**UNIVERSITI TEKNOLOGI MALAYSIA**
**FACULTY OF COMPUTING**

# INDUSTRIAL TRAINING REPORT
# CODE AND CONNECTIVITY: AN INDUSTRIAL TRAINING EXPERIENCE IN VECTOLABS

By
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| | | |
|---|---|---|
| TRAINING PLACE | : | VECTOLABS TECHNOLOGIES SDN BHD<br>(A-1-01, Block A, CoPlace 2, Jalan Usahawan 1, 63000,<br>Cyberjaya Selangor Darul Ehsan, MALAYSIA) |
| TRAINING PERIOD | : | 20 WEEKS (23 SEPTEMBER 2024 – 7 FEBRUARY 2025) |
| SUPERVISORS | : | MR. WAN MOHD ASYRAF (Company)<br>DR. CHAN WENG HOWE (Faculty) |
| REPORT DATE | : | 3 February 2025 |

Reflection Video link: https://eportfolio.utm.my/user/hibban-kamil-hizbuttahrir/internship-documents

## ABSTRACT

Industrial training allows students to apply the theoretical knowledge and skills they have acquired during their academic coursework in a practical, real-world setting. Through industrial training, students gain exposure to a professional work environment. They learn about workplace etiquette, collaboration, time management, and effective communication. Real-world projects often present challenges that require creative problem-solving and critical thinking.

The details of the 20-week industrial training program at VectoLabs Technologies Sdn. Bhd will be compiled in this report. The organization supervisor of this industrial training is Mr. Mohd Asyraf who is also the senior software developer of this company. Meanwhile, the faculty supervisor is Dr. Chan Weng Howe.

VectoLabs is primarily a forefront of industrial IoT technology integration with construction engineering. My main responsibility as the developer at VectoLabs Technologies Sdn. Bhd throughout my internship. My job required me to develop code accordingly as requested. A careful develop code process was required to produce a business logic and managing optimized queries and schema design. Also, I participated in documenting to maintain application performance and quality.

## ACKNOWLEDGMENT

First, I would like to express my sincere gratitude towards my faculty supervisor, Dr Chan Weng Howe for guiding me throughout this industrial training period which is from 23rd Sep 2024 until 07th Feb 2025. The questions and doubts regarding the industrial training will not be cleared without her guidance and advice.

Next, I also would like to thank my company supervisor, Mr. Wan Mohd Asyraf who is the Senior Software Developer of VectoLabs Technologies Sdn. Bhd for willing to accept me as an intern in his company. He generously shares his technical knowledge, experience, and company operation.

Finally, I also would like to thank my family who constantly provide morale support for me throughout this internship period. They always motivate me and ask current situation every several weeks during these 20 weeks of industrial training.

**TABLE OF CONTENTS**

## LIST OF TABLES

## LIST OF FIGURES

## LIST OF ABBREVIATIONS

| | | |
|---|---|---|
| UTM | - | Universiti Teknologi Malaysia |
| PDF | - | Portable Document Format |
| IoT | - | Internet of Things |
| CPU | - | Central Processing Unit |
| GPU | - | Graphics Processing Unit |
| UI | - | User Interface |
| UAT | - | User Acceptance Test |
| AFES | - | Alam Flora Environmental Solutions |
| KPKT | - | Kementrian Perumahan dan Kerajaan Tempatan |
| SDN | - | Sendirian |
| BHD | - | Berhad |

## LIST OF APPENDICES

# CHAPTER 1

# INTRODUCTION

## 1.1 Organization's Core Business and Activity

Vectolabs focuses on transforming city infrastructure with smart IoT solutions aimed at creating safer, more efficient, and environmentally sustainable urban environments. The organization integrates advanced hardware and software systems, delivering real-time data that enables better decision-making for asset management and maintenance. Key offerings include smart street lighting systems, which monitor and control various types of lights to reduce energy consumption and operational costs while lowering carbon footprints. Their smart toilet systems provide data-driven facility management, employing IoT sensors to ensure efficient maintenance, cleanliness, and user satisfaction in public spaces.

In addition to lighting and sanitation solutions, the company is also active in smart traffic and energy monitoring systems that enhance urban safety and resource efficiency. For instance, their radar speed signs and AI-powered pedestrian crossings help manage traffic flow and improve road safety. These systems, along with IoT-enabled power metering solutions, allow for remote energy monitoring and consumption analysis, optimizing power usage and reducing waste. Through these innovations, Vectolabs contributes significantly to advancing Malaysia's smart city initiatives by supporting municipalities in implementing scalable IoT solutions that align with global standards in technology and sustainability

Figure 1.1 VectoLabs Technologies Sdn Bhd Logo

## 1.2 Number Of Staff

Vectolabs Technologies Sdn Bhd and Vectolabs Engineering Sdn Bhd are spearheaded by the same CEO, by combining both companies in total the staff is around 25 employees.

