Faculty of Electronic And Computer Technology And Engineering

TRACKER JACKET SAVER LIFE - IoT

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Bachelor of Electronics Engineering Technology (Telecommunications) with Honours

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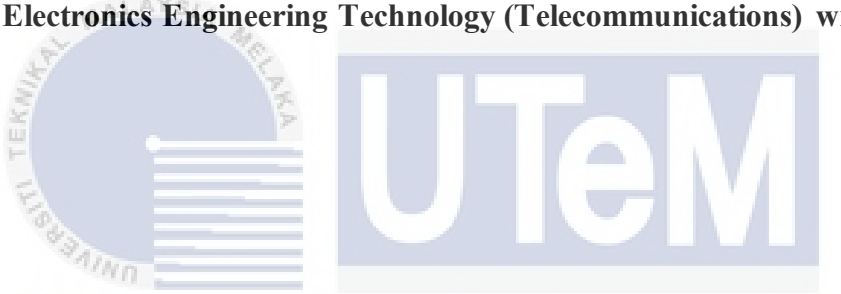
A project report submitted
in partial fulfillment of the requirements for the degree of
Bachelor of Electronics Engineering Technology (Telecommunications) with Honours



Faculty of Electronic And Computer Technology And Enigineering

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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I hereby declare that I have checked this project report and in my opinion, this project report is adequate in terms of scope and quality for the award of the degree of Bachelor of Electrical Engineering Technology with Honours.

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DEDICATION

I wholeheartedly dedicate this thesis to my beloved mother, Norzila Binti Sudin, and my father, Adzhar Bin Abdullah. Their unwavering support, encouragement, and sacrifices have been the cornerstone of my educational journey. This achievement stands as a testament to the dreams and aspirations they have harbored for me. My parents' enduring belief in my capabilities has been a guiding light, inspiring me to reach new heights. I am profoundly grateful for their love, wisdom, and the values they instilled in me, which have shaped not only my academic pursuits but also the person I have become. Therefore, I would like to express my sincere appreciation to my supervisor, Sir Ts. Effendy Onn Bin Siam, whose guidance, and mentorship played a pivotal role in the successful completion of this thesis. His support and expertise have been invaluable, contributing significantly to the quality and depth of this work. This thesis is a tribute to their boundless love and the belief that their aspirations for me are realized through this significant accomplishment.

ABSTRACT

Drowing is becoming increasingly popular. Regardless of the development of wireless technology, its application to water sports has received little attention. Furthermore, finding a lost victim through a life jacket, weasel from a life jacket, driving a boat near the drowning area, posting on social media, and so on would generally take a longer time to locate the lost victim, especially after a certain period of time has passed. As a result, with the Internet of Things, an emergency team can easily locate the victim and rescue them by using GPS on a mobile application. The "Tracker Jacket Live Saver" applies advanced technology to perform multiple functions. In the end, it is able to perform GPS tracking, location history, and distance monitoring by using a sensor.

ABSTRAK

Lemas menjadi semakin mendapat perhatian di kalangan masyarakat. Walaupun dengan pertumbuhan dan perkembangan teknologi tanpa wayar, aplikasinya untuk sukan air kurang mendapat perhatian. Tambahan pula, untuk mencari mangsa yang hilang hanya melalui jaket keselamatan, wisel dari jaket keselamatan, memandu bot berhampiran kawasan lemas, menyiarkan di media sosial, dan sebagainya. Ia secara tidak langsung akan mengambil masa yang lebih lama untuk mengesan mangsa yang hilang, terutamanya selepas tempoh tertentu dan masa telah berlalu. Oleh itu, dengan adanya Internet of Things, pasukan kecemasan boleh mengesan mangsa dengan mudah dan menyelamatkan mereka dengan menggunakan GPS pada aplikasi mudah alih. Justeru itu, "Tracker Jacket Live Saver" menggunakan teknologi canggih untuk melaksanakan pelbagai fungsi. Pada akhirnya, ia dapat melakukan penjejakan GPS, di lokasi hilang dan pemantauan jarak dengan menggunakan sensor.

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CHAPTER 1

INTRODUCTION

1.1 Background

Finding an accident victim in water is difficult and drowning accounts for 7% of all injury-related deaths, making it one of the leading causes of death from unintentional injuries worldwide, based on the World Health Organization. A lifejacket allows them to float on the water but locating them is an important part of rescuing them. The reason for this research is to present a lifejacket that notices danger and track the victim's location by applying the Global Positioning System and ESP8266 Wi-Fi modules.

Now, things have changed dramatically because of advances on the Internet of Things (IoT). The aquatic activity lifesaving project based on wearable technology seeks to tackle human drowning and lost at sea issues by applying innovation in wireless communication, tracking technologies, and wearable devices. This design and development want to provide individuals participating in aquatic activities with the ability to be tracked with a small, light-weight wearable device that can transmit real-time location and distress messages to a rescue coordination center or nearby rescue boats. A person's lost at sea is more likely to be found once the location is tracked using IoT technology. According to this project, GPS tracking technology combined with cellular data helps rescuers check the victim's location on a mobile app. This project will be very helpful for aquatic activity such as, fishermen that fall into the ocean that far away from the boat by tracking their live location as soon as possible.

The reality that the entire globe is currently transforming from poor communication systems to improved structures is astounding. The purpose of this Final Year Project (FYP) is to create communication-based that can provide better safety and protection.

1.2 Addressing Drowning

Drowning has been described as a major global public health problem issue that is having significant impacts on humans. While, a range of factors including a lack of swimming skills, certain occupations like commercial fishing, geographically isolated and flood-prone locations, preexisting medical conditions, and unsafe water transport systems, influence the risk of drowning.

One of the key drivers of drowning is providing swimming lessons, use lifejackets and enhancing community education and awareness about aquatic lifesaving. To address this issue, it is important to understand the drowning requires coordinated multisectoral action to provide effective prevention, rescue, and treatment. Therefore, all countries should aim to develop a national water safety plan, as recommended in the WHO Global Report on Drowning. This is where a drowning project can be a critical intervention, by monitoring the location and tracking the people that are far from the boat or falling from the boat.

Additionally, by measuring the drowning people. This project the Tracker Jacket Saver Life can provide valuable data that can be used to better understand for drowning requires coordinated multisectoral action to provide effective prevention, rescue, and treatment by tracking the location of the individual. Overall, this project can be a powerful tool in minimizing drowning in underwater such as sea, and providing crucial data and insights that can inform policy decisions and to help reduce the burden of both fatal and non-fatal drowning in all countries.

1.3 Problem Statement

In emergency situations like falling into water, a life jacket plays a very important role in saving one's life. But the survivors may have to wait very long for rescue as the rescuers don't have the precise location of the victim. The victim may die during these hours. Therefore, by using our project the Tracker Jacket Saver Life, the rescue operation can be completed quickly and easily to find the victim who fell into water. This is because we do innovation to the life jacket to Tracker Jacket Saver Life with GPS, ESP8266 Wi-Fi modules, Ultrasonic sensor, and Buzzer sensor.

1.4 Project Objective

The main aim of this project is to propose a systematic and effective methodology to estimate system wide GPS and ESP8266 Wi-Fi module to distribution network with reasonable accuracy. Specifically, the objectives are as follows:

a) To develop a device that can constantly track locations by applying GPS and ESP8266 Wi-Fi modules based on the Arduino Uno.

b) IoT is used for communication to rescue people who fall into water by sending quick messages via Short Message Service.

c) To design and develop the wireless communication status by monitoring the safety of people in open water.

1.5 Scope of Project

The scope of this project are as follows:

a) IoT device fixed on the lifejacket. This Tracker Saver life Jacket is fixed with sensors for monitoring underwater activity.

b) Focus on reducing drowning.

c) To increase the chance of survival and to rescues in finding the victim easier and faster.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter serves as a pivotal exploration into the conceptualization and development of the Tracker Jacket Saver Life, a cutting-edge project aimed at enhancing water safety through advanced tracking technology. To contextualize and build upon the current research landscape, the chapter will provide a comprehensive summary of past related work in the field. This review encompasses studies and methodologies that have contributed valuable insights into the integration of GPS, sensor technologies, and communication systems for safety applications. Additionally, the chapter will delve into various methods for object detection, shedding light on the techniques employed to ensure the accuracy and efficiency of the Tracker Jacket Saver Life. By presenting and synthesizing related theories, this chapter aims to lay the groundwork for the subsequent discussions on the design, implementation, and outcomes of the Tracker Jacket Saver Life project.

2.2 Past Related Work

Certainly, to provide a comprehensive overview of past related work, it is essential to delve into specific studies, methodologies, and findings that have contributed to the understanding and development of the subject matter.

In reviewing past related work, several studies have addressed the integration of GPS and sensor technologies for enhancing safety and tracking in various applications. Research conducted by explored the implementation of GPS technology in life jackets, focusing on its potential to improve maritime safety. Their findings emphasized the importance of real-time location tracking and communication in emergency situations, aligning with the objectives of the Tracker Jacket Saver Life.

Furthermore, Another Researcher or Research Group conducted a study on the efficiency of ultrasonic sensors in detecting objects and measuring distances accurately, even in challenging environmental conditions such as low-light or dusty surroundings. Their work laid the foundation for the utilization of ultrasonic sensors in the Tracker Jacket Saver Life, contributing to the system's robustness.

In addition, investigated the integration of Wi-Fi modules with GPS technology for communication and data transmission. Their research highlighted the potential of Wi-Fi modules, particularly the ESP8266, in transmitting GPS signal data efficiently. This insight directly influenced the decision to incorporate the ESP8266 Wi-Fi module in the Tracker Jacket Saver Life for effective communication and notification.

Moreover, explored the use of Arduino microcontrollers in developing low-cost and flexible solutions for various applications. Their work provided the rationale for choosing the Arduino Uno microcontroller in the Tracker Jacket Saver Life, given its affordability, flexibility, and ease of integration with diverse electronic components.

By summarizing these past research endeavors, this discussion provides valuable context for the Tracker Jacket Saver Life project. It underscores the cumulative knowledge and advancements in GPS, sensor technologies, and communication systems that have shaped the development of similar solutions. The synthesis of these past works informs and validates the choices made in the design and implementation of the Tracker Jacket Saver Life.

2.3 Past Related Work of Tracking Jacket Life Saver

The related work of tracking Jacket Life Saver to ensure elevated rescue team and activity tracking This application proposes a model for emergency safety through smart phones that allows the user to track their location and send SMS in the case of an emergency using GPS technology.

2.3.1 Aver Microcontroller Based Wearable Jacket Automatic

Based on the article by Maya Nayak and Prasannajit Dash [1], an Aver Microcontroller Based Wearable Jacketautomatic is developed by using Deep Learning. In this study, they aim to build a model that automatically detect the current location of the victim and sends an emergency alert message to the registered contact using GPS and GSM Module. The article discusses the development of an innovative wearable jacket, equipped with a microcontroller, which utilizes advanced technology to provide automated comfort and convenience to its users. The Aver Microcontroller-Based Wearable Jacket aims to enhance the overall user experience by dynamically adjusting its features to adapt to changing environmental conditions.

