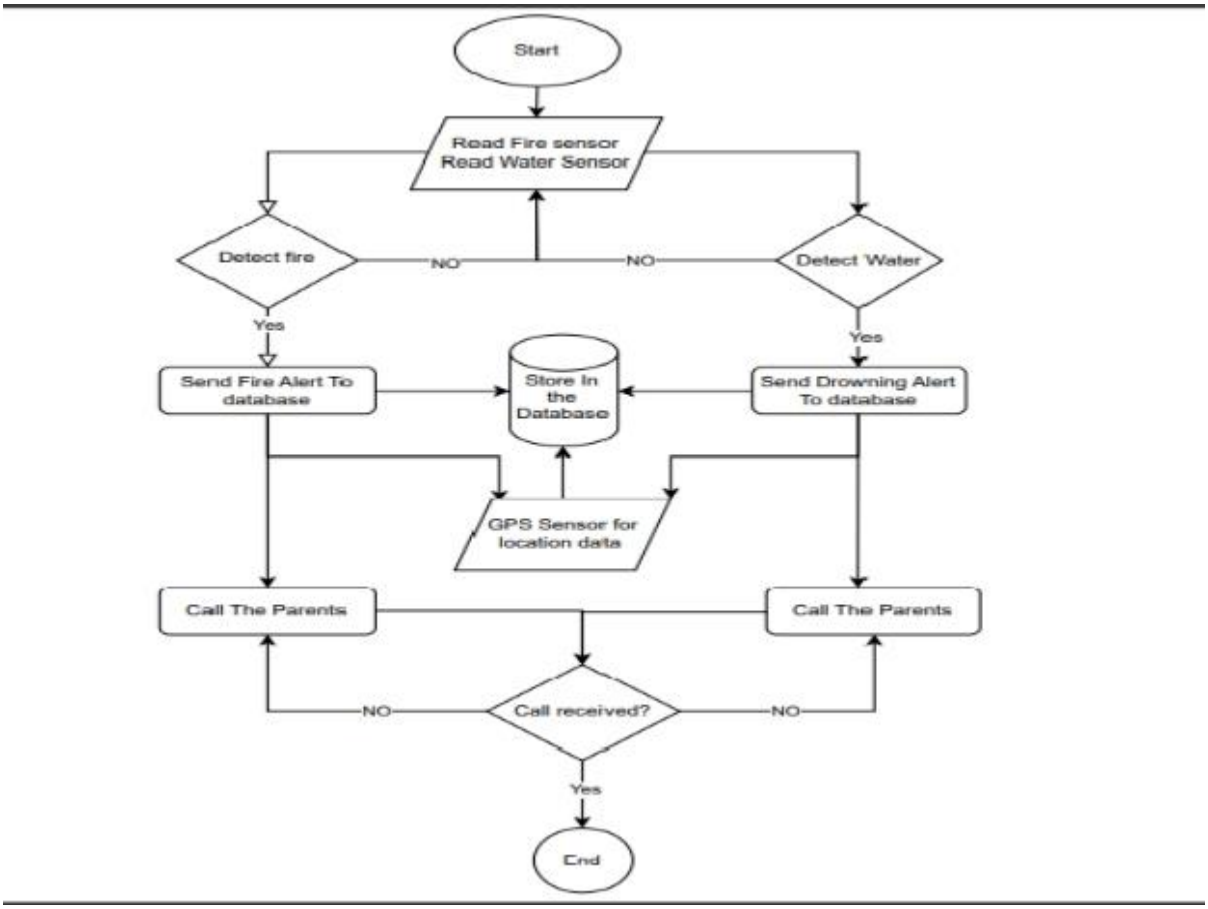


Fig 3.2: Flowchart Structure

3.2 Block Structure of Proposed System

The primary Block Structure of our system is seen. As a result, we will go over the entire system because we covered its entire operation in the following part.

At first the power will be on, then the power source information will come. Then the information will go to the microcontroller. It is depicted in figure 3.2

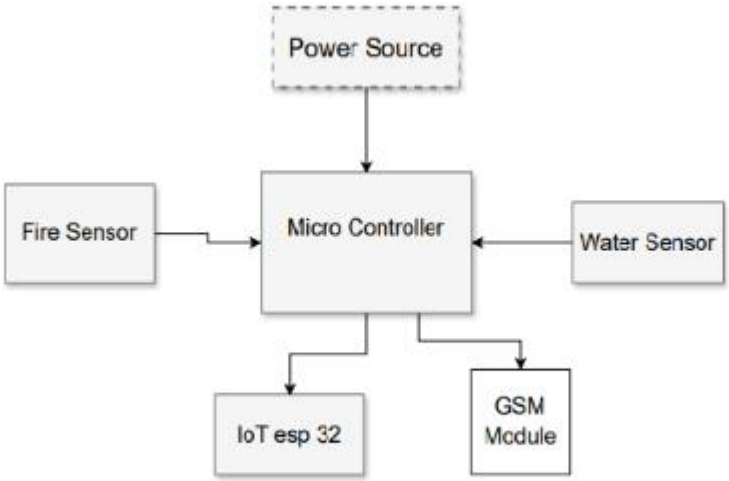


Figure 3.3: Block Structure

When it detects fire, that information will go to the microcontroller; when it detects water, that information will also go to the microcontroller. Then it will come to IOT ESP 32 and GSM Module and Call to Parents.

3.3 An explanation and circuit Structure

This circuit schematic shows a fairly straightforward connection.