## 1.3 Organization Structure

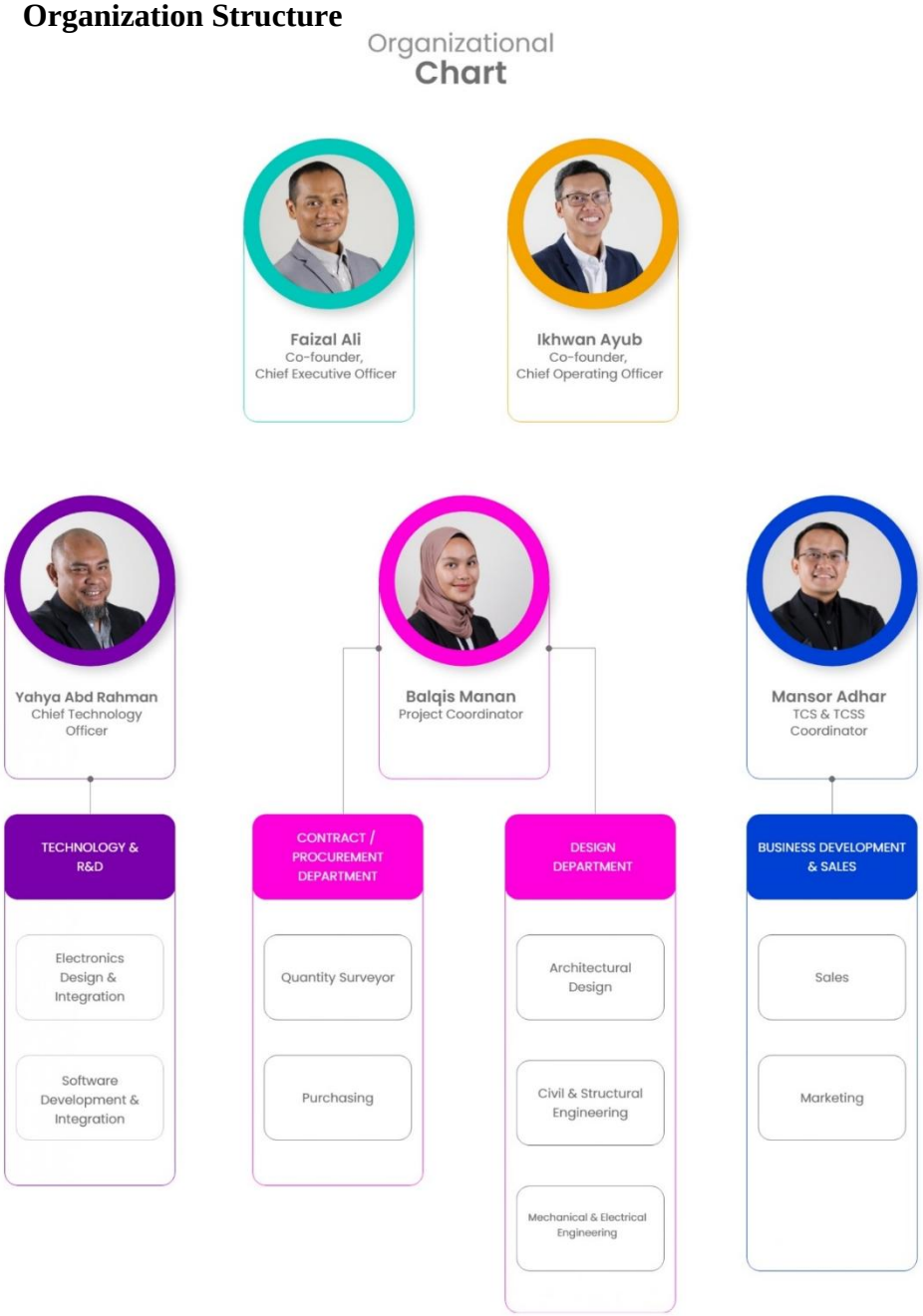



Figure 1.2 VectoLabs Organization Chart

## 1.4 Information Of The Division/Unit in Which The Practical Training Takes Place

According to the organizational chart, I am conducting my practical training within the Software Engineering division of Vectolabs Technologies Sdn Bhd, which is part of the Software Development & Integration division. This unit is dedicated to developing and integrating software solutions that support the company's development. During my training, I am involved in tasks such as coding, and system testing, gaining hands-on experience with the company's innovative technologies and software methodologies. This division plays a critical role in ensuring seamless functionality and high performance in Vectolabs' various IoT projects and smart infrastructure solutions.

## 1.5 The Training Program Which The Organization/Company Has Planned

In frontend development involves designing responsive user interfaces with Vue.js, creating reusable components, and integrating with backend APIs while optimizing performance and ensuring cross-browser compatibility. In backend development with Golang, the focus is on creating RESTful APIs, implementing business logic and authentication, and managing a PostgreSQL database with optimized queries and schema design. Effective collaboration and documentation are essential, as is ongoing monitoring and troubleshooting in production environments to maintain application performance and quality.

The company did not provide a structured Gantt chart or a planned training program for my internship. This is because my assignments follow a task-based approach, where I receive a new task only after completing the previous one. This method allows the team to dynamically assess my progress and assign relevant, practical tasks that align with both my learning objectives and the company's ongoing projects. Upon finishing each task, I receive new instructions and responsibilities, ensuring a continuous learning experience that adapts to real-time project needs and priorities.

# CHAPTER 2

# SPECIFIC DETAILS ON PROJECTS/TRAINING

## 2.1 Introduction

In this chapter, the specifics of the 20-week internship program will be outlined. It will delve into the primary and ancillary tasks that were completed. Additionally, the chapter will provide a concise overview of the tools, software, programming languages, and libraries utilized throughout the internship program's tasks.

With all the knowledge I have obtained throughout the weeks, Mr. Asyraf, the senior software developer from VectoLabs, distributed tasks to handle the backend, some frontend, and documentation. These tasks were challenging all of the knowledge that I have taken from all of the classes from UTM, from Mr. Asyraf's, guidance and my own self-learning. This knowledge played a critical role in supporting professional work throughout the rest of my weeks of internship.

## 2.2 Objectives

The assigned project involves the development of an ongoing project and website named "arms AFES". In the module named SCADA, the goal is to insert the given data into the specific database by defining a new data model that will create table and connecting it with the existing table and after that display the inserted data on the incinerator picture.

Additionally, in the WEIGHBRIDGE module, the goal is to improve the backend side. In the analytic section, it has the option to select a time to display a graph chart. The purpose of improving the code at the backend side is changing the

formatting date to be displayed for options daily, weekly, and monthly. As well as change the data to be displayed for empty dates when selecting the date range.

### 2.2.1 Training Objectives

The Training Objectives are:

i. To understand the workflow of the company.
ii. Gain an understanding of backend engineering principles.
iii. Learn how to code with Go and Vue language, which was never used before this internship.
iv. Gain experience in collaborating with developers, managers, and other stakeholders.

### 2.2.2 Project Objectives

The Project Objectives are:

i. To gather the functional and non-functional requirements of the original system by developing the backend system.
ii. Enhance frontend development of the original system by determining the flow and architecture of the original system.
iii. Developing Scalable Web Applications.
iv. Automate data extraction through web scraping.
v. Improve software quality assurance practices.

## 2.3 Main Internship Task – System Development

This section outlines the primary internship task conducted in 20 weeks. The role designated during the internship mostly is that of a back-end developer and a bit front-end developer. The core responsibility involves implementing and understanding the backend from the data that existed. After that implement it into the ‘arms AFES’ app code. Further elucidation on the details of this pivotal task will be provided in subsequent chapters.

### 2.3.1 Project Overview

The backend of “arms AFES” for the “SCADA” and “WEIGHBRIDGE” modules is designed with the primary objective of keeping the data through the PostgreSQL database management system. The authentic data will be used to display on the interface of the ‘arms AFES’ website. The SCADA module will display the data on the picture as sensor data. While the WEIGHBRIDGE module will display the data in a graph cart and tabulation format.