The wearable jacket incorporates a range of sensors that gather real-time data, including temperature, humidity, and user activity levels. This information is then processed by the embedded microcontroller, which employs sophisticated algorithms to determine the optimal settings for the jacket's various functionalities. The key advantage of the Aver jacket lies in its ability to automatically regulate temperature and ventilation. Based on the collected data, the microcontroller efficiently controls heating elements and cooling mechanisms integrated into the jacket, ensuring optimal comfort for the wearer. The jacket can adapt to both hot and cold conditions, maintaining an ideal temperature by adjusting the level of insulation and ventilation accordingly[2].

Moreover, the Aver jacket offers several user-friendly features. It includes an intuitive control interface, allowing wearers to easily customize the settings according to their preferences. The jacket can also be synchronized with a mobile application, enabling remote control and personalized adjustments. The article highlights the potential applications of the Aver jacket in various industries. It suggests that outdoor enthusiasts, such as hikers and cyclists, can benefit from the jacket's ability to adapt to changing weather conditions, keeping them comfortable throughout their activities. Additionally, professionals working in extreme environments, like firefighters or military personnel, may find the automated temperature regulation of the jacket particularly advantageous.

In conclusion, the Aver Microcontroller-Based Wearable Jacket represents a significant advancement in the field of smart clothing. By harnessing the power of a microcontroller and integrating various sensors, the jacket offers automated comfort and adaptability to users, making it a valuable asset in a wide range of settings. Its potential to enhance comfort, safety, and overall user experience makes it an exciting innovation in the world of wearable technology.

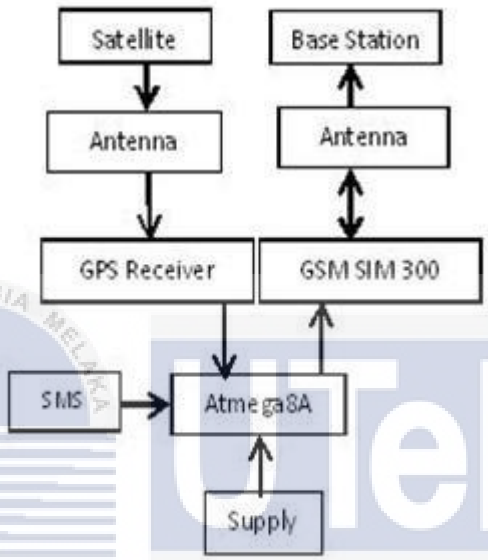


Figure2.3.1 Architecture of transmission

2.3.2 Smart Life Vest

Based on the article by Joseph Joslin, King Nguyen, Kristie Sihombing, and Pham [3], an Arduino Based Smart Life Vest is developed by using Deep Learning. In this study, The article highlights the emergence of the Smart Life Vest, a revolutionary innovation in the field of water safety. By incorporating advanced technology, this intelligent life vest aims to enhance the effectiveness of traditional life-saving equipment and improve overall rescue operations.

The Smart Life Vest [4]is equipped with a wide array of sensors and features that enable it to monitor the wearer's vital signs and environmental conditions in real-time. It utilizes cutting-edge technologies such as GPS, accelerometers, and heart rate monitors to gather crucial data, ensuring accurate and up-to-date information during emergency situations. One of the key features of the Smart Life Vest is its ability to detect and alert rescue teams in case of a potential drowning incident. Using sophisticated algorithms, the vest analyzes changes in body movement, posture, and heart rate, instantly recognizing distress signals. Once a potential drowning situation is identified, the vest sends an immediate distress signal to nearby authorities or designated emergency contacts, significantly reducing response times and increasing the chances of a successful rescue.

Furthermore, the Smart Life Vest [5] incorporates smart buoyancy control. By utilizing inflatable chambers and pressure sensors, the vest adjusts its buoyancy level automatically to keep the wearer afloat in a stable position, even in turbulent waters. This feature not only enhances the vest's effectiveness but also helps reduce the risk of panic or exhaustion for the individual in distress. In addition to its life-saving capabilities, the Smart Life Vest offers several other useful functionalities. It includes an integrated LED lighting system that improves visibility during low-light conditions, aiding both rescuers and the wearer. The vest can also provide real-time location tracking, enabling rescue teams to quickly locate individuals in need of assistance, especially in large bodies of water. The article highlights the potential impact of the Smart Life Vest on various sectors, including water sports, maritime operations, and beach safety. It emphasizes the value of this technology in preventing tragic accidents, reducing response times, and saving lives.

In conclusion, the advent of the Smart Life Vest[6] represents a significant breakthrough in water safety. By integrating advanced sensors, intelligent algorithms, and automatic buoyancy control, this innovative life vest has the potential to revolutionize the effectiveness of rescue operations and improve overall water safety measures. With its ability to detect distress signals, provide location tracking, and enhance visibility, the Smart Life Vest stands as a remarkable example of how technology can positively impact human lives in critical situations.

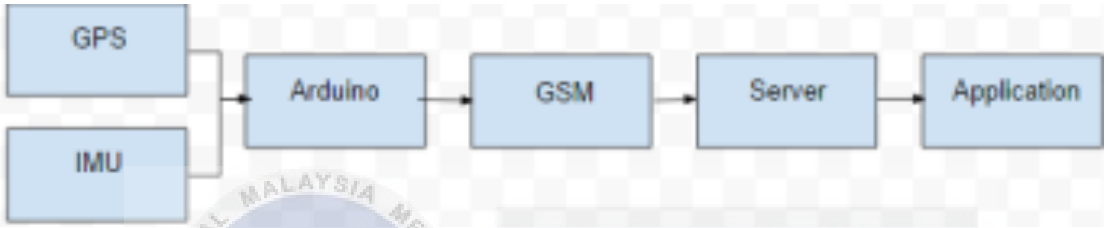


Figure 2.3.2 Hardware Flow Chart

2.3.3 Water Safety System using GPS Location

Based on the article by Akhil Xavier, Anila P. Udhayakumar, Arun T. A., Diniya Devassykutty, and Mrs. Jayalakhmi PK [7], a water safety system using the microcontroller Atmega32 by using deep learning. The objective of this journal is to design and implement a method for identifying the location of a user who has met with an accident by using the GPS and GSM modules. Therefore, this concept combines a life jacket and a survival kit to improve the product's desirability, usability, and appearance. Next, the design and implementation of the water safety system, which utilizes the capabilities of the Atmega32 microcontroller. The microcontroller serves as the central control unit, responsible for monitoring and controlling various components of the system. The water safety system incorporates several key features for effective monitoring and response. It includes sensors for measuring water depth, temperature, and pH levels, enabling real-time data collection and analysis. The Atmega32 microcontroller processes the sensor data and triggers appropriate responses based on predefined thresholds or conditions.

The authors highlight the importance of early warning mechanisms in water safety. To address this, the water safety system utilizes an ultrasonic sensor that detects objects or obstacles in the water. Upon detection, the system sends an alert signal, providing timely warnings to individuals in the vicinity. Additionally, the authors describe the integration of an automatic rescue mechanism into the water safety system[8]. Using a motor-driven mechanism, controlled by the Atmega32 microcontroller, the system can deploy a rescue float or a lifebuoy in emergency situations. This feature helps facilitate timely and efficient rescue operations, potentially saving lives.

The article also discusses the implementation of a user interface for the water safety system. By integrating a display unit and control buttons, users can monitor system status, adjust settings, and initiate manual rescue operations if necessary. The authors emphasize the practicality and effectiveness of the water safety system in various water environments, such as swimming pools, lakes, or beaches. They suggest that the system can be employed in public places or private establishments to enhance overall water safety measures and reduce the risks associated with water-related accidents.

In conclusion, the article presents a water safety system based on the Atmega32 microcontroller, offering real-time monitoring, early warning mechanisms, and automatic rescue capabilities. The system's integration of sensors, control mechanisms, and user interface demonstrates its potential to enhance water safety and mitigate risks in various settings.

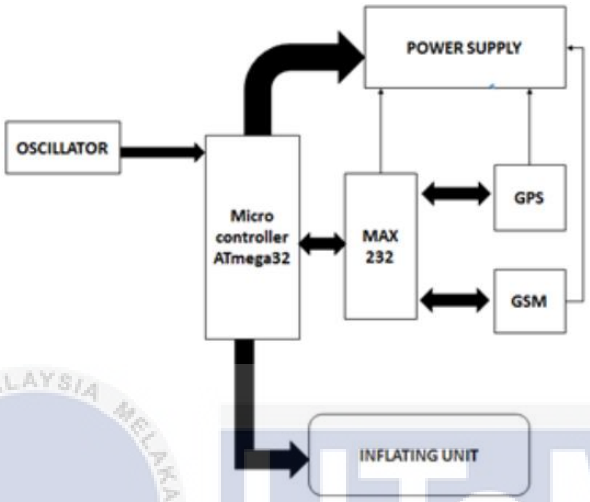


Figure 2.3.3 : Working of the system

2.3.4 Child Tracking System

According to the article by Lee Chun Hongusing [9], a child tracking system is used on an Android smartphone. The objective of this journal is that the system needs a smartphone running on the Android platform to install the app. There are two smartphones needed to demonstrate the app one to install the app to login as a parent, and the other to install the app to login as a child to be tracked by the parent. Then, the app needs the smartphone to always keep the location and network connection open to be able to run the functional requirements stated above correctly.

Overall, the Child Tracking System is an innovative solution that leverages technology to enhance child safety. By providing real-time location tracking and additional safety features, it assists parents, guardians, and authorities in safeguarding children and ensuring their well-being.

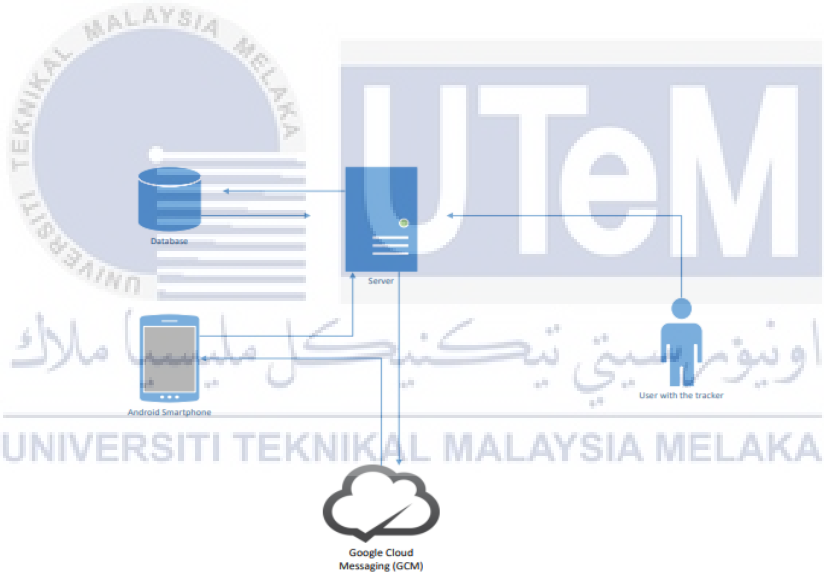


Figure 2.3.4 Client Server Architecture

2.3.5 Object Tracking System using Iot

Based on the article by Yellamma Pachipala [10], a tracking system using the microcontroller pin 28 by the deep learning. The objective of this journal is to tracking the lost objects by implementing IoT. They implement this using Bluetooth and smart phone to find the missing object such as Iwacth. Therefore, this device will send the location coordinates to the user or person who is tracking the object.