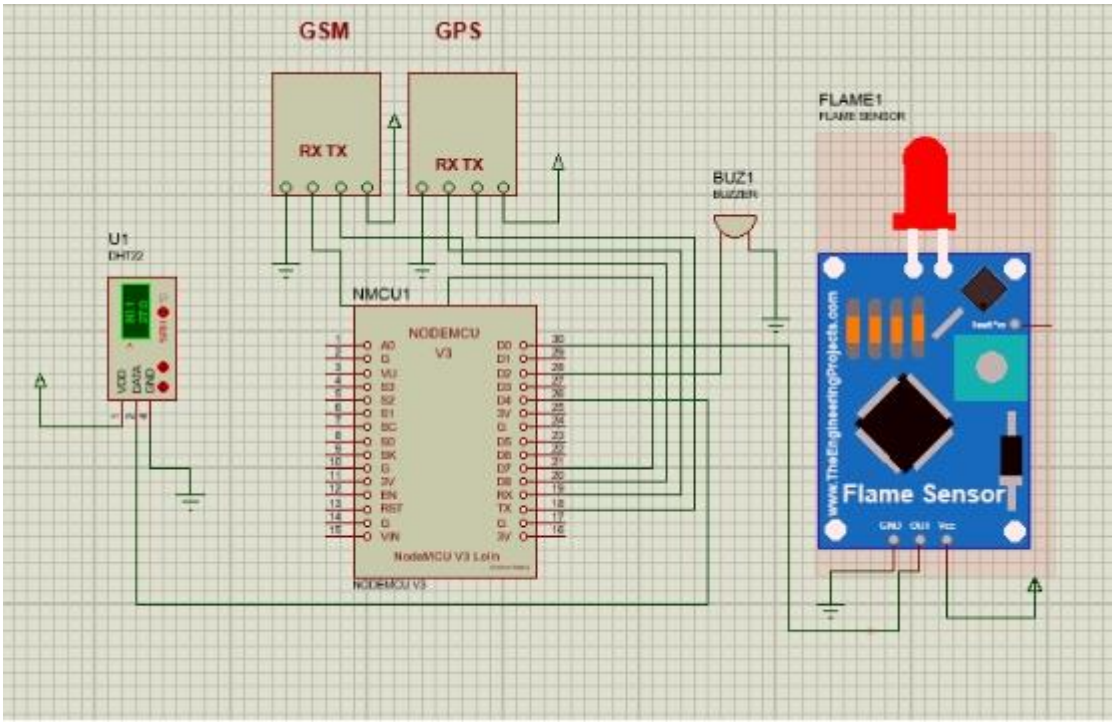


Fig 3.4: Circuit Structure

The circuit schematic above shows that there aren't any difficult connections. ESP 32, DHT22, GPS, and fire sensors are all very loosely coupled. The data pin of the DHT22 is connected to the D4 pin of the ESP 32, as can be seen in the diagram. The GPS pins RX and TX are connected to the corresponding pins RX and TX of the ESP 32. The ESP 32 D0 pin is linked to the fire sensor's single pin. The Vero board is linked to the GND pin, and the buzzer pin is attached to the D2 pin. Additionally, the Vero board has connections for all of the VCC and GND pin equipment. If there is a problem with a connection, we can replace the wire. We are able to switch the component-containing wire. In order to proceed, we first power up the ESP 32 module on our laptop and verify the coding. After that, every connection was finished in accordance with the previously mentioned circuit schematic. It was now prepared for programming.

3.4 Requirement Collection and Analysis

The earlier conversation provided an overview of related research. It has been expressed deeply here. For Internet of Things applications, requirements analysis is a critical part of project management. It is well known that demands fall into two categories: nonfunctional

requirements and functional requirements. The process of an Internet of Things application that outlines the characteristics and functionalities of a product is known as functional requirements. Nonfunctional criteria also provide an overview of a system's overall characteristics for an Internet of Things application. The primary user of this device, a young person, wears a bracelet that detects accidents. Then, in order to find the position, another user must have a mobile phone. The actual module model that he has to choose in order to construct the system is the Adriano Uno, which is an ESP 32 model. The band senses danger zones and, in the event that it identifies a threat, pinpoints the precise location. The second user will locate the dangerous area and be able to save the youngster after receiving the notification. The system may be effortlessly operated by the second user. We required a development methodology in order to create this control system. We employed the agile development process to create this Internet of Things-based control system. This technique enabled us to create the control system correctly. We adhered to the requirements analysis, planning, design, programming, testing, and release phases of the agile development process. Following publication, we monitored and kept an eye on and resolved some of the problems. We used this approach since certain of our needs were not really apparent. Initially, we only used the voltage step button to arrange the voltage control. However, this was not a very excellent execution. Following that, we made the decision to create a more intelligent-looking slider for that rule. We combine that includes an app button for this reason after creating this slider technique. Therefore, our criteria are unknown till then. This is the real rationale behind the agile development process, which is why the entire system is being created step by step.

3.5 Specifications for Design

The system's design specifications, encompassing hardware and software details, are presented in this section. The hardware requirements for this system are the most crucial component of the project's primary implementation. We designed the entire system because of the hardware. The list of required hardware is shown below.

Hardware Requirements:

1) ESP32
2) Adriano Uno R3
3) Soil moisture sensor
4) Fire Flame Sensor
5) Jumper wire

6) 5v 2A power adapter
7) Breadboard 830pin
8) GPS Sensor Neo 6m
9) GSM Sim900 A
10) 18650 battery
11) 5v power bank circuit
12) Push switch

The second most crucial element of project development in this case is the software requirements approach. We created the system process and its operation using the software. Furthermore, the software has designed the project's implementation. The list of software requirements is as follows:

Required software:

Adriano IDE

In this section, we merely covered the list of hardware and software requirements. We will then have a quick discussion regarding the entire system.

CHAPTER 4

DESIGN SPECIFICATIONS

4.1 Design at the Front End

We discussed the system's requirements and their list in the last debate. Therefore, we will talk about all of the prerequisites in this part.

4.1.1 Hardware Devices

In this discussion, the hardware tools required to build the project prototype will be covered.

1. **ESP32:** The ESP32 chip provides Wi-Fi and (in some versions) Bluetooth connectivity to embedded devices, also known as Internet of Things devices. The chip itself is called ESP32, but the manufacturer also often refers to the development boards and modules that use this device as "ESP32."

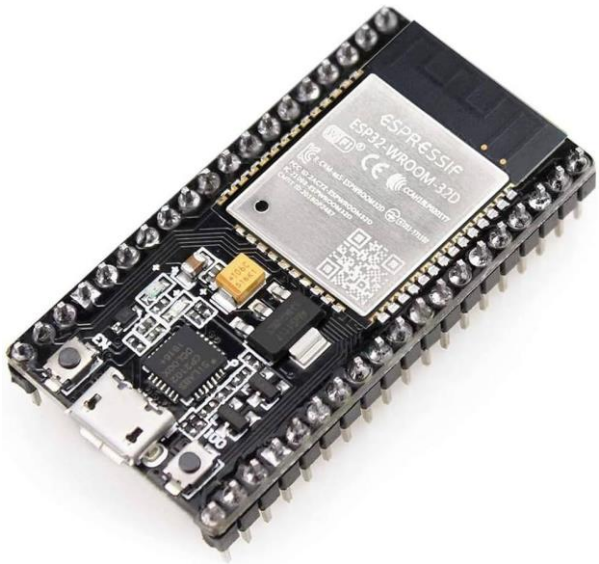


Figure 4.1: ESP32 Wi-Fi and Bluetooth connectivity for embedded devices

Adriano Uno R3: Adriano UNO is a microcontroller board that runs on the ATmega328P. It features an ICSP header, a reset button, a USB port, a power connection, a 16 MHz ceramic resonator, six analog inputs, and fourteen digital input/output pins, six of which may be used as PWM outputs. Everything needed to support the microcontroller is included; all you have to do is power it using an AC-to-DC converter or a battery.