### 2.3.2 Project Execution

Before the commencement of the project, Mr. Asyraf initiates a briefing that explains the purpose of the project. During this briefing, Mr. Asyraf outlines the requirements to be fulfilled to complete the task. Subsequently, before proceeding to improve the backend code, we need to create the ERD required to define the Data Model structure for the database project.

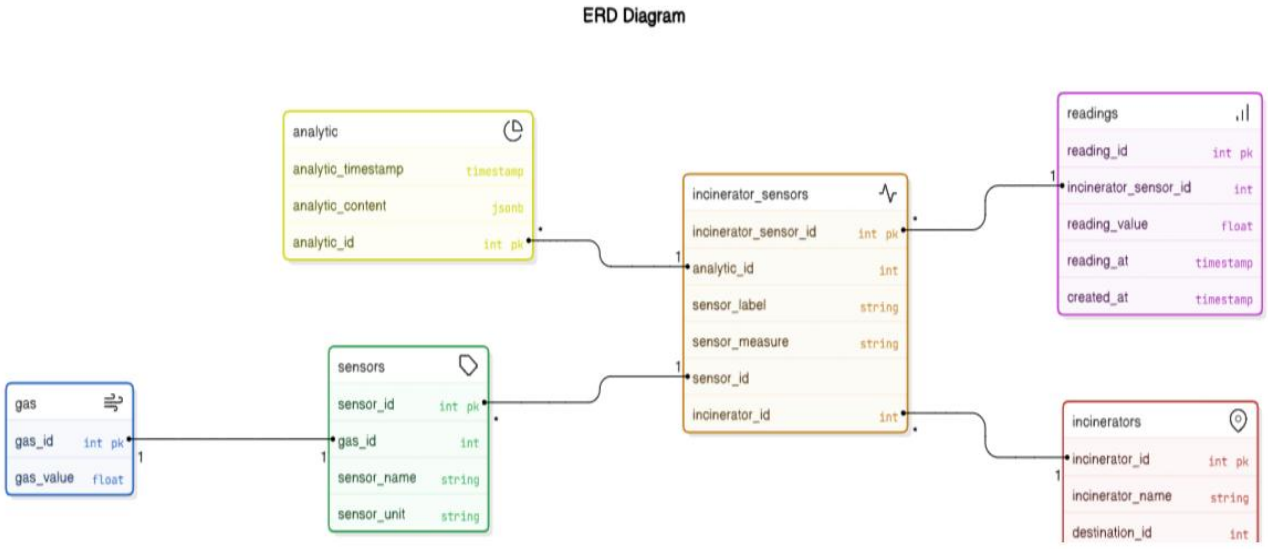



Figure 2.1 arms AFES ERD

### 2.3.3 Project Output

In this project output section will display and explain the process of developing the code, and validating the created API with the Postman application until data is displayed in the user interface (UI). This means that although the process looks quite simply, but in behind its quite tricky if not pay attention carefully. The provided figure below will describe all its purposes. However, not all code will be captured because of the limitation space.

- **New API and Data Model structure**

The first thing that needs to be done when want to create a new resource on the server is to define the data model, set up an HTTP server, define handlers, JSON encoding and decoding, error handling, status code and routing. All that thing is a step to do in creating a new API with the Go programming language. By defining data models, it creates a structure that represents the database schema for tracking destinations, incinerators, sensors, and their readings. It utilizes GORM's features to establish relationships between entities, manage timestamps, and enforce data integrity through unique constraints and foreign keys. The insertDataFromExcel function is designed to handle the upload of Excel files, validate input parameters, interact with the database to ensure the destination exists and manage file uploads while providing appropriate responses based on the success or failure of each operation through an HTTP POST request using the Postman application.