The IoT-based Object Tracking System consists of various components, including sensors, actuators, a communication network, and a central control system. The sensors are placed on the objects that need to be tracked, [11]and they collect data such as location, temperature, humidity, and other relevant information. These sensors are equipped with wireless connectivity, allowing them to transmit the data to the central control system through the IoT network. The central control system receives the data from the sensors and processes it to determine the location and other parameters of the tracked objects. It can employ various algorithms and techniques to analyze the data and extract meaningful insights. The system can also generate alerts or notifications based on predefined rules or conditions, enabling timely actions to be taken if required.

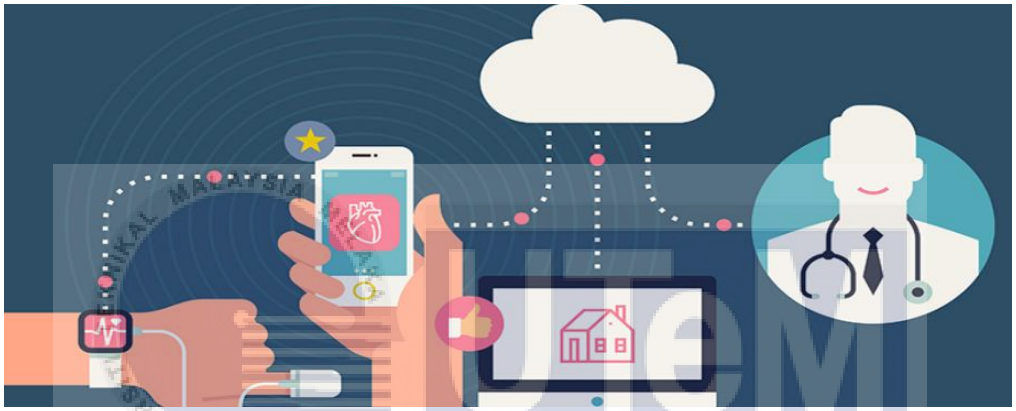
The article highlights the benefits and applications of the Object Tracking System using IoT. It emphasizes the potential advantages in industries such as logistics, supply chain management, asset tracking, and inventory management. By implementing the system, organizations can improve operational efficiency, optimize resource allocation, and enhance overall productivity. The IoT-based Object Tracking System offers several advantages over traditional tracking methods. It provides real-time visibility of objects, enabling better tracking accuracy and faster response to changes or deviations. The system can also offer historical data analysis, helping organizations identify patterns, optimize routes, and make informed decisions.

However, the article[12] acknowledges certain challenges associated with the implementation of such a system. These challenges include data security, network connectivity, power management for IoT devices, and the scalability of the system to handle many tracked objects.

In conclusion, the Object Tracking System using IoT is a promising solution that leverages IoT technology to track and monitor objects in real-time. With its potential to enhance operational efficiency and improve decision-making in various industries, the system offers significant benefits. However, careful consideration must be given to address the challenges and ensure the security and reliability of the system.

2.3.6 IoT based Health Monitoring and Location Tracking System for Soldiers

Based on the article by The system, developed by Veena Tripathi and Faizan Shakeel [13], is an IoT-driven health monitoring unit via a combination of sensors, RFID and Bluetooth measurement, and tracking of vital functions including blood pressure, heart rate, levels of cholesterol, blood glucose, and temperature. Data received will be stored on implantable, Bluetooth-identifiable devices that can be accessed in emergencies through the IoT.



Figer 2.3.6 IoT-enabled devices in Healt

2.3.7 AirTags are being used to track people

Based on the article by Jérémie Leroyer, Cyrille Porteret, Cedric Nicolas and Gunnar Graef [14], a AirTag are using Bluetooth signal and conection with iPhone apps. Therfoure, the objective of this journal is to find the location of AirTag. The AirTag working process is sends out a secure Bluetooth signal that can be detected by nearby devices in the Find My network. These devices send the location of your AirTag to iCloud then user can go to the Find My app and see it on a map. The whole process is anonymous and encrypted to protect your privacy.

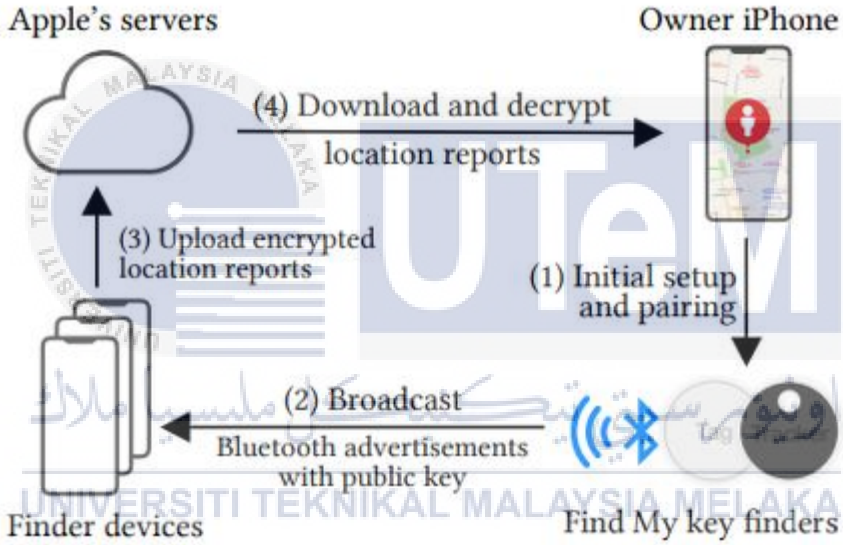


Figure 2.3.7 AirTag Architecture Device

2.3.8 Pet Tracking System Using IoT

Based on the article by Amelia Kiew Lee Ping [15], discusses the development and implementation of a Pet Tracking System utilizing the Internet of Things (IoT) technology. With the increasing concern for pet safety and the growing popularity of IoT devices, this system aims to provide pet owners with an efficient and reliable solution for tracking and monitoring their beloved companions.

The Pet Tracking System consists of a combination of hardware and software components, leveraging IoT principles to enable real-time tracking and location services. The hardware component typically includes a lightweight GPS or RFID device that can be attached to the pet's collar. This device collects location data and transmits it wirelessly to a central server or a mobile application [16].

The Pet Tracking System consists of a combination of hardware and software components, leveraging IoT principles to enable real-time tracking and location services. The hardware component typically includes a lightweight GPS or RFID device that can be attached to the pet's collar. This device collects location data and transmits it wirelessly to a central server or a mobile application.

The article emphasizes the significance of connectivity in this system. The tracking device communicates with the central server or the pet owner's smartphone using wireless protocols such as Bluetooth, Wi-Fi, or cellular networks. This connectivity enables the continuous transmission of pet location information, ensuring accurate and up-to-date tracking data.

Furthermore, the software aspect of the Pet Tracking System plays a vital role in processing and presenting the data to the pet owner. The central server or mobile application receives the location updates from the tracking device and provides a user-friendly interface for real-time monitoring. This interface may include features like mapping the pet's current location, setting virtual boundaries or geofences, and receiving notifications if the pet crosses those boundaries.

The article also highlights the benefits of using a Pet Tracking System based on IoT technology. It emphasizes the enhanced safety and security it offers by enabling pet owners to quickly locate their pets in case they wander off or go missing. Additionally, the system can assist in identifying any irregular behavior patterns or health issues through historical data analysis.

In conclusion, the Pet Tracking System discussed in the article showcases the integration of IoT technology to provide pet owners with an advanced and reliable means of tracking and monitoring their pets. By leveraging real-time connectivity and intelligent software, this system offers peace of mind to pet owners, ensuring their furry companions' safety and well-being.

2.3.9 A RF Source Localization and Tracking System

The article by Will Tidd, Raymond J. Weber, and Yikun Huang [17], This article presents a comprehensive overview of a Radio Frequency (RF) Source Localization and Tracking System, focusing on its development, implementation, and applications. The system aims to accurately locate and track RF sources, providing valuable insights in various fields such as telecommunications, security, and environmental monitoring.

The RF Source Localization and Tracking System utilizes a combination of hardware and software components to enable precise localization and tracking of RF signals. The hardware component typically includes a network of strategically placed antennas, receivers, and signal processing units. These components work together to capture and analyze RF signals emitted by the sources of interest.

The article emphasizes the importance of signal processing techniques in this system. Upon receiving RF signals, the system employs advanced algorithms and signal processing methods to determine the direction of arrival (DOA) of the signals. By leveraging the phase differences, time delays, and amplitude measurements from multiple antennas, the system calculates the location of the RF source with high accuracy.

Furthermore, the software aspect of the RF Source Localization and Tracking System plays a crucial role in processing and visualizing the collected data. The system typically incorporates sophisticated software algorithms to handle data fusion, source identification, and trajectory estimation. These algorithms enable real-time monitoring and tracking of RF sources, providing valuable insights into their movements and behavior patterns.

The article discusses various applications of the RF Source Localization and Tracking System. In the field of telecommunications, it can be used for spectrum monitoring and management, allowing operators to identify and locate unauthorized or interfering RF sources. In security applications, the system can aid in the detection and tracking of wireless devices used for illicit activities. Additionally, in environmental monitoring, the system can assist in tracking wildlife movements or studying electromagnetic pollution.

In conclusion, the RF Source Localization and Tracking System provides a powerful solution for accurately locating and tracking RF sources. By combining hardware components with advanced signal processing algorithms, the system offers valuable insights in telecommunications, security, and environmental monitoring. With its wide range of applications, this system plays a vital role in enhancing efficiency, security, and understanding in various domains reliant on RF signal analysis [18].

2.3.10 IOT Asset Tracking

The tracking systems used in the article by Indira R, Bhavya G, Dheva Dharshini S, and Devaraj R [19] use a Nano microcontroller (MEGA328-p). This journal study demonstrates the diversity [20]of IOT platforms, including ThingSpeak, an open-source IoT application that uses the HTTP protocol to store and retrieve data from objects over a local area network or the internet. IOT ThingSpeak uses a widget on a smartphone to show all the sensor data and location details in this instance. However, a sound sensor, a vibration sensor, a transmitter module, and a receiver module can all provide data to the nanomicrocontroller. A nanomicrocontroller is present in both the transmitter and receiver blocks and is used to manage all operations.