To begin, insert the adapter or use a USB cable to connect it to a computer. With your UNO, you may explore without too much fear of failure since, should something go wrong, you can always buy a new chip and start over.

Figure 4.2: Adriano Uno R3

1. **Soil moisture sensor:** The volumetric water content of soil is determined using the Soil Moisture Sensor. For doing experiments in classes like soil science, agricultural science, environmental science, botany, and biology, this makes it perfect.

Figure 4.3: Soil moisture sensor uses

2. **Jumper wire:** Generally speaking, a jumper wire is an electrical wire. These cables are used for small-scale project construction. Anybody may use these wires on a breadboard and they include pins for convenience. Additionally, they have numerous alternate uses, as Figure illustrates.

Figure 4.4: Jumper wire

3. **5v 2A power adapter:** The module's charging connection may be powered by a USB port, and it can charge one lithium battery at a time or several lithium batteries in simultaneously. It is compatible with different 3.7V batteries in addition to 18650 ones. It prevents the battery from being overcharged or discharged. It may be connected to any USB C port with a USB cable. The module's maximum output current is 1A.

Figure 4.5: 5v 2A power adapter

4. **Breadboard 830pin:** The BreadBoard-830 is a plug-in, solder less breadboard featuring 830 connection tie-points or holes for inserting wires. 4 power rails are included. Solder less breadboards are an excellent tool for developing and evaluating novel circuits as they make it simple to add and remove components. They may be used again and again.

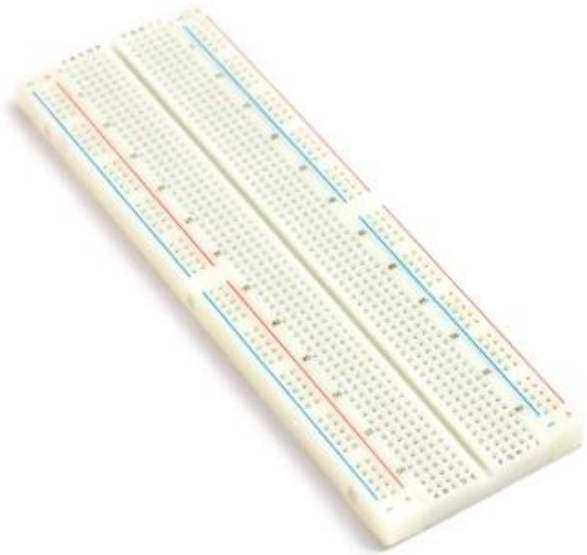


Figure 4.6: Breadboard 830pin

5. **GPS Sensor Neo 6m:** The NEO-6M GPS Module with EPROM is commonly used in applications such as vehicle tracking, navigation systems, geocaching, drone flight control, and outdoor sports monitoring, The NEO-6M GPS engine is excellent, and precise position data is necessary for every project.

Figure 4.7: GPS Sensor Neo 6m Uses

6. **GSM Sim900 A:** Users may send and receive SMS, make and receive phone calls, and send and receive data over GPRS using the SIM900A module. This module is a great option for any project requiring long-range communication because of its affordable price, small size, and compatibility with quad-band frequencies. The power module powers up upon connection, looks for a cellular network, and automatically logs in. USART communication is used by the GSM and GPRS module to connect with a microcontroller or PC terminal.

Figure 4.8: GSM Sim900 A

7. **18650 battery:** The 18650 rechargeable batteries have a voltage range of 3.2 to 3.7 volts and a capacity of 2500 mAh to 3500 mAh. They can be classified as high-drain batteries because of these features. They are made to deliver enough voltage and current to meet the demands of the equipment they power.

Figure 4.9: 18650 battery

8. **5v power bank circuit:** A power bank usually consists of several internal battery cells, a charging circuit and several output ports. The internal battery cell is usually a high-quality lithium-ion or lithium-polymer battery, which can store sufficient energy. The charging circuit controls the charging process of the power bank itself.

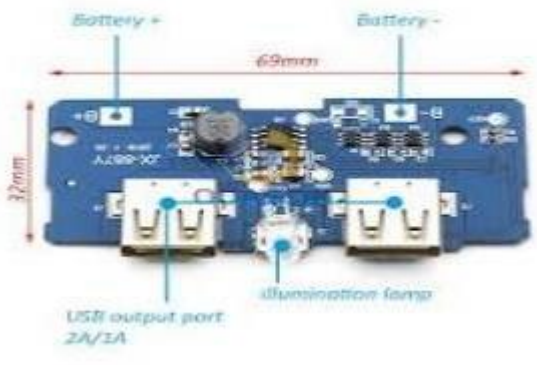


Figure 4.10: 5v power bank circuit

9. **Push switch:** When you press the button, it makes or breaks an electrical connection, allowing or interrupting the flow of electricity through the circuit. Pushbutton switches are commonly used in various electronic devices, control panels and applications where a user needs to activate or deactivate a function or operation.

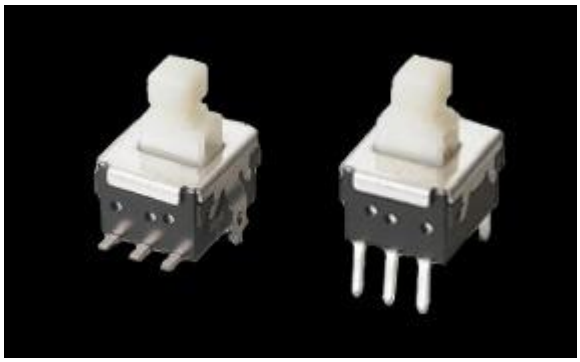


Figure 4.11: Push switch

10. **Fire Sensor:** A flame detector is a type of sensor that can identify whether there is a fire or flame present and responds appropriately. Responses to a detected flame may include activating a fire suppression device, turning off a fuel line, or sounding an alarm, depending on the installation. This is mostly

done to check if the boiler is running efficiently. These sensors react faster and more accurately than a heat smoke detector because of the technology employed to detect the flame**.**

Fig 4.12: Fire Sensor

4.2 server-side-development

We are using an app application for this project. We use the backend of MIT App Inventor, which handles the server-side operations, and is built using:

Java is the primary language for the backend is java. It is used to handle server-side logic, including processing requests, managing data, and interfacing with the database. JavaScript is primarily used for adding interactive behavior to web pages. The common markup language used to create web pages is HTML. When specifying how an HTML document is presented, CSS is utilized. A Java development toolkit called Google Web Toolkit (GWT) is used to create and enhance intricate browser-based applications. Java code was forced into Java script by GWT, enabling MIT app inventors to use Java for front-end development.