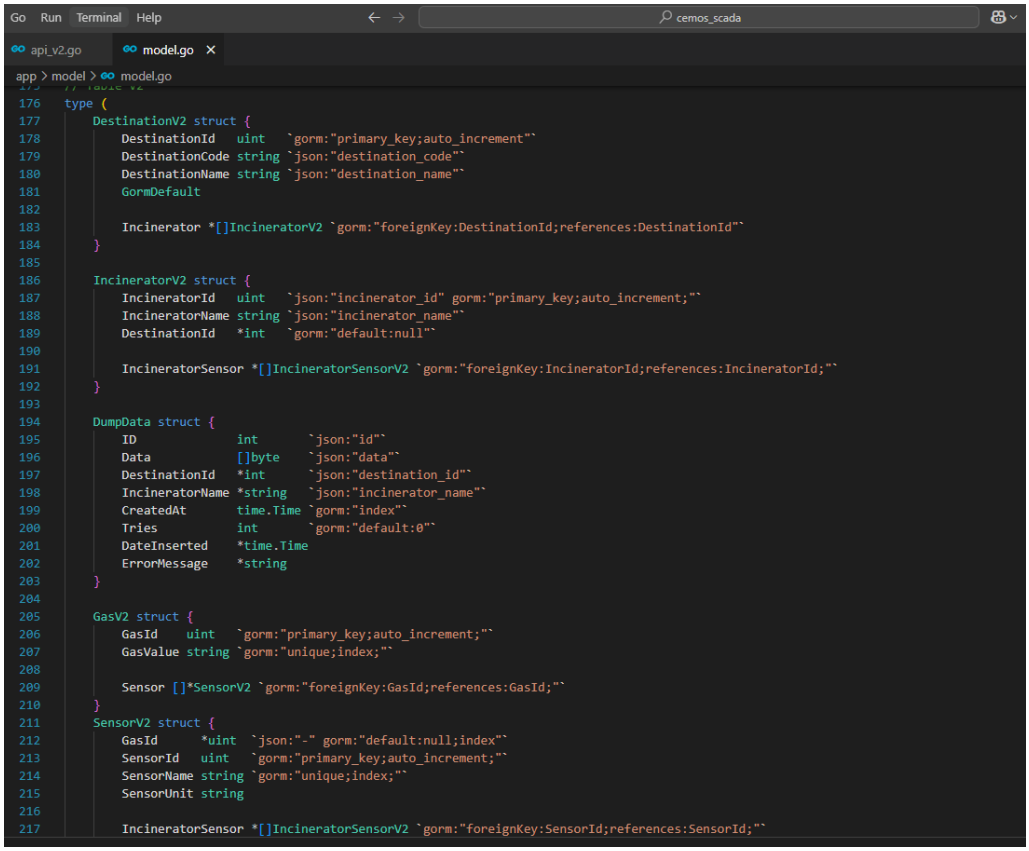



Figure 2.2 New DumpData Table Structure Code

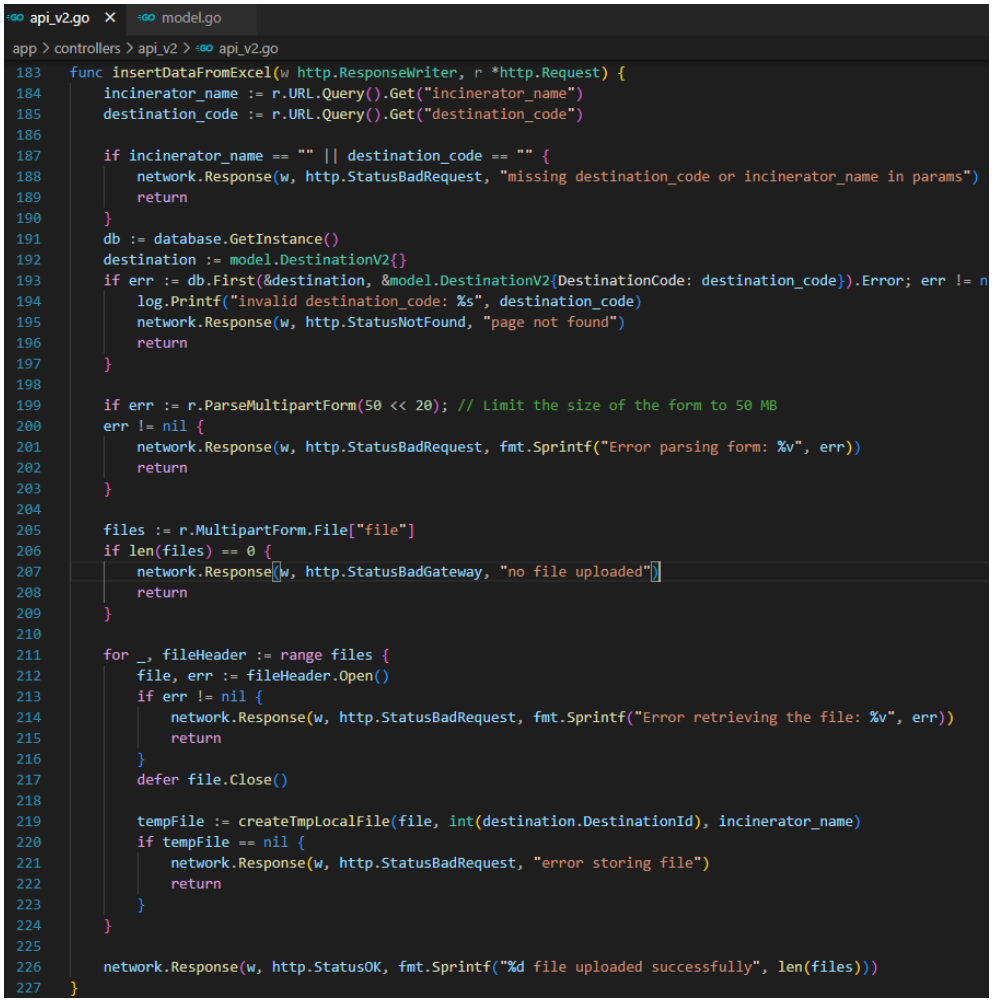



Figure 2.3 API Insert Data Code

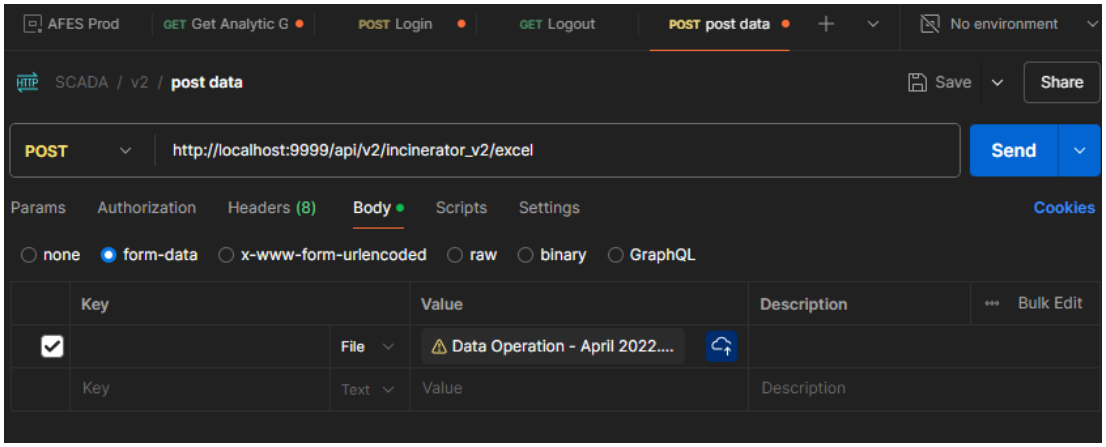



Figure 2.4 Postman API to Insert Data

- **Validating API**

Validating an API in Postman involves using the API endpoints created in the backend code to ensure that they function as expected. This process is critical for verifying that the backend logic properly handles requests and communicates with the database.

The primary goal of validating the API in Postman is to confirm whether the data has been successfully inserted into the database. To achieve this, a **GET request** is sent to the server using the appropriate API endpoint. This request retrieves the stored data from the server, allowing developers to check if the previously inserted data is correctly stored and accessible.

By performing this validation, any issues with data handling, endpoint configurations, or database connectivity can be identified and resolved early in the development cycle. It also ensures that the API provides accurate responses, maintains proper status codes, and delivers the expected data structure to the client.