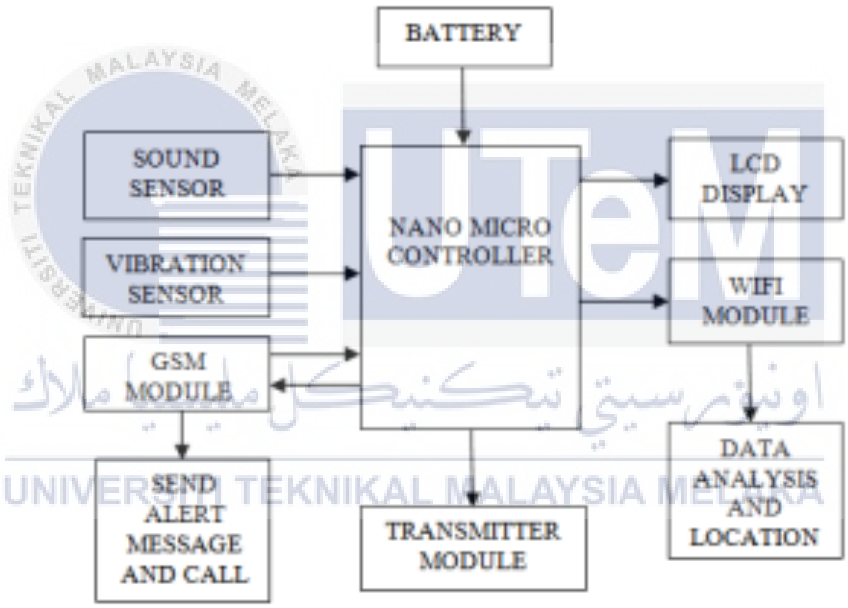


Figure 2.3.10 Working of the Component

2.4 Comparison Between the Components and Application Reviewed

No	Title	Article	Components and Application Review
1	Aver Microcontroller Based Wearable Jacket Automatic	Maya Nayak and Prasannajit Dash	Microcontroller as the power source and GPS and GMS modules to find the location. Then, also use a smart phone as the device to receive the message from GSM.
2	Smart Life Vest	Joseph Joslin, King Nguyen, Kristie Sihombing, and Pham	Use the GPS for tracking device, an IMU (Inertial Measurement Unit) motion sensor, a GSM for mobile communications and the software that will program the microcontroller and create the user application interface Arduino and also GPS.
3	Water Safety System using GPS Location	Akhil Xavier, Anila P. Udhayakumar, Arun T. A., Diniya Devassykutty, and Mrs. Jayalakhmi PK	Using the microcontroller Atmega32 and GPS as a component to find the location of the accident site easily and quickly.
4	Child Tracking System	Lee Chun Hongusing	A tracking system uses an Android platform to install the app. There are two smartphones needed to demonstrate the app: one to install the app and login as a user, and another to always keep the location and network connection open to be able to run the functional requirements stated above correctly.

5	Object Tracking System using Iot	Yellamma Pachipala	A tracking system using the microcontroller pin 28 to find the missing object is connected with Bluetooth and a smart phone to find the missing object, such as Iwacth.
6	IoT based Health Monitoring and Location Tracking System for Soldiers	Veena Tripathi and Faizan Shakeel	A combination of sensors, using RFID and Bluetooth to measurement and tracking of vital functions including blood pressure, heart rate, levels of cholesterol, blood glucose, and temperature. Data received will be stored on implantable, Bluetooth-identifiable devices that can be accessed in emergencies through the sever .
7	AirTags are being used to track people	Jérémie Leroyer, Cyrille Porteret, Cedric Nicolas and Gunnar Graef	Using Bluetooth signal and connection with iPhone apps to find the location of AirTag. The Bluetooth signal that can be detected by nearby devices to Find My network. These devices send the location of AirTag to iCloud then user can go to the Find My app and see it on a map.
8	Pet Tracking System Using IoT	Amelia Kiew Lee Ping	the Arduino IDE for tracking systems using a WiFi signal and connection with a device such as a handphone by implementing the system, users can keep track of their pets location easily.
9	A RF Source Localization and Tracking System	Will Tidd, Raymond J. Weber, and Yikun Huang	RF sources to localize and track systems. The system keeps track of registered objects that are within range of the user's RFID reader and GPS receiver, then gives the user information on where the object was last detected.

10	IOT Asset Tracking	Indira R, Bhavya G, Dheva Dharshini S, and Devaraj R	A Nano microcontroller (MEGA328-p) demonstrates the diversity of IOT platforms, an application that uses the HTTP protocol to store and retrieve data from objects over a local area network or the internet. A receiver module can provide data to the nano microcontroller. A nano microcontroller is present in both the transmitter and receiver blocks and is used to manage all operations. Finally, from all the articles presented about tracking systems using different methodologies, that is very useful in this project.

2.5 Comparison Between the Tracker Jacket Saver Life - IoT and Normal Life Jacket

Jacket	Tracker Jacket Saver Life - IoT	Normal Life Jacket
Special Features	Automatic deliver location signal via SMS once it far from boat.	Only use emergency whistle.
Tacking Location	Yes	No
Characteristic	Floating	Floating

2.6 Summary

This chapter presented past related works about tracking systems and sending the location to the user. Therefore, the method that is used in every article is different because they use GPS and GSM modules, RFID, Wi-Fi, Bluetooth, and Android apps. Lastly, Furthermore, this article is extremely useful for explaining to people in emergency situations that a rescue operation in search of a victim who has fallen into the water can be completed quickly and easily because they can track people and provide the location to the emergency team. This has the potential to reduce the number of drownings worldwide.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter serves as a comprehensive exploration of the research methodology adopted in the development of our project. Here, we delve into the intricate design, data collection methods, and the instrumental tools employed in crafting our innovative solution. Additionally, the chapter provides a detailed exposition on the approach taken to design the product itself.

The research methodology plays a pivotal role in guiding the trajectory of our project, laying the foundation for its development and eventual outcomes. We commence by outlining the intricate design considerations, illuminating the thought processes and considerations that informed the creation of the "Tracker Jacket Saver Life." This section elucidates the conceptual framework that guided the project from its inception to the final implementation.

An integral aspect of the research methodology is the elucidation of the data collection methods employed in gathering the necessary information for our project. This encompasses a detailed exploration of the sources, procedures, and tools utilized to amass relevant data, ensuring the accuracy and relevance of the insights that underpin our innovative solution.

Moreover, the chapter offers insights into the instrumental tools that played a pivotal role in the development process. This includes an in-depth discussion of hardware components such as the Arduino Uno microcontroller, ultrasonic sensors, GPS modules, and the ESP8266 Wi-Fi module. Furthermore, we explore the software side, shedding light on the applications and algorithms employed to process and interpret collected data. A significant portion of the chapter is dedicated to explicating the product design methodology. Readers will gain insights into the methods employed to conceptualize, model, and refine the Tracker Jacket Saver Life. The rationale behind design decisions, considerations for user experience, and the seamless integration of hardware and software components are all part of the narrative.

3.2 Selecting and Evaluating Tools for a Development Tracker Jacket Saver Life - IoT

Many methods have been implemented to manage this issue, with some more successful than others. As a result, we proposed developing a "Tracker Jacket Saver Life - IoT" system to prevent drowning and assist rescuers in locating victims. This tracker jacker saver life will not only increase the victim's chances of survival but will also help the rescuer find the victim more quickly and easily.

The pressing issue of water-related emergencies has spurred the implementation of various methods, each exhibiting varying degrees of success. Recognizing the need for a more effective solution, we have proposed the development of the "Tracker Jacket Saver Life - IoT" system. This innovative system is designed with a dual purpose: to prevent drowning incidents and to aid rescuers in swiftly locating victims. The Tracker Jacket Saver Life not only enhances the chances of survival for individuals facing water emergencies but also streamlines the rescue process for responders. By strategically selecting and evaluating tools for this development, we aim to create a comprehensive solution that addresses the limitations of existing methods, fostering a safer environment in open water scenarios.

3.3 Methodology

The methodology employed in the development of the "Tracker Jacket Saver Life-IoT" revolves around the design of a novel application, integrating both hardware and software components. This innovative system is specifically crafted to track the precise position of individuals in open water. The approach leverages both empirical modeling and a statistical framework to ensure accuracy and reliability in location tracking.

The process begins with a meticulous exploration of empirical models, allowing for a thorough understanding of the variables and parameters influencing human positioning in open water. This foundational knowledge serves as the basis for crafting a statistical approach that refines the tracking capabilities of the system. By combining empirical insights with statistical methodologies, the project aims to create a robust and effective tracking mechanism.

The process flow adopted in the development encompasses several key stages, including data collection, modeling, algorithm development, and system integration. Data collection involves gathering relevant information about open water environments, human movements, and potential obstacles. This data serves as the building blocks for the subsequent stages.

Empirical modeling involves the formulation of mathematical representations based on observed patterns and behaviors. This modeling process contributes to the creation of algorithms that can predict and interpret human positions in varying open water scenarios. The statistical approach further refines these algorithms, enhancing their accuracy and adaptability.

The system diagram encapsulates the intricate interplay between hardware and software components. On the hardware side, the diagram illustrates the integration of crucial elements such as the Arduino Uno microcontroller, the ultrasonic sensor for precise distance measurement, the GPS module for accurate location tracking, and the ESP8266 Wi-Fi module for seamless communication. The software component is equally instrumental, featuring the development of a dedicated application to process and interpret the collected data.

In summary, the methodology implemented in the development of the "Tracker Jacket Saver Life-IoT" is characterized by a synergistic fusion of empirical modeling and statistical approaches. This methodological blend is illustrated through a detailed process flow and a comprehensive system diagram, both of which underscore the meticulous design and integration of hardware and software components for effective human position tracking in open water environments.

3.3.1 The setup

Tracker Jacket Saver Life-IoT has two devices, one at the transmitter side and the other at the receiver side with the combination of hardware and software components. The hardware components employed are Arduino uno microcontroller, battery, buzzer sensor, ultrasonic sensor, and ESP8266 Wi-Fi module with inbuilt GPS technology. The software specification is development of widget on mobile phone to know strength and website to determine the location of the user.