4.3 UX & Interaction Design

By applying the design of interactions process, developers may produce more aesthetically pleasing user interfaces for their applications and systems. Interface design is simple. Its actions, language, timing, and illustration. We have made every effort to include the previously specified interaction in this system. These describe several sorts of contact. By applying the interaction design process, developers may produce more aesthetically pleasing user interfaces for their applications and systems. A vital component of all systems and applications is visual representation. A fluid native interface is all we need. We included a number in the user

interface to assist all system users. Users receive a call when there is a fire or water issue. Users can see the current location by logging into the apps. As shown in Figure 4.13.

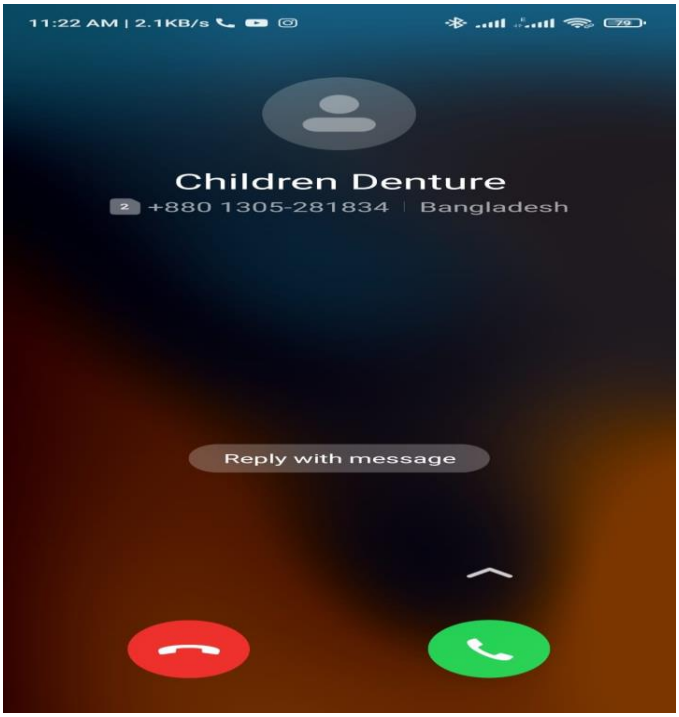


Figure 4.13: Call

Every customer may have a better client experience by implementing this work and encouraging positive behavior inside the boundaries. We gathered input on the many kinds of systems that have already been developed using online and in-person questionnaires. After that, we conducted several tests on a regular population. They were able to enjoy the most amazing experience possible because of this very comfy and seamless technology.

4.4 Implementation Requirement

I noted before that this project is an Internet of Things system. To construct this undertaking. To design the system architecture, we employed C language. Using the Arduino IDE, we wrote code. Our entire project is operational if we adhere to this code. Initially, we require something that the sensor is capable of sensing. It will make a mobile call and track GPS. In addition, the logical all-condition implementing code that powers the system is required. The primary

implementation will require well-arranged hardware, which will give the system a more sophisticated appearance.

CHAPTER 5

TESTING AND RESULT DISCUSSION

5.1 Setting up the Arduino IDE

Initially, we covered Arduino installation in this section. The Ide symbol will appear on the screen upon installation. The Arduino window will then open by clicking on the icon. This is seen in Figure 5.1

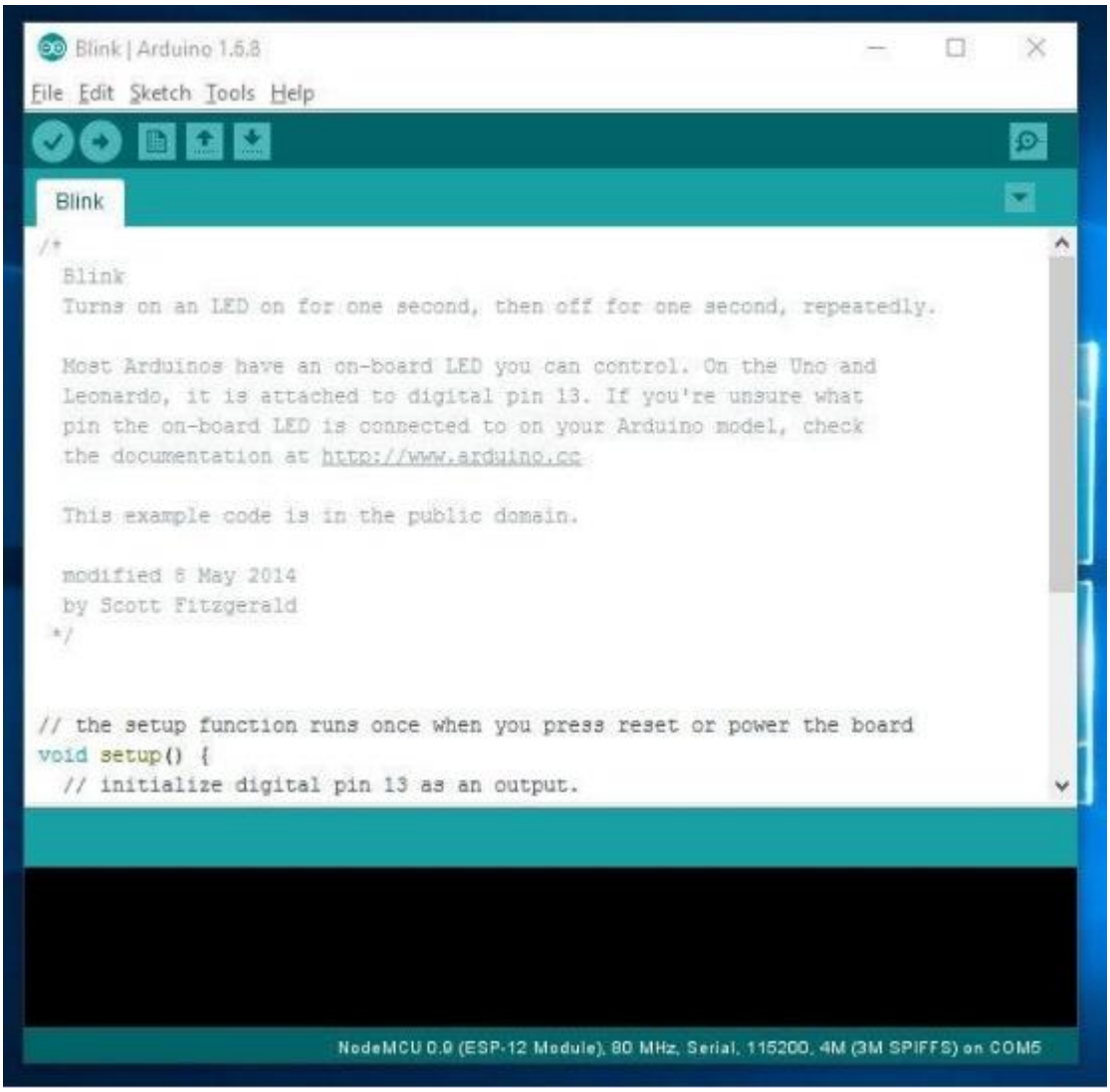


Figure 5.1: Opening Arduino IDE

After opening the file, select the preference. Select the Boards Manager option after opening the tools in the selected board. Which Figure 5.2 illustrates.