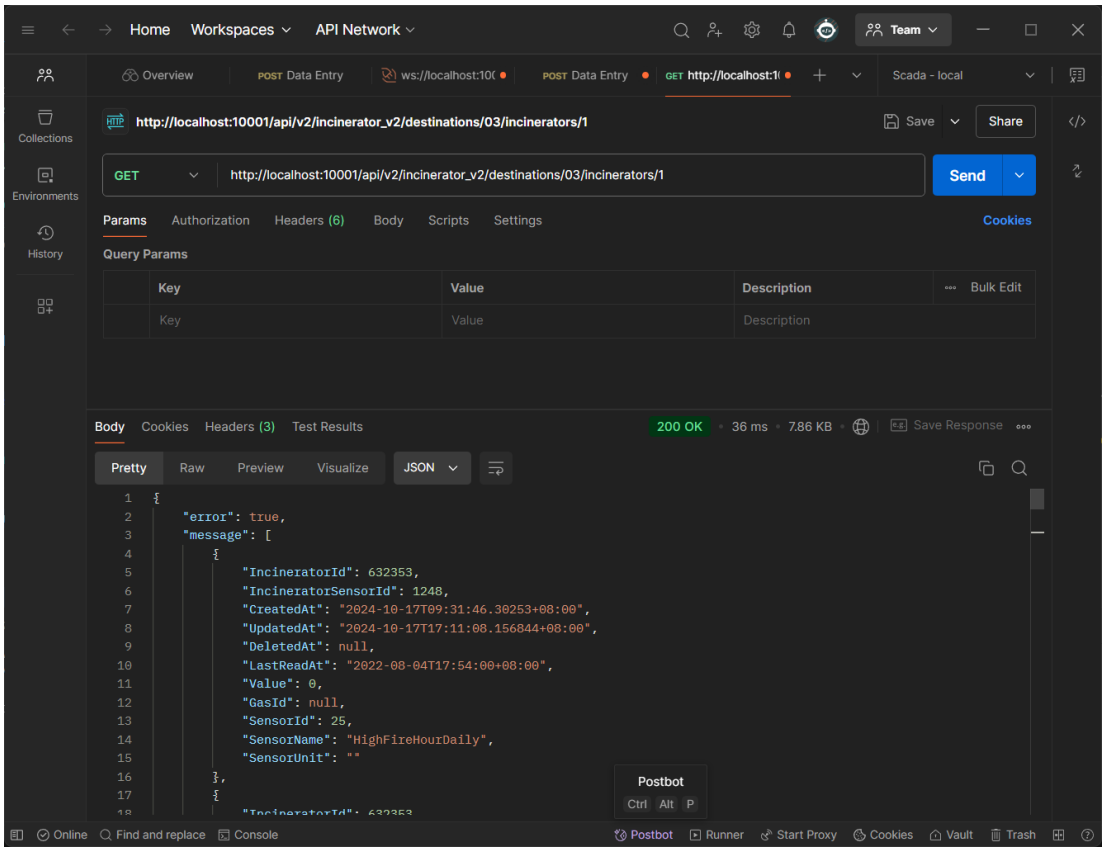



Figure 2.5 Read inserted data in DB through Postman

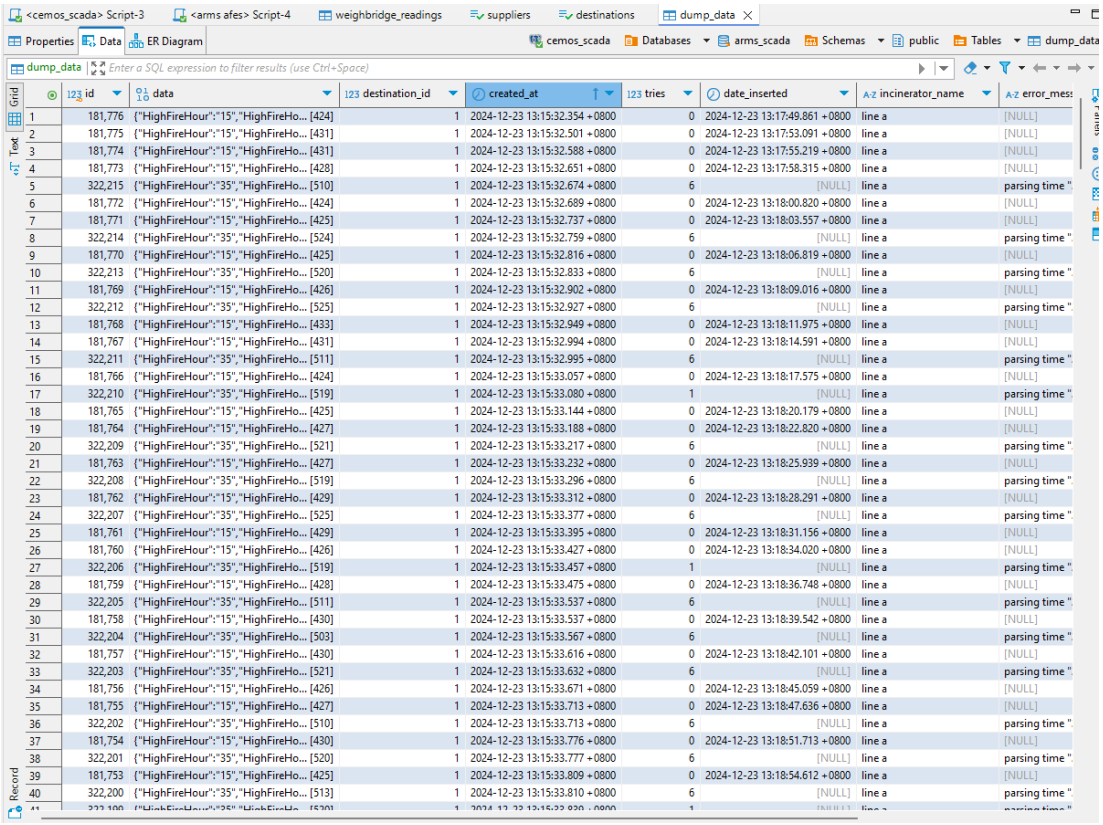
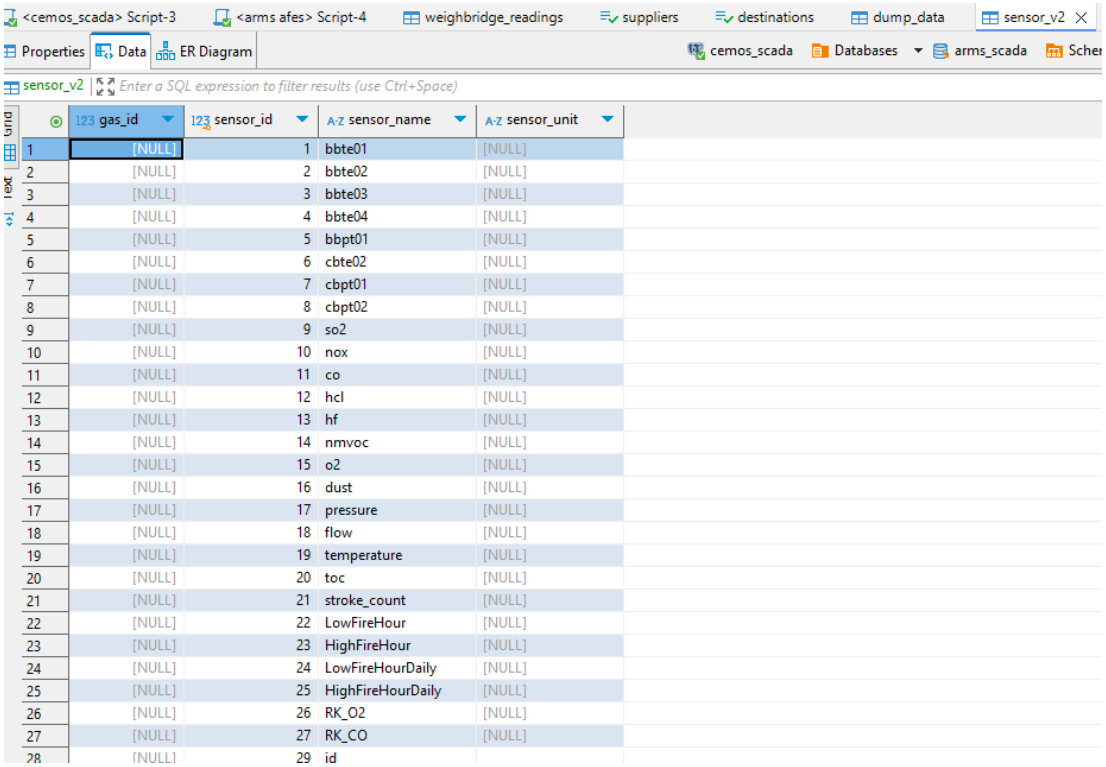