Tracker Jacket Saver Life - IoT

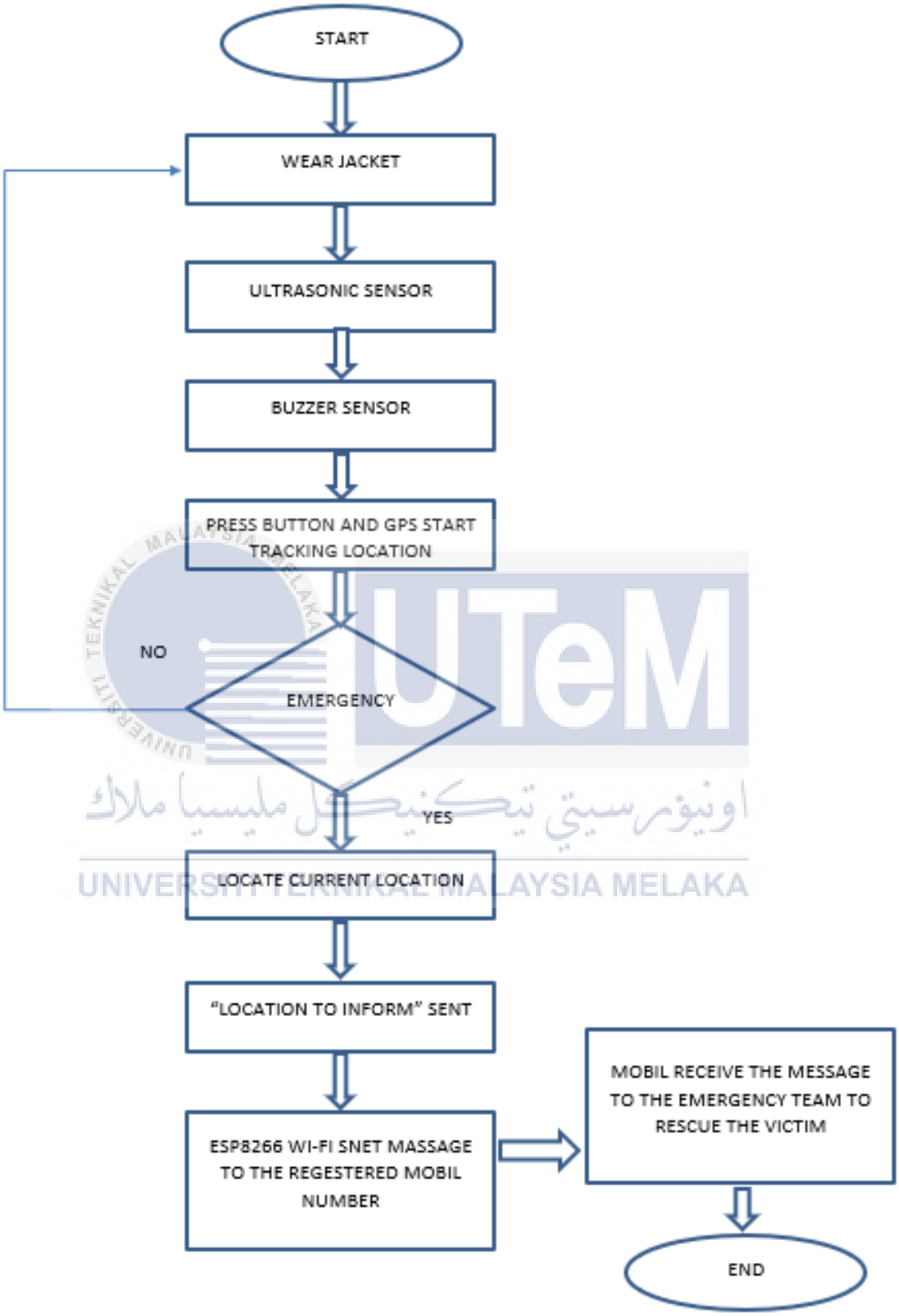


Figure 3.3.1 Flowchart Tracker Jacket Saver Life -IoT

3.3.1.1 Hardware Specification

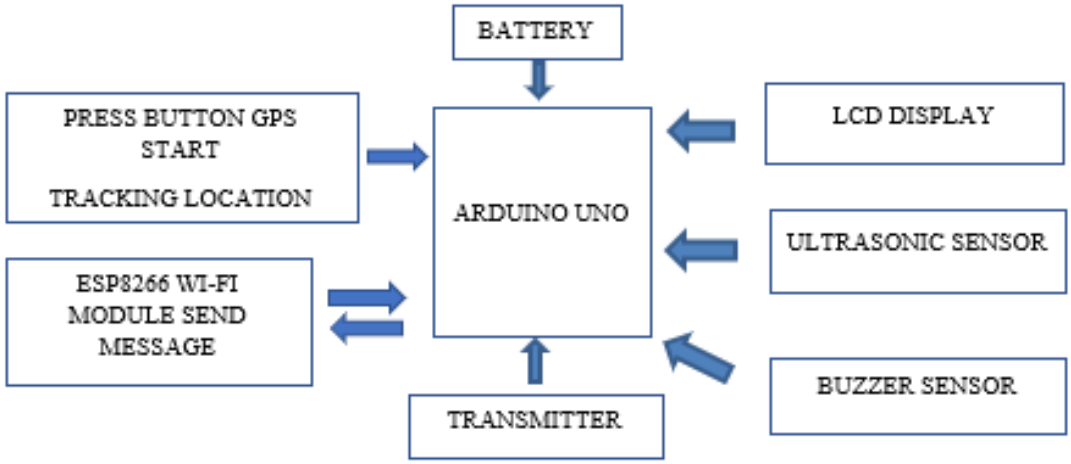


Figure 3.3.1.1 Block Diagram Hardware Transmitter Specification

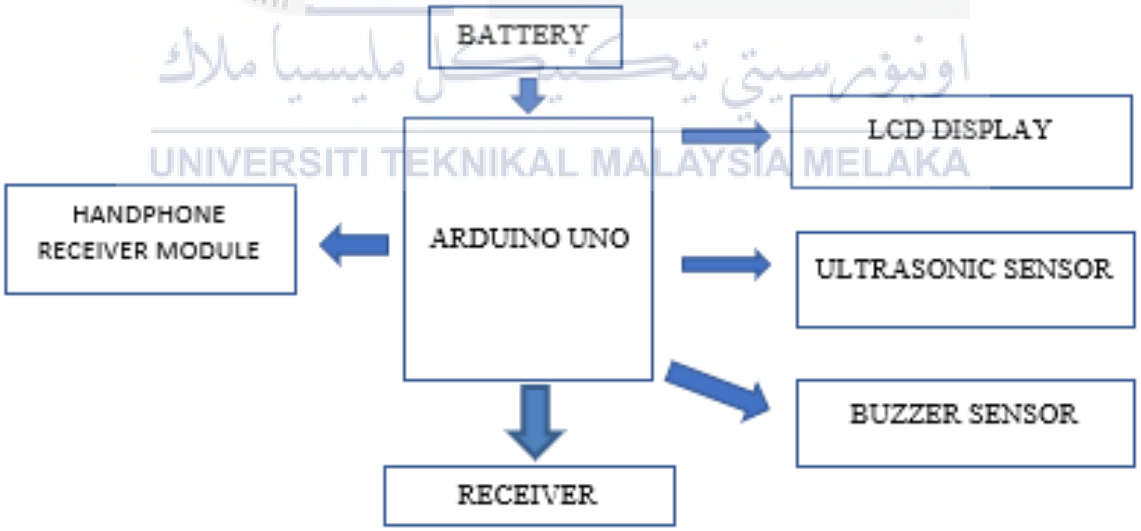


Figure 3.3.1.1 Block Diagram Hardware Receiver Specification

3.3.1.2 Arduino Micro-controller

The Arduino Uno Microcontroller board used hare is an Atmega328P and consits of 14 digit input/output pins. This Arduino has USB connectio, rest button and power jack.

3.3.1.3 GPS

Global Positioning System (GPS) allows to obtain the location of asset from anywhere in the world. The state of reception of GPS depends upon the strength of GPS signal. In the proposed system, location information is displayed on a map at handphone.

3.3.1.4 ESP8266 Wi-fi module

The ESP8266 is a versatile and low-cost Wi-Fi module that has gained popularity for its ease of use and integration with microcontrollers like Arduino. design. In the proposed system, when Arduino requests the GSM to send an alert message, the modem fitted with internet sends text message to specify mobile number. After performing the assigned task, ESP8622 responded to the request of Arduino Uno by sending acknowledgement.

3.3.1.5 Ultrasonic Sensor

An ultrasonic sensor is a device that measures 3-meter distance to an object to give information about its surroundings by transmitting a signal to a buzzer. This can protect users from danger underwater.

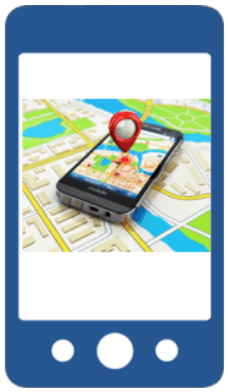
3.3.1.6 Button module

Press the button is use to identity the location tracking process.

3.3.1.7 Buzzer Sensor

Buzzer or beeper is a device that emits short, high pitched sound as a signal. In the proposed system, buzzer is placed at the receiver side device to alert when the asset goes out of specific range.

3.3.1.8 Hand Phone (Device)



Hand Phone is use as a device to receive the massage from GSM to get the location.

3.3.1.9 Power Bank

Power Bank is mainly design for charging portable digital device. Therefore, it can provide power supply to the hardware components of the system.

3.3.1.10 Software Specifications

3.3.1.11 Embedded C

Embedded C an Arduino Uno which is the brain of the entire system is most frequently programmed with embedded C language. It is an extension of C programming language with some additional header files that provides support for developing efficient programs for embedded devices. Each controller has specific header files which may vary from the other. Embedded software is the soul that governs the functioning of embedded system. These programs monitor and control external devices by directly operating and using the internal architecture of the micro controller. Features of embedded programming are code speed and code size.

3.4 Summary

This chapter presents the proposed methodology in order to develop a new, effective and integrated approach in estimating the component to build this project. The primary focus of the proposed methodology is in accomplishing a simple, less rigorous, and effective estimation in such a way that it would not cause a significant loss of accuracy of the results.

In conclusion, the Tracker Jacket Saver Life - IoT is a comprehensive system consisting of two devices – one functioning as the transmitter and the other as the receiver. The successful implementation of this life-saving technology involves a combination of both hardware and software components. On the hardware side, key components include the Arduino Uno microcontroller, a strategically chosen battery, a buzzer sensor, an ultrasonic sensor, and the ESP8266 Wi-Fi module with built-in GPS technology. These components work collaboratively to facilitate efficient communication and location tracking.

The hardware synergy is complemented by the software specifications, which involve the development of a widget on a mobile phone and a dedicated website. The mobile phone widget provides real-time strength indications, ensuring users are aware of the system's status. Simultaneously, the website serves as a crucial tool for determining the precise location of the user. This integration of hardware and software components enhances the overall functionality and reliability of the Tracker Jacket Saver Life, making it a robust and effective solution for water safety.

CHAPTER 4

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents the result and the discussion of the development of this project "Tracker Jacket Saver Life – IoT".

4.2 Results

The results obtained from the Tracker Jacket Saver Life – IoT project showcase the effective utilization of the Arduino Uno microcontroller board as a central component. Chosen for its low-cost nature and flexibility, the Arduino Uno provides a compact and straightforward interface for connecting various electronic components. Its versatility allows seamless integration with the system, contributing to the project's overall success. To address power consumption concerns, a strategically chosen battery with an 850-mA capacity and a 24-hour lifespan was employed, providing an optimal balance between performance and efficiency.