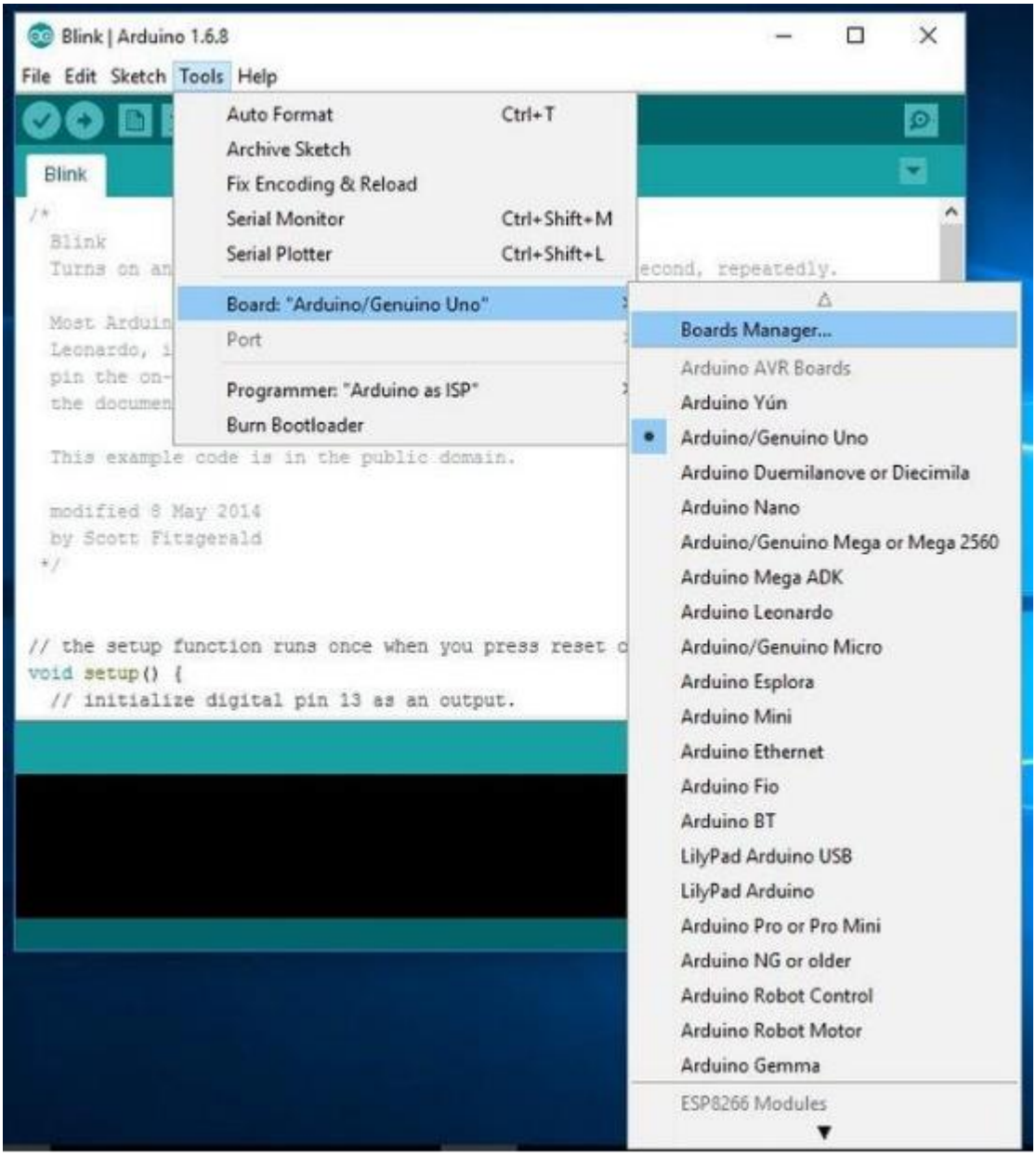


Figure 5.2: Selecting Board

The module with the name EPS 32 will be shown at the bottom of the page once the board's management window opens. Next, choose the "install" button. After installation, the figures Installed in the module appear, and you can shut the window shown in Figure 5.3.