Figure 2.6 Inserted data in the new table inside DB




| | gas_id | sensor_id | sensor_name | sensor_unit |
|---|---|---|---|---|
| 1 | [NULL] | 1 | bbte01 | [NULL] |
| 2 | [NULL] | 2 | bbte02 | [NULL] |
| 3 | [NULL] | 3 | bbte03 | [NULL] |
| 4 | [NULL] | 4 | bbte04 | [NULL] |
| 5 | [NULL] | 5 | bbpt01 | [NULL] |
| 6 | [NULL] | 6 | cbte02 | [NULL] |
| 7 | [NULL] | 7 | cbpt01 | [NULL] |
| 8 | [NULL] | 8 | cbpt02 | [NULL] |
| 9 | [NULL] | 9 | so2 | [NULL] |
| 10 | [NULL] | 10 | nox | [NULL] |
| 11 | [NULL] | 11 | co | [NULL] |
| 12 | [NULL] | 12 | hcl | [NULL] |
| 13 | [NULL] | 13 | hf | [NULL] |
| 14 | [NULL] | 14 | nmvoc | [NULL] |
| 15 | [NULL] | 15 | o2 | [NULL] |
| 16 | [NULL] | 16 | dust | [NULL] |
| 17 | [NULL] | 17 | pressure | [NULL] |
| 18 | [NULL] | 18 | flow | [NULL] |
| 19 | [NULL] | 19 | temperature | [NULL] |
| 20 | [NULL] | 20 | toc | [NULL] |
| 21 | [NULL] | 21 | stroke_count | [NULL] |
| 22 | [NULL] | 22 | LowFireHour | [NULL] |
| 23 | [NULL] | 23 | HighFireHour | [NULL] |
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| 26 | [NULL] | 26 | RK_O2 | [NULL] |
| 27 | [NULL] | 27 | RK_CO | [NULL] |
| 28 | [NULL] | 29 | id | |

Figure 2.7 Sensor name table

- **Overview Incinerator Page**

The **Overview Incinerator Page** is a key feature within the SCADA module on the AFES website. This page is specifically designed to provide users with a clear and comprehensive view of the incinerator's operational status.

The page prominently displays an image or diagram of the incinerator, serving as a visual representation of the system. Above this visual, real-time data from various sensors associated with the incinerator is presented. These sensor readings may include critical metrics such as temperature, pressure, combustion efficiency, and other parameters that are essential for monitoring and maintaining the incinerator's performance.

The purpose of this page is to enable users to quickly assess the incinerator's current state at a glance, ensuring that any anomalies or issues can be identified and addressed promptly. By integrating visual and data-driven elements, the overview page enhances usability and supports effective decision-making in incinerator management.