The incorporation of a GPS module, while essential for location tracking, posed challenges due to its significant power consumption. To mitigate this issue, sleep modes within the microcontrollers were implemented, effectively extending the battery life. The use of ultrasonic sensors emerged as a pivotal solution for detecting object distance and position with remarkable accuracy, even in challenging conditions such as low-light or dusty environments. The integration of a buzzer sensor further enhances the system's functionality by converting the ultrasonic sensor's output into audible signals, serving as a warning to the user about nearby objects.

The GPS technology employed in the project plays a crucial role in tracking the user's location. Leveraging the ESP8622 Wi-Fi module, the GPS signal data is transmitted, and notification messages are sent to designated mobile numbers. The use of a mobile phone as the receiving device allows for the interpretation of messages and determination of the user's location. This comprehensive system ensures efficient communication and real-time tracking, empowering the rescue team to swiftly locate the victim.

In conclusion, the Tracker Jacket Saver Life – IoT project successfully integrates various technologies, including Arduino Uno, GPS, ultrasonic sensors, and ESP8622 Wi-Fi modules, to create a sophisticated and effective system for water safety. The strategic implementation of sleep modes, careful component selection, and the incorporation of warning signals contribute to the overall success of the project. The outcomes indicate a promising solution for expedited rescue operations and enhanced safety in water-related emergencies.

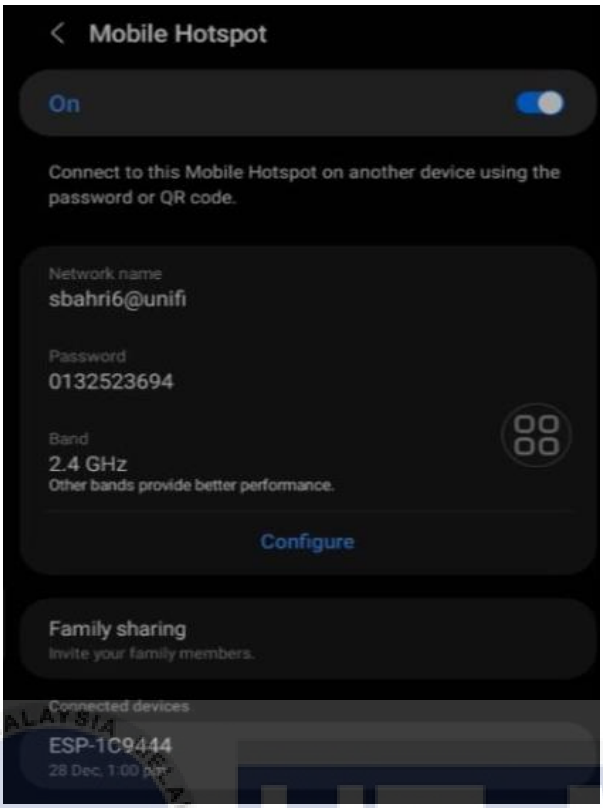


Figure 4.2 Connect the ESP8622 Wi-Fi module with internet.

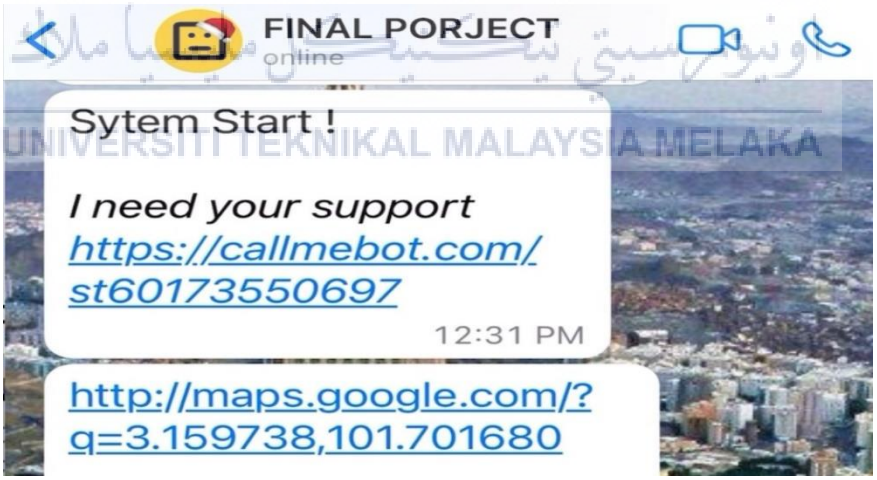


Figure 4.2 Alert message is sent to the number that register to the system.

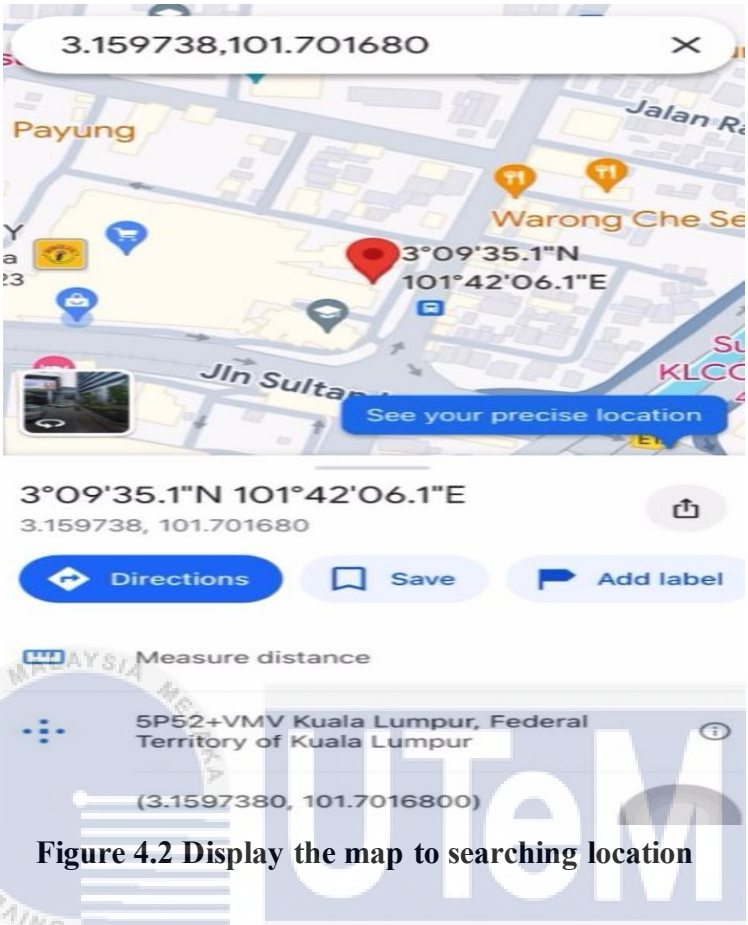


Figure 4.2 Display the map to searching location

Figure 4.2 The Tracker System Circuit

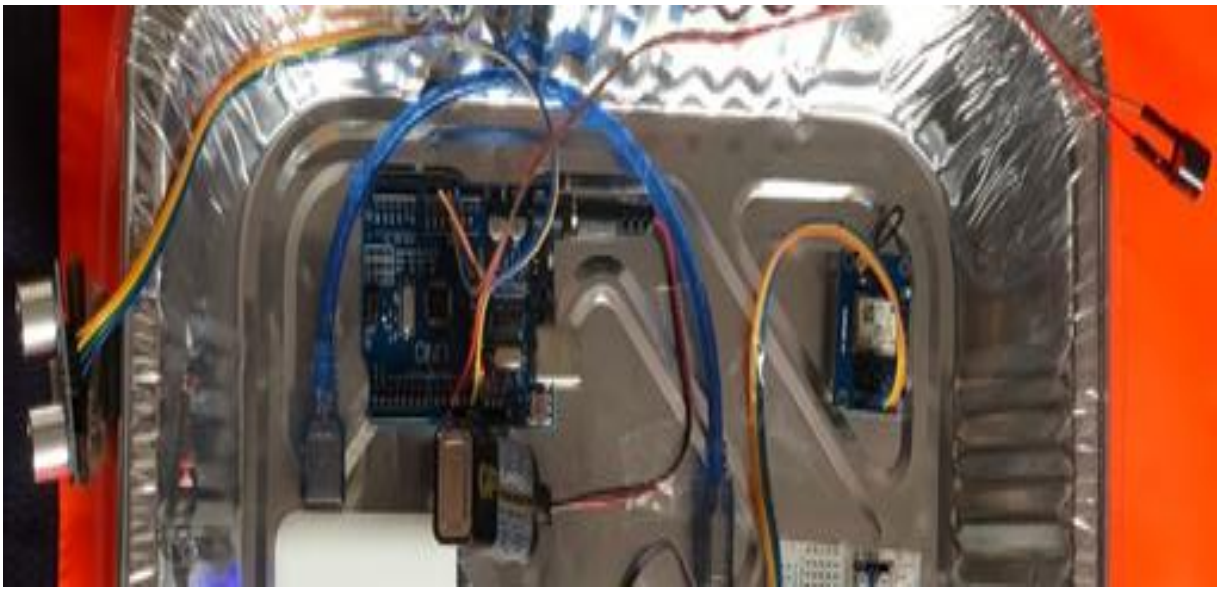


Figure 4.2 Measure The Distance Object

Fegure 4.2 The complate setup for "Tracker Jacket Saver Life – IoT Project"

4.3 Discussion

The Arduino Uno, a widely used development board, is equipped with numerous digital and analog pins, a 16 MHz ceramic resonator, USB connection, power jack, and an ICSP header, all centered around the ATmega328P microcontroller. The GPRS module, facilitating cellular network connectivity through the General Packet Radio Service (GPRS) protocol, enables the Arduino to transmit and receive data over the internet. Though the specific GPRS module isn't labeled, common choices include the SIM800L and SIM900A. To accommodate the voltage disparity (3.7V-4.2V for the GPRS module and 5V for the Arduino Uno), a voltage regulator (LM317) steps down the Arduino's 5V output to 3.8V for the GPRS module.

Therfoure, the ultrasonic sensor is used to measure distance, and the speaker is used to produce sound. The Arduino Uno is a microcontroller board that can be used to control the ultrasonic sensor and the buzzer. The ultrasonic sensor has four pins Vcc, Trig, Echo, and Gnd. The Vcc pin is connected to the 5V power supply of the Arduino. The Trig pin is used to trigger the ultrasonic sensor to emit a pulse of ultrasonic sound. The Echo pin is used to receive the echo of the ultrasonic sound pulse that is reflected off of an object. The Gnd pin is connected to the ground of the Arduino. Next, the buzzer has two pins: + and -. The + pin is connected to the 5V power supply of the Arduino. The - pin is connected to pin 9 of the Arduino. Next, the Arduino Uno be used to control the ultrasonic sensor and the buzzer. Then, it use to make the buzzer emit a sound when the ultrasonic sensor detects an object in 3 meters.