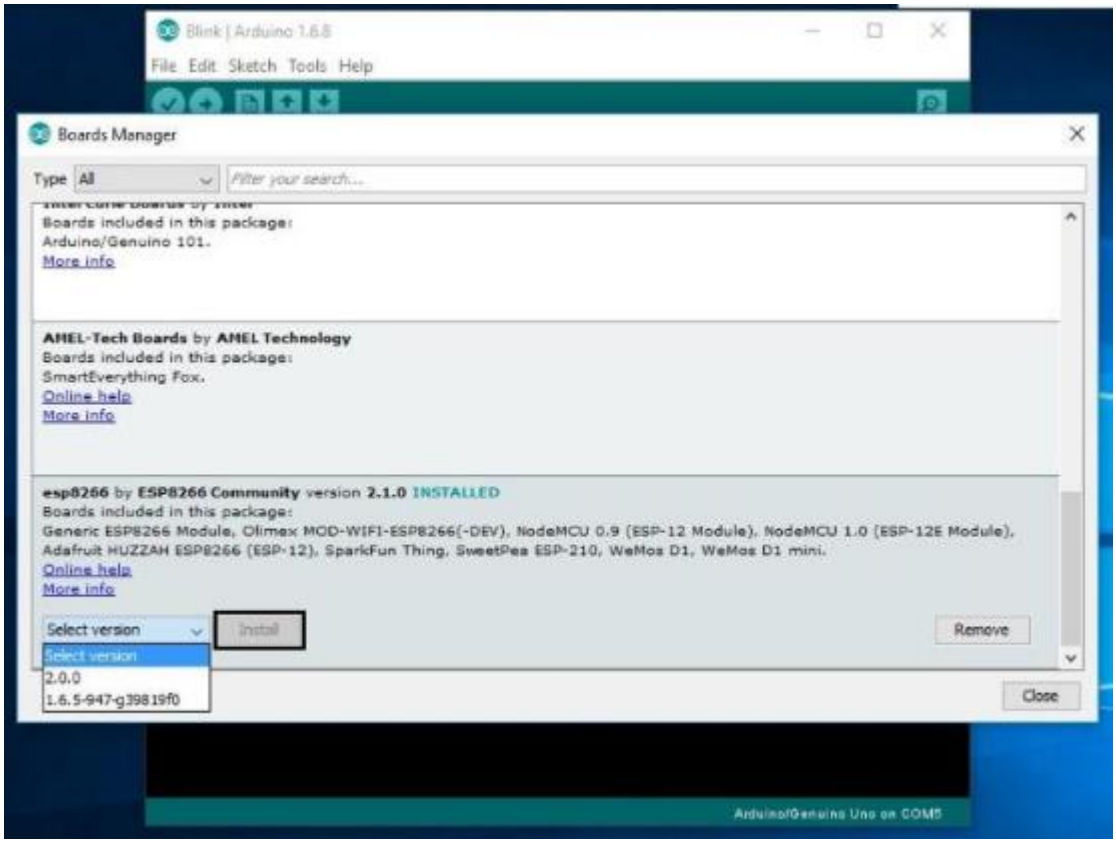


Figure 5.3: EPS 32 Board Package

To run the EPS 32 with Arduino, choose the Board: "Arduino/Genuino Uno" and then esp 32 1.0 (EPS 32 E Module) or another EPS 32. Then using the USB cord to attach the EPS 32 module to the PC as indicated the Figure 5.4.

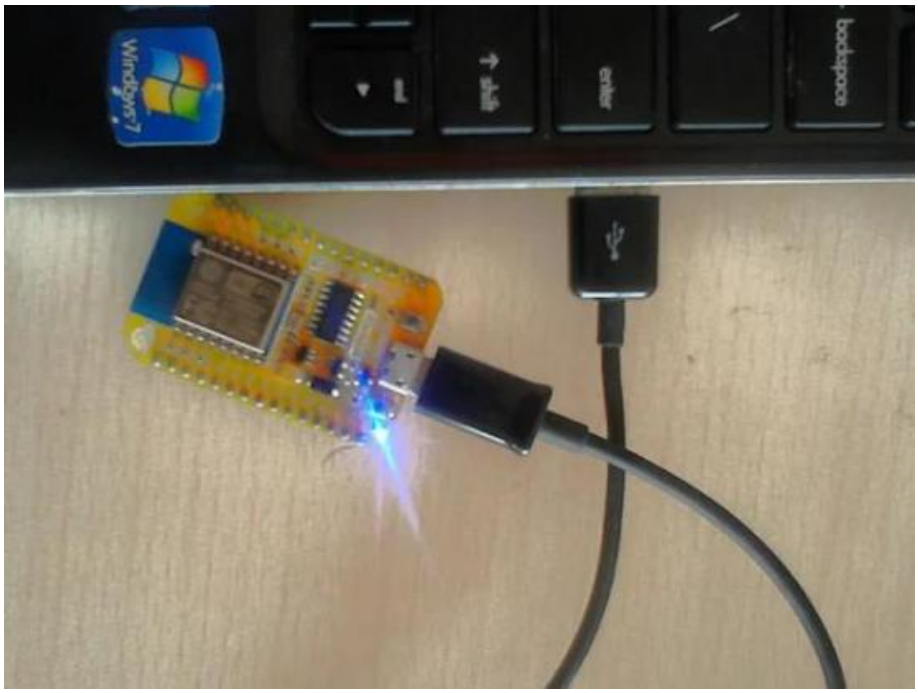


Figure 5.4: Connecting EPS 32 to the PC

Lastly, we need to add the Arduino libraries.

5.2 Step-by-Step Demonstration of the Final Project

We went over the project's general functionality and how it produces output depending on user input in this part. When our project is initially turned off, everything will be normal.

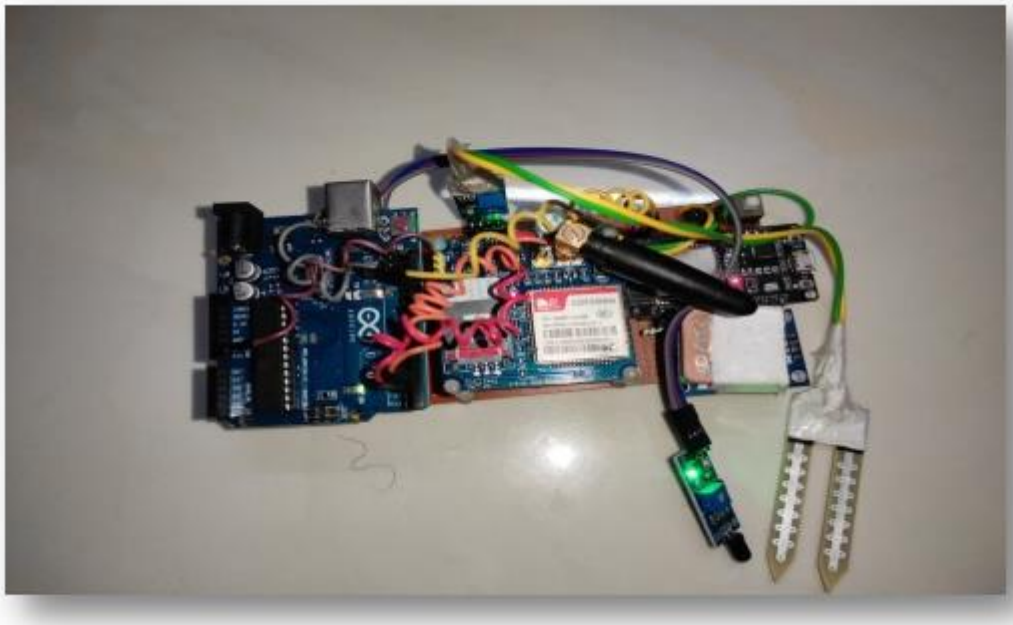


Figure 5.5: Project View

When the system is turned on, the red light will blink as it turns on.