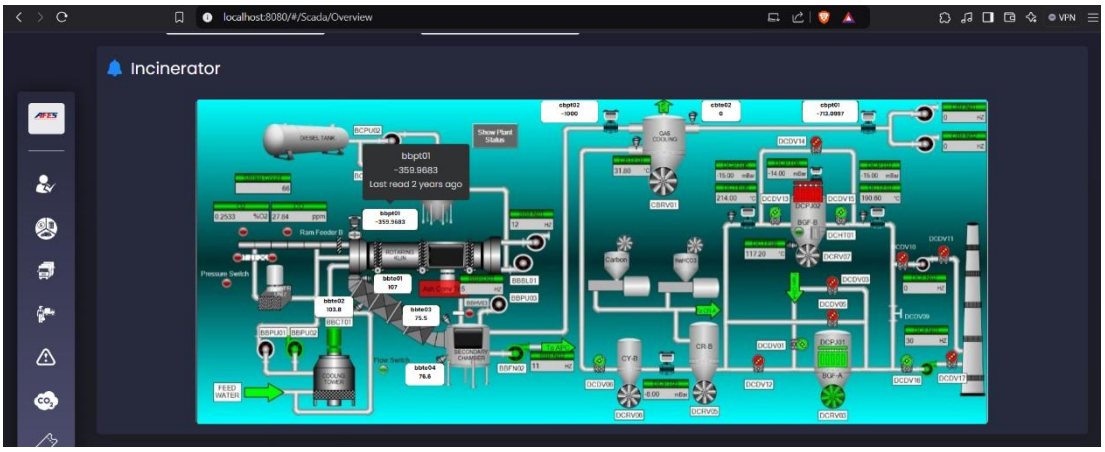


Figure 2.8 New data displayed in the interface

```
68                    src="@/assets/img/overview/SCADA PP Line A.jpg"
69                    width="1100px"
70                  />
71                  <div v-for="(item, index) in datas" :key="index">
72                    <!-- BATE01 -->
73                    <el-tooltip
74                      class="item"
75                      effect="dark"
76                      placement="top-start"
77+                     v-if="item.label === 'bbpt01'"
78                    >
79                      <template slot="content">
80                        <div style="text-align: center">
    1006 hidden lines | div > div > div > el-tooltip.item
1087                    class="item"
1088                    effect="dark"
1089                    placement="top-start"
1090+                   v-if="item.label == 'bbpt01'"
1091                  >
1092                    <div slot="content" style="text-align: center">
1093                      <p>{{ item.label }}</p>
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1163                    placement="top-start"
1164+                   v-if="item.label == 'cbpt02'"
1165                  >
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1202                  >
```

Figure 2.9 Display sensor data code

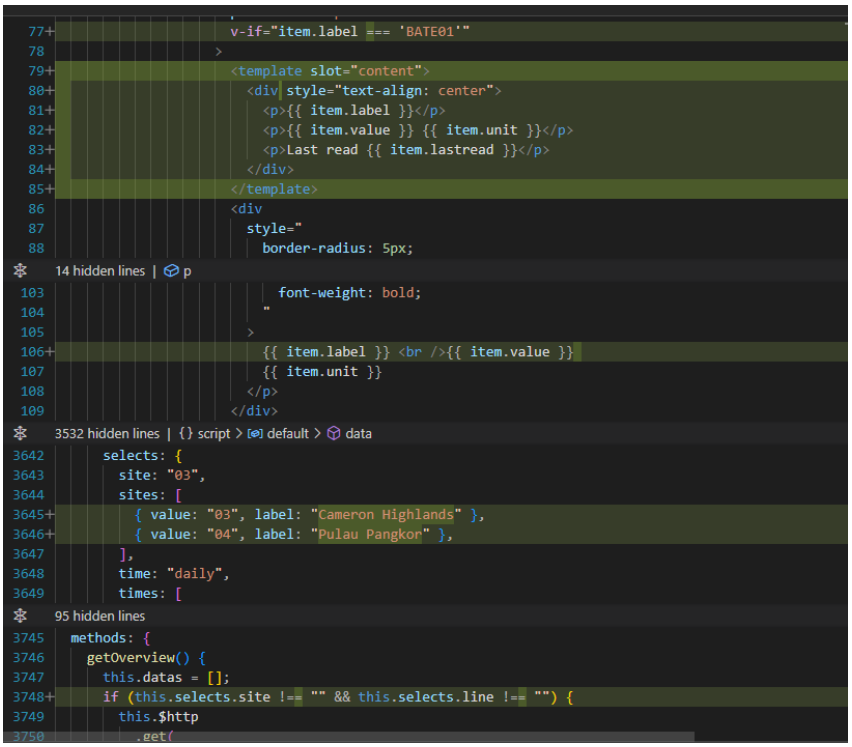



Figure 2.10 Improved site code

- **Website Scraping**

The website scraping is the process of using automation to extract content and data from a website. The sraper is responsible for extracting data from a webpage using Puppeteer. In the main script, index.js orchestrates the web scraping process. It uses Puppeteer to automate a browser and navigate through a website. The scraped data is then inserted into a database. The script handles pagination to ensure all data is collected. It also includes error handling and logging to track the scraping process.