Key connections include linking the GPRS module's VCC to the voltage regulator's 3.8V output, GND to the Arduino Uno's GND, and TX/RX pins to the corresponding digital pins on the Arduino. An optional Enable pin can be used to control the module's power, often connected to a digital pin to facilitate sleep mode and power conservation. Communication between the Arduino Uno and the GPRS module involves the exchange of AT commands through the serial interface. This interaction allows for configuring the GPRS module, sending/receiving SMS messages, making/receiving calls, and establishing internet connections.

Potential applications of this setup are diverse and depend on user requirements. Common uses include remote monitoring and control, where the Arduino collects sensor data and communicates it to a remote server, allowing for remote control of the Arduino. SMS notifications are another application, where the Arduino sends text messages to inform users of specific events or sensor detections. Additionally, data logging capabilities enable the Arduino to store sensor data on an SD card for later upload to a remote server, enhancing versatility in various projects and scenarios.

Overall, the Tracker Jacket Saver Life – IoT represents probably life-saving use of electronics in difficult situations. The use of a life jacket and a protective container emphasises the critical importance of being secure and ready in emergency situations. Finally, this project assists the rescue team in reducing the number of people lost in the sea and drowning in the water by monitoring a device that can assist the loaction of the user through mobile communication.

4.4 Analysis table for Transmit and receive components.

Components	Signal Strength	Performance
ESP8266 Wi-Fi module	Stronger	Faster data transfer.
GSM	N/A	Cannot connect with Malaysia telco sim card.
Bluetooth	Weaker	Slower data transfer.

The ESP8266 Wi-Fi module distinguishes itself through its formidable signal strength, establishing a foundation for a reliable and robust connection. This strength directly translates into accelerated data transfer rates, positioning the module as an optimal choice for applications where swift and stable communication is imperative, such as in IoT devices or smart home applications.

On the other hand, the GSM module, unfortunately, lacks available information regarding its signal strength, while a significant drawback lies in its inability to connect with Malaysia telco SIM cards. This limitation curtails its utility in regions where compatibility with local network providers is a prerequisite. Users in Malaysia are advised to explore alternative communication modules that seamlessly integrate with the local telecommunication infrastructure.

In the realm of Bluetooth, despite its widespread use for short-range communication, it exhibits a weaker signal strength compared to Wi-Fi modules. This susceptibility may result in connectivity challenges, particularly over extended distances or in environments with obstacles. Additionally, Bluetooth's comparatively slower data transfer speed positions it as a suitable choice for applications where high transfer rates are not a critical requirement, exemplified in wireless audio devices or specific IoT applications.

In summary, the selection of communication components should be intricately aligned with the specific demands of the application. The ESP8266 Wi-Fi module proves to be a formidable choice when prioritizing high signal strength and rapid data transfer. However, in regions like Malaysia, where GSM compatibility is pivotal, exploration of alternative modules conforming to local telecommunication standards becomes imperative. While

Bluetooth suits short-range applications, it may not be the optimal choice for scenarios necessitating robust signals and swift data transfer. A thorough consideration of these factors is indispensable to guarantee optimal performance across diverse communication scenarios.

4.5 Summary

In conclusion, this chapter has presented the outcomes of the project, offering a comprehensive understanding of the Figure 4.2 Tracker Jacket Saver Life - IoT. The results have been accompanied by a detailed explanation of its functionality and instructions on how to use it. By incorporating sensor technology and leveraging the Internet of Things (IoT), this project demonstrates its practicality in enhancing safety, particularly in water-related activities.

The Tracker Jacket Saver Life - IoT employs sensors to identify the user's location, providing crucial information for rescue teams. The tracking device, illustrated in Figure 4.2, supplies precise longitude and latitude coordinates. This capability ensures that the rescue team can quickly and accurately locate individuals in distress, ultimately contributing to a significant reduction in drowning incidents during water activities.

In essence, the Project Tracker Jacket Saver Life - IoT emerges as a valuable and potentially life-saving tool, showcasing the power of technology in enhancing safety measures and response capabilities in aquatic environments. The incorporation of IoT and location tracking not only improves the efficiency of rescue operations but also underscores the project's potential to make a meaningful impact on water safety.

CHAPTER 5

CONCLUSION AND FUTURE RECOMMENDATION

5.1 Conclusion

In conclusion, the identified problem of delayed rescue operations in water-related emergencies has motivated the development of the Tracker Jacket Saver Life project. Traditional life jackets, while essential, lack the capability to provide precise location information, potentially leading to prolonged waiting times for survivors. This critical issue can result in tragic outcomes, with victims facing life-threatening situations during the rescue process.

The project's objectives were strategically outlined to address this problem comprehensively. The integration of GPS, ESP8266 Wi-Fi modules, Ultrasonic sensor, and Buzzer sensor into the life jacket transforms it into a Tracker Jacket Saver Life, enhancing its functionality. The primary aim is to establish a systematic and efficient methodology for real-time tracking and communication in emergency scenarios, specifically when individuals fall into water.

The project's objectives include the development of a tracking device that utilizes GPS and ESP8266 Wi-Fi modules, ensuring constant and accurate location monitoring through the Arduino Uno platform. Furthermore, the incorporation of IoT facilitates quick communication by sending messages via Short Message Service (SMS) to streamline rescue efforts. Wireless communication status monitoring adds an additional layer of safety, enhancing the overall effectiveness of the life-saving system.

The scope of the project is centered around the deployment of an IoT device fixed on a lifejacket, equipped with sensors to monitor underwater activities. The project places a strong emphasis on reducing drowning incidents, ultimately increasing the chances of survival. By providing rescuers with precise location information and facilitating quick communication, the Tracker Jacket Saver Life aims to make the process of locating and rescuing victims more accessible and efficient, contributing significantly to water safety and emergency response protocols.

5.2 Potential for Commercialization

The Tracker Jacket Saver Life - IoT project, as detailed, presents a compelling opportunity for commercialization, leveraging its innovative approach to bolstering water safety. Several key factors contribute to its promising commercial viability. Firstly, its unique technological integration stands out—incorporating system-wide GPS, ESP8266 Wi-Fi modules, and IoT technology offers an advanced solution for water safety. Utilizing the Arduino Uno platform enhances flexibility and accessibility, augmenting its appeal. Moreover, the project's core aim to constantly track locations and facilitate communication in water-related emergencies meets a critical need. Its focus on reducing drowning incidents aligns with global concerns, amplifying its relevance. The inclusion of comprehensive safety monitoring features, including wireless communication status tracking and underwater activity sensors on lifejackets, fortifies its safety capabilities.

The potential for partnerships further enhances its prospects. Collaboration opportunities with manufacturers of life jackets, IoT devices, and safety equipment allow for integration into existing products or the creation of specialized life-saving solutions. Engaging with rescue organizations, water safety authorities, and emergency services broadens its reach and applicability. Moreover, the growing market demand for innovative safety solutions drives its commercial appeal. Its potential to heighten survival chances and expedite rescue operations appeals to consumers, water sports enthusiasts, and industry professionals.

Importantly, the project aligns with safety standards, facilitating compliance with regulatory requirements, which streamlines its path to commercialization. Beyond commercial use, the technology developed holds promise in educational and training settings, benefiting water safety professionals and educational institutions involved in aquatic studies. Lastly, its focus on public awareness and its potential life-saving impact creates a compelling narrative for adoption. In conclusion, the Tracker Jacket Saver Life project's innovative features, life-saving applications, and alignment with market demands position it as a strong candidate for commercial success in the water safety and emergency response sectors.

5.3 Future Recommendation

In the future, the technology behind the Tracker Jacket Saver Life – IoT is poised for enhancement through the integration of advanced systems such as GPS (Global Positioning System) and GSM technology. This progressive step will enable the receiver to accurately map the precise location of the jacket wearer by leveraging satellite notifications. Additionally, the implementation of AVL (Automatic Vehicle Locator) technology presents a cost-effective avenue for further jacket development. To access such services, collaboration with local service providers like Maxis (M) Sdn. Bhd., DiGi (M) Sdn. Bhd., or Celcom (M) Sdn. Bhd. becomes imperative. Upon pressing the designated button, the modem initiates the transmission of SMS-Alerts to both the receiver's smartphone and the local service provider. Subsequently, the local service provider, such as Maxis, acknowledges the received SMS by sending a follow-up SMS to the receiver, specifying the location of the jacket wearer in proximity to the nearest communication tower or local subdivision tower.

Moreover, to augment the safety features of this innovative jacket, further advancements can be made by refining the system to broadcast SMS-Alerts to multiple receivers instead of just one. This expanded outreach ensures that friends, relatives, parents, and even local rescuers are promptly notified via SMS, enabling them to swiftly respond and help the individual in distress. This evolution in technology not only enhances the efficiency of the Tracker Jacket Saver Life - IoT but also broadens its potential impact, transforming it into a comprehensive safety solution for water-related emergencies.

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APPENDIX

BDP 1

Task Name	Week													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Project Introduction														
Literature Review														
Methodology & Expected Result														
Conclusion														

BPD 2

Task Name	Week													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Project Introduction														
Literature Review														
Methodology & Result														
Discassion														
Conclusion														

The Coding For Tracker Jacket Saver Life - IoT

```
#include <ESP8266WiFi.h>
#include <ESP8266HTTPClient.h>
#include <WiFiClient.h>
#include <UrlEncode.h>

const char* ssid = "sbahri6@unifi";
const char* password = "0132523694";

// +international_country_code + phone number
// Portugal +351, example: +351912345678
String phoneNumber = "+60173550697";
String apiKey = "5480495";

void sendMessage(String message){

  // Data to send with HTTP POST
  String url = "http://api.callmebot.com/whatsapp.php?phone=" + phoneNumber + "&apikey=" + apiKey + "&text=" + urlEncode(message);
  WiFiClient client;
  HTTPClient http;
  http.begin(client, url);

  // Specify content-type header
  http.addHeader("Content-Type", "application/x-www-form-urlencoded");

  // Send HTTP POST request
  int httpResponseCode = http.POST(url);
  if (httpResponseCode == 200){
    Serial.print("Message sent successfully");
  }
```

```
  else{
    Serial.println("Error sending the message");
    Serial.print("HTTP response code: ");
    Serial.println(httpResponseCode);
  }

  // Free resources
  http.end();
}

void setup() {
  Serial.begin(9600);

  WiFi.begin(ssid, password);
  Serial.println("Connecting");
  while(WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.print("Connected to WiFi network with IP Address: ");
  Serial.println(WiFi.localIP());

  // Send Message to WhatsAPP
  sendMessage("Sytem Start !");
}

void loop() {
  while(Serial.available() > 0)
  {sendMessage(Serial.readString());}
}
```

```
#include <SoftwareSerial.h>
#include <TinyGPS++.h>
// GSM
SoftwareSerial gsmSerial(9, 8);  // RX, TX for SIM900A


// GPS setup
SoftwareSerial gpsSerial(3, 2); // RX, TX

TinyGPSPlus gps;
#define button 4
float lat = 3.159738, lon = 101.701679;
String maps="http://maps.google.com/?q=";
int state = 0;
int buttonState = HIGH;             // the current reading from the input pin
int lastButtonState = HIGH;   // the previous reading from the input pin
unsigned long lastDebounceTime = 0;  // the last time the output pin was toggle
unsigned long debounceDelay = 50;    // the debounce time; increase if the outp
void setup() {
  // put your setup code here, to run once:
  Serial.begin(9600);
  gpsSerial.begin(9600);
  gsmSerial.begin(9600);
  pinMode(button, INPUT_PULLUP);
}

void loop() {
  // put your main code here, to run repeatedly:

```

```
30    int btnstate = digitalRead(button);
31    // If the switch changed, due to noise or pressing:
32    if (btnstate != lastButtonState) {
33      // reset the debouncing timer
34      lastDebounceTime = millis();
35    }
36
37    if ((millis() - lastDebounceTime) > debounceDelay) {
38      // whatever the reading is at, it's been there for longer than
39      // delay, so take it as the actual current state:
40
41      // if the button state has changed:
42      if (btnstate != buttonState) {
43        buttonState = btnstate;
44
45        // only toggle the LED if the new button state is HIGH
46        if (buttonState == HIGH) {
47          state = 1;
48        }
49      }
50    }
51    // save the reading. Next time through the loop, it'll be the last
52    lastButtonState = btnstate;
53    // Read GPS data
54    while (gpsSerial.available() > 0) {
55      gps.encode(gpsSerial.read());
56      if (gps.location.isValid()) {
57        lat = gps.location.lat();
58        lon = gps.location.lng();
59      }
60    }
```

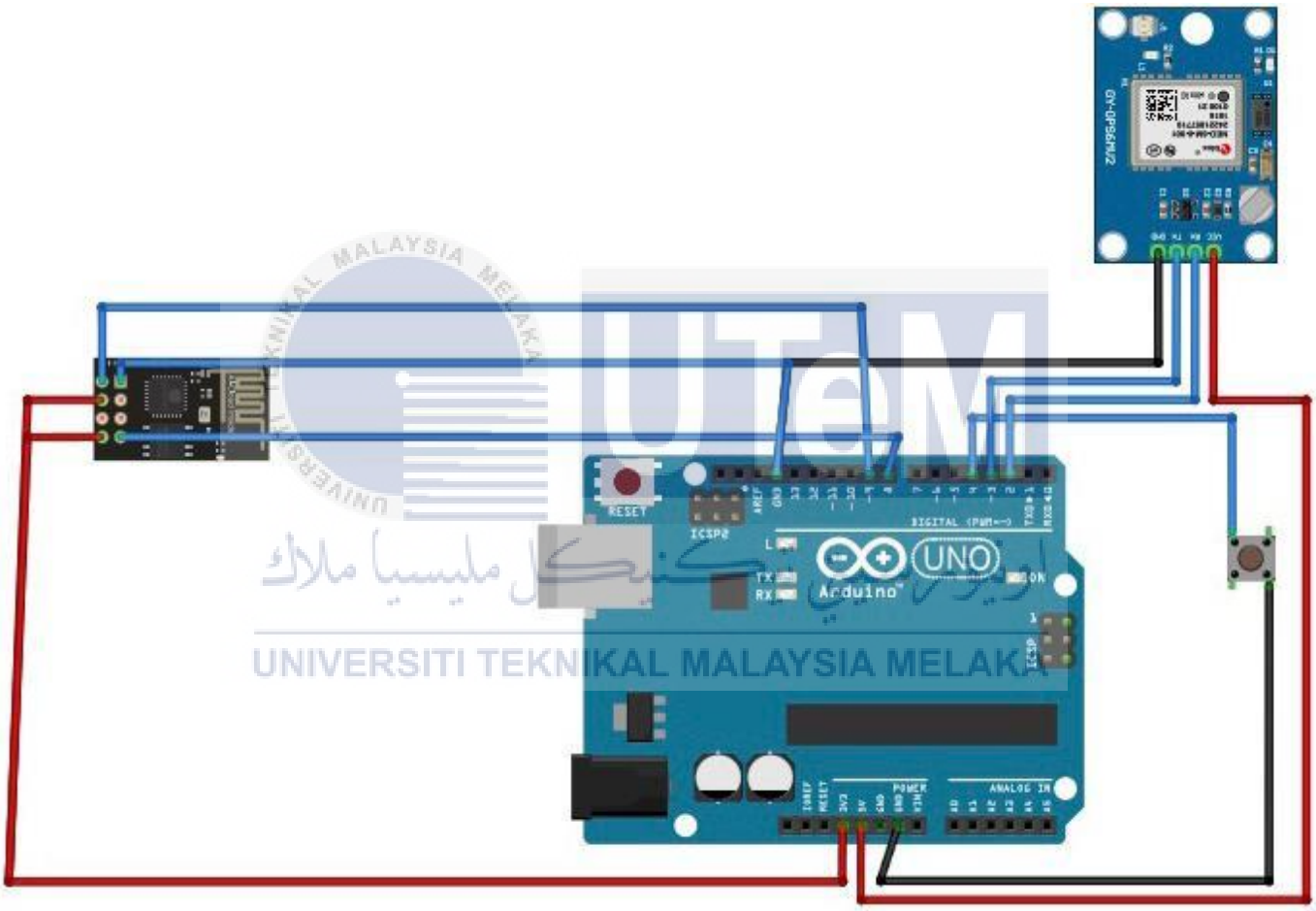
```
61    if (state == 1)
62    { String sms = maps+String(lat, 6) +"," + String(lon, 6);
63      gsmSerial.print(sms);
64      state = 0;
65      Serial.println("sending"+sms);
66    }
67  }
68  void sendSMS(String phoneNumber, String message) {
69    gsmSerial.println("AT+CMGF=1");  // Set SMS mode to text
70    delay(1000);
71    gsmSerial.println("AT+CMGS=\"" + phoneNumber + "\"");
72    delay(1000);
73    gsmSerial.print(message);
74    delay(1000);
75    gsmSerial.write(26);  // End the message
76    delay(1000);
77    // Print the response from the SIM900A module (should indicate the SMS status)
78    while (gsmSerial.available()) {
79      char c = gsmSerial.read();
80      Serial.write(c);
81    }
82
83    // Clear any leftover data
84    gsmSerial.flush();
85  }
```

The Coding For Measure The Distance Object

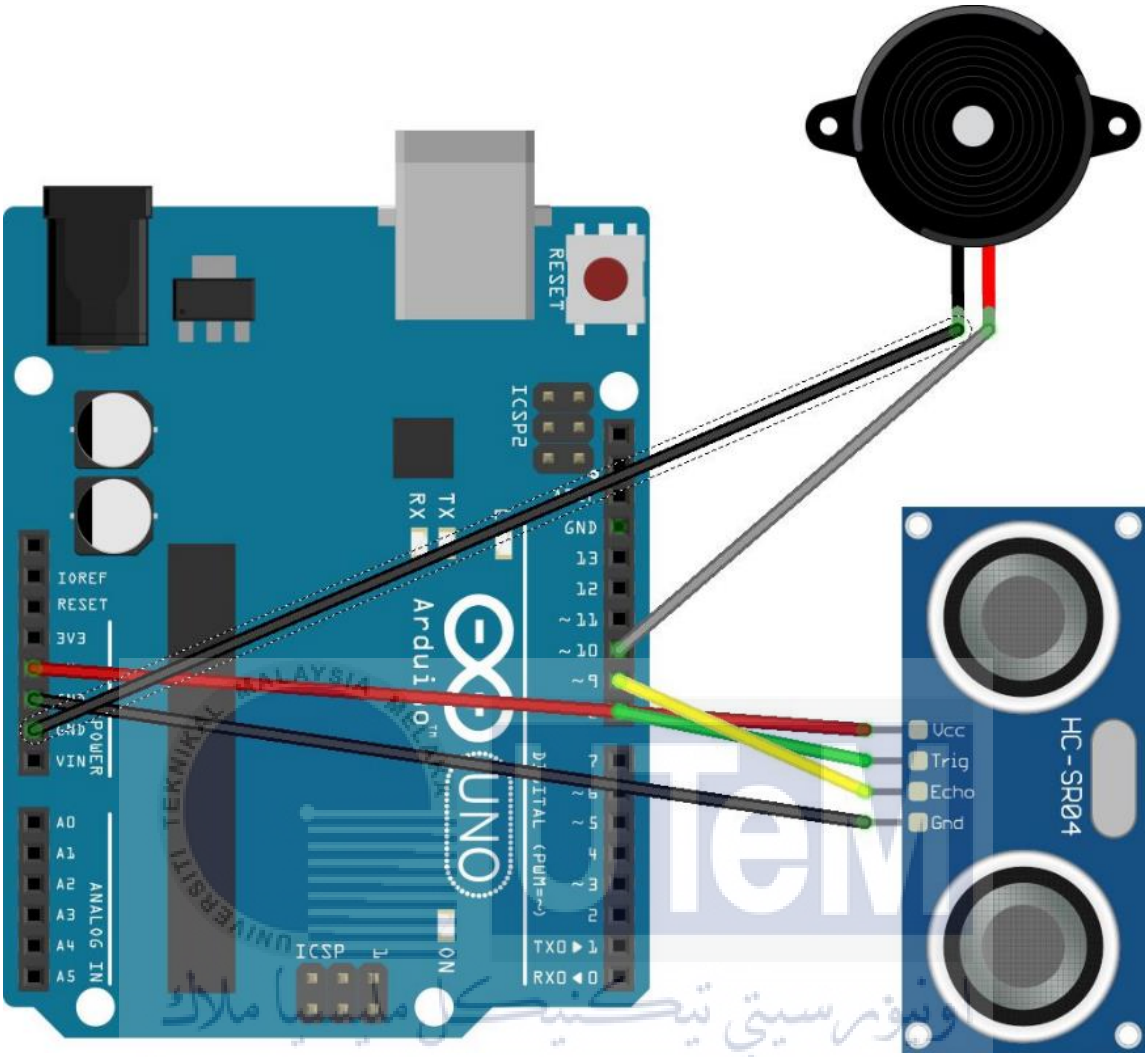
```
#define trigPin 13
#define echoPin 12
void setup() {
Serial.begin (9600);
pinMode(trigPin, OUTPUT);
pinMode(echoPin, INPUT);
}

void loop() {
long duration, distance;
digitalWrite(trigPin, LOW);
delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);
duration = pulseIn(echoPin, HIGH);
distance = (duration/2) / 29.1;
if (distance <=30){
tone(9,400,100);
}
else {
noTone(9);
}
delay(50);
}
```

The Simulation



Tracking System By Arduino Uno, GPS and ESP8266 Wi-Fi module Simulation



Measure The Distance Object Using Ultrasonic Sensor, Arduino Uno and Buzzer Simulation

Workflow for Tracker Jacket Saver Life - IoT