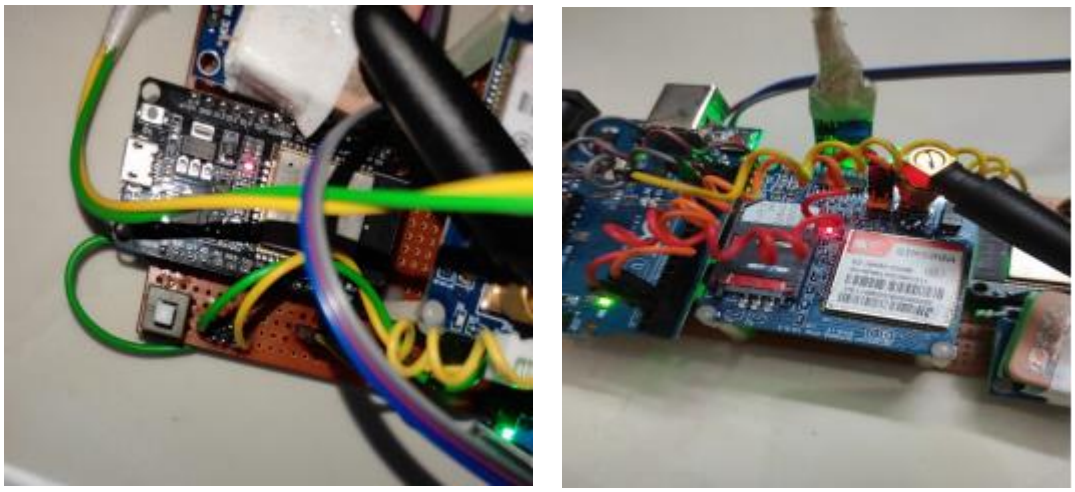


Fig 5.6: Turn on the red light and make it flicker.

Internet connection will be added to the WiFi module within a few seconds. Then it will blink slowly. Figure 5.9: red light is displayed on the GPS module.

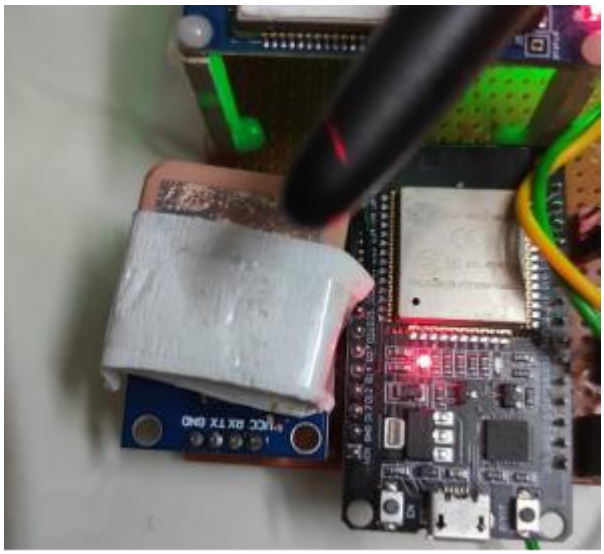


Fig 5.7: Showing Red light on the GPS module

If we take an object in the vicinity of fire and the moisture of water, then the object can sense. After detecting the object, parents are informed through a call.

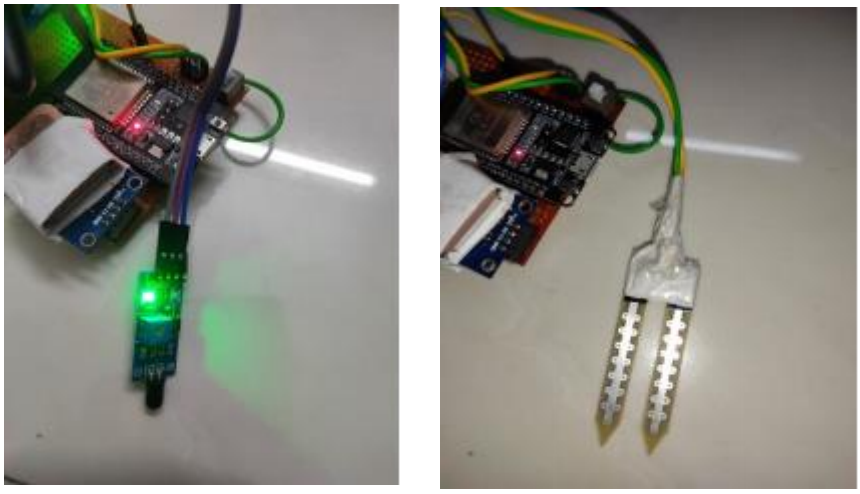


Fig 5.8: Fire and water sensor

Then if we want to know the child's current location, we can know the current location by entering the apps.

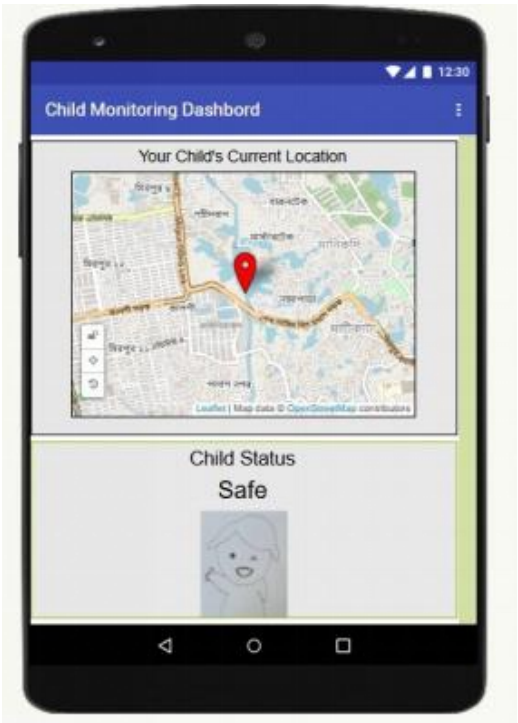


Figure 5.9: Child location

Through the app we can also know where the child is and what his condition is and what kind of danger he is in whether he is in fire or he is in water. If it catches fire, it will be visible in the Danger Fire app

Figure 5.10: Child Danger in (Fire) location

And if he falls into the water then dangerous water will appear in the Apps

Figure 5.11: Child Danger in (Water) location

5.3 Final System Analysis and Result

We have achieved excellent production and quick response through ongoing system testing. Installing this quicker method can be easily accommodated in any specific place where the automation system is needed. We've witnessed outstanding output and prompt service. Any designated region where automation is required may easily accommodate the installation of this speedier technology. A comparison of earlier studies Since I have no prior professional experience in this field, I can only state that I must create a strong system via hard effort. In addition, I had a lot of difficulties while working on this project. Utilizing the EPS32 and GPS module hardware, which is crucial these days for creating quality products, was my primary emphasis. I have therefore successfully done everything I could to succeed. As a result, everyone has found my work incredibly helpful and simple to use.

CHAPTER 6

FINAL THOUGHTS AND FUTURE PROGRAMS

6.1 Advantages

We would want to talk about the following section's constraints about our development project:
1) Gives parents access to their kids' in real-time. They will be notified immediately if a youngster wanders into a harmful place.
2) Increases kid safety by giving parents the ability to react swiftly to possible dangers or mishaps.
3) Continually keeps an eye on things, especially in busy or strange areas, which lessens parental concern.
4) Helps reduce water-related accidents and improve resource management by providing real-time data on water levels and quality.
5) Gives out real-time fire notifications, enabling prompt emergency action and evacuation.
6) It helps in reducing infant mortality rate.

6.2 Limitations

We want to clarify the limitations of our development project in this part.

1) A reliable internet connection needs for work, which might be problem in rural or undeveloped locations.
2) Privacy issues may arise from ongoing data collection and monitoring. Because it's possible for unauthorized parties to gain personal data.
3) Cyber-attacks and hacking can target Internet of Things devices. May compromise system security.
4) The initial high setup and installation expenses of IoT devices could be a disadvantage for some users.
5) It might be challenging for certain users to update and maintain IoT devices on a regular basis to guarantee reliable and correct performance.
6) For the battery to function in an emergency, it must always be able to be charged.

7) The GPS tracker must operate efficiently. If not, it won't display the precise position.

6.3 Future Work

The suggested system can be improved by

1) Putting in place more robust security mechanisms to protect Internet of Things devices against hacking and assaults.

2) Developing methods, such as mesh networks or satellite internet, to provide dependable internet access in rural or undeveloped regions.

3) Using artificial intelligence to improve the efficiency and productiveness of Internet of Things systems, including anomaly detection and predictive maintenance.

4) Call receiving system can be added.

5) Seeking to lower the price of IoT systems and devices to increase their affordability for a wider range of users.

6) Creating industry standards for Internet of Things devices to guarantee compatibility and interoperability across various manufacturers and platforms.

7) Can be equipped with a camera.

8) Increasing IoT device energy efficiency to prolong battery life and lessen environmental effects.

6.4 Conclusion

Day by Day devices connected to the Internet of Things are improving the safety, health, and efficiency of daily living. The having fact of a fire reduce child mortality due to fires, it motivates parents to take special care and keep an eye on their children. The proposed idea aims to prevent drowning incidents in rivers and lakes. The purpose of the project is to save children under five who might faint while being driven to the pond. Because it would respond more quickly, combining the sensor and controller with the recovery set would be quite beneficial. The proposed task's reaction time can be less than a minute, considering that the model was run on outdated hardware. While other methods are confined to prediction, the research is saving the lives of children. Ultimately our proposed model was able to achieve its original goal. IoT and building based models of fire and water alarm systems were the most used. It can alert the user through Call about fire and other dangerous situations. It can sense the moisture of water. One of the primary objectives of the study was to demonstrate that well-developed, inexpensive, and well-understood technology such as those outlined may be used

to achieve smart fire evacuation. The prototype effectively illustrated this assertion. It gives a good notion of how a more expansive and useful system may operate. We expect that in order to develop a more appropriate fire prevention system, the scientific and technical community will look into and test technologies similar to these in the future.

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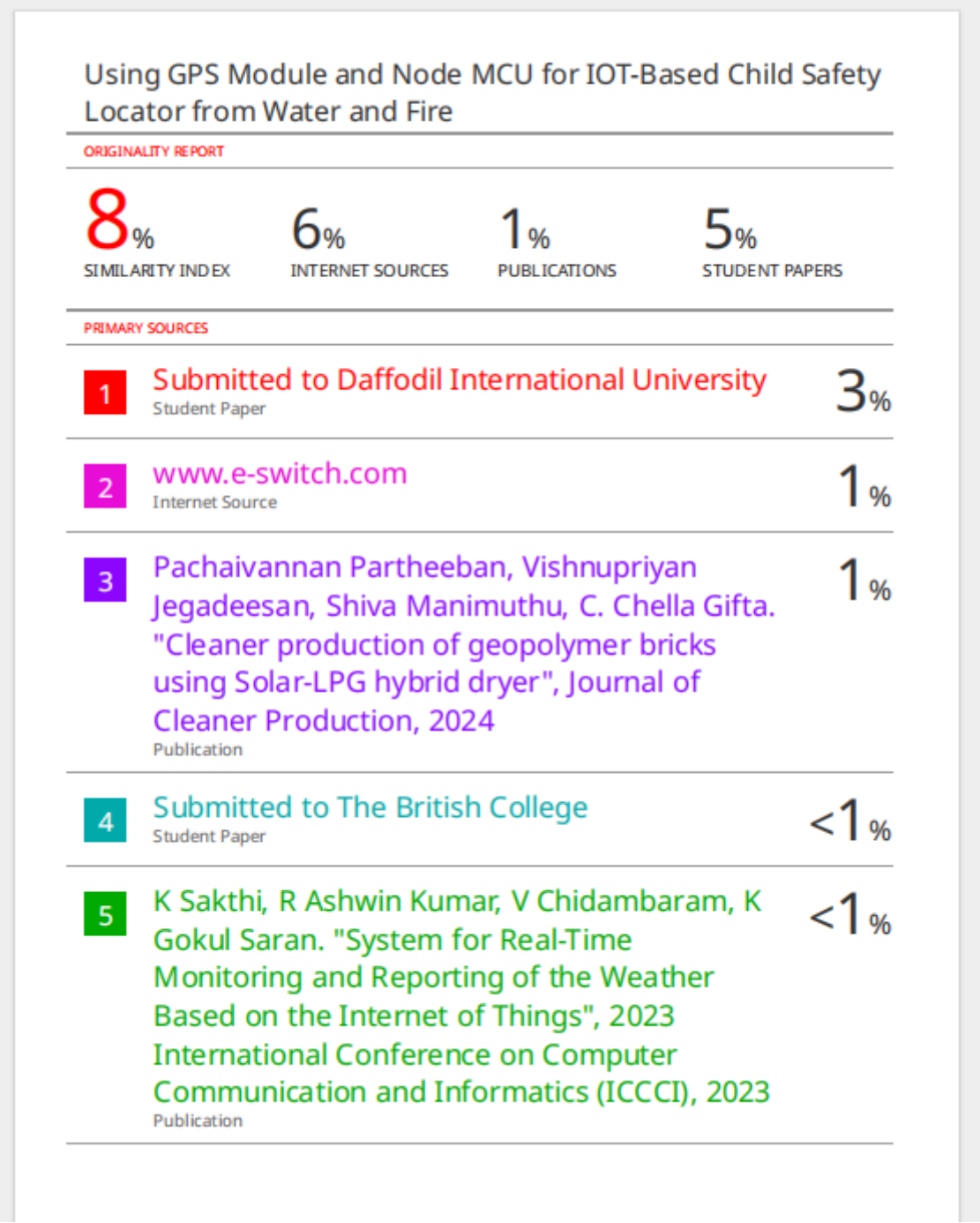

Using GPS Module and Node MCU for IOT-Based Child Safety Locator from Water and Fire

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