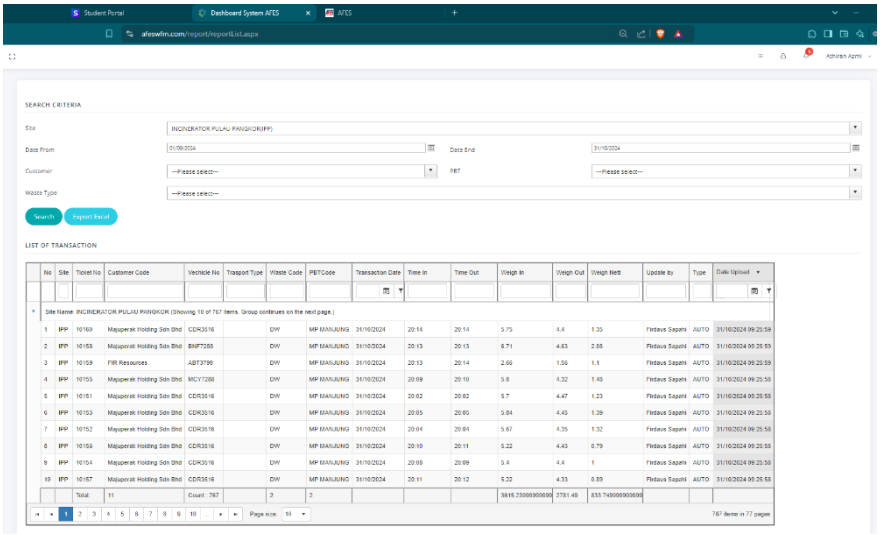



Figure 2.11 AFESwfm report interface

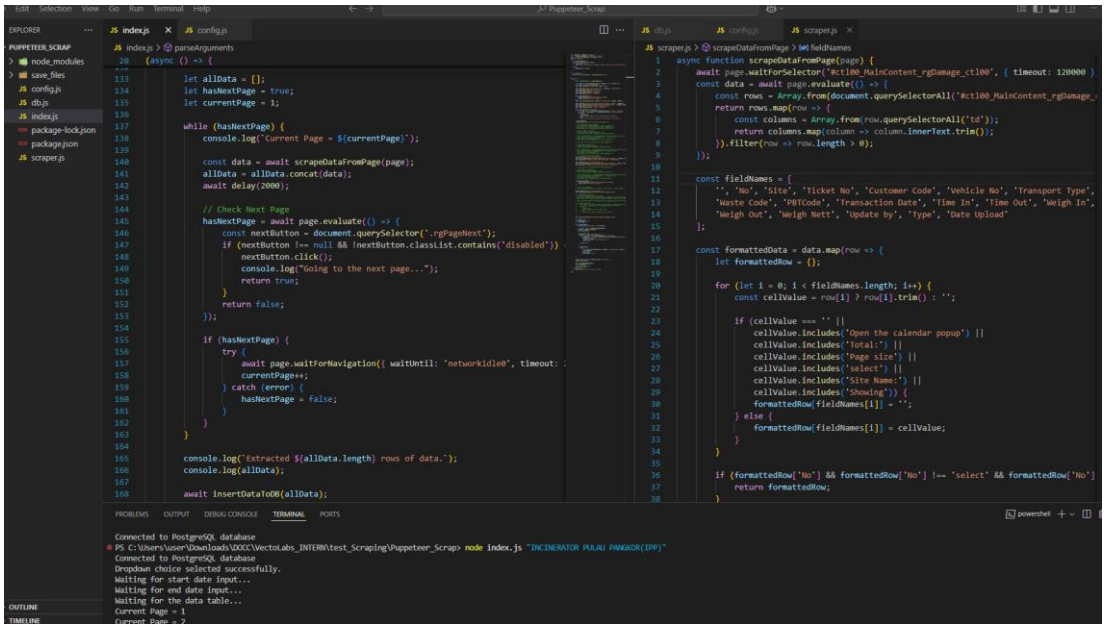
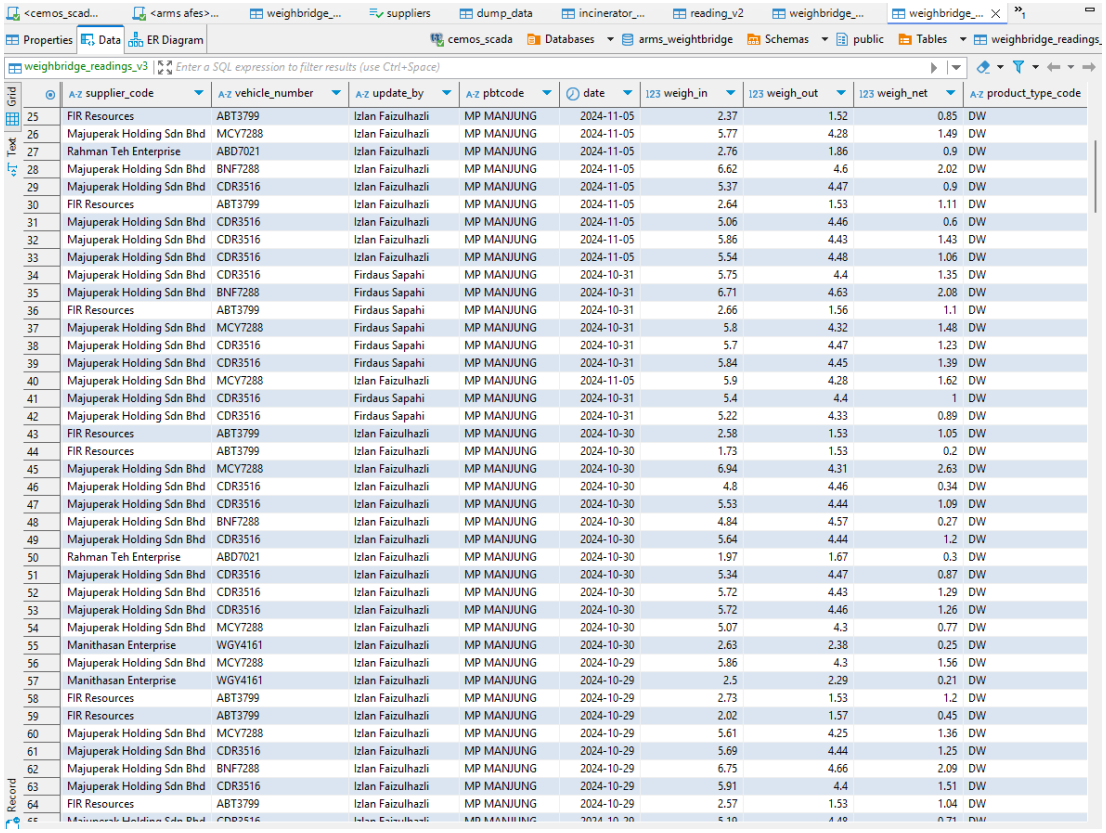


Figure 2.12 Scraping code



| | supplier_code | vehicle_number | update_by | pbtcode | date | weigh_in | weigh_out | weigh_net | product_type_code |
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| 26 | Majuperak Holding Sdn Bhd | MCY7288 | Izlan Faizulhazli | MP MANJUNG | 2024-11-05 | 5.77 | 4.28 | 1.49 | DW |
| 27 | Rahman Teh Enterprise | ABD7021 | Izlan Faizulhazli | MP MANJUNG | 2024-11-05 | 2.76 | 1.86 | 0.9 | DW |
| 28 | Majuperak Holding Sdn Bhd | BNF7288 | Izlan Faizulhazli | MP MANJUNG | 2024-11-05 | 6.62 | 4.6 | 2.02 | DW |
| 29 | Majuperak Holding Sdn Bhd | CDR3516 | Izlan Faizulhazli | MP MANJUNG | 2024-11-05 | 5.37 | 4.47 | 0.9 | DW |
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| 61 | Majuperak Holding Sdn Bhd | CDR3516 | Izlan Faizulhazli | MP MANJUNG | 2024-10-29 | 5.69 | 4.44 | 1.25 | DW |
| 62 | Majuperak Holding Sdn Bhd | BNF7288 | Izlan Faizulhazli | MP MANJUNG | 2024-10-29 | 6.75 | 4.66 | 2.09 | DW |
| 63 | Majuperak Holding Sdn Bhd | CDR3516 | Izlan Faizulhazli | MP MANJUNG | 2024-10-29 | 5.91 | 4.4 | 1.51 | DW |
| 64 | FIR Resources | ABT3799 | Izlan Faizulhazli | MP MANJUNG | 2024-10-29 | 2.57 | 1.53 | 1.04 | DW |

Figure 2.13 Inserted scraping data in DB

- **Weighbridge Analytics**

The weighbridge analytics pages provide a comprehensive total waste graph chart based on selected sites, collectors, interval time and date range. In backend code, it improves the time interval handling. By constructing SQL queries based on specific time intervals (daily, weekly, monthly, yearly) for analyzing weighbridge readings and making all time intervals and other options able to read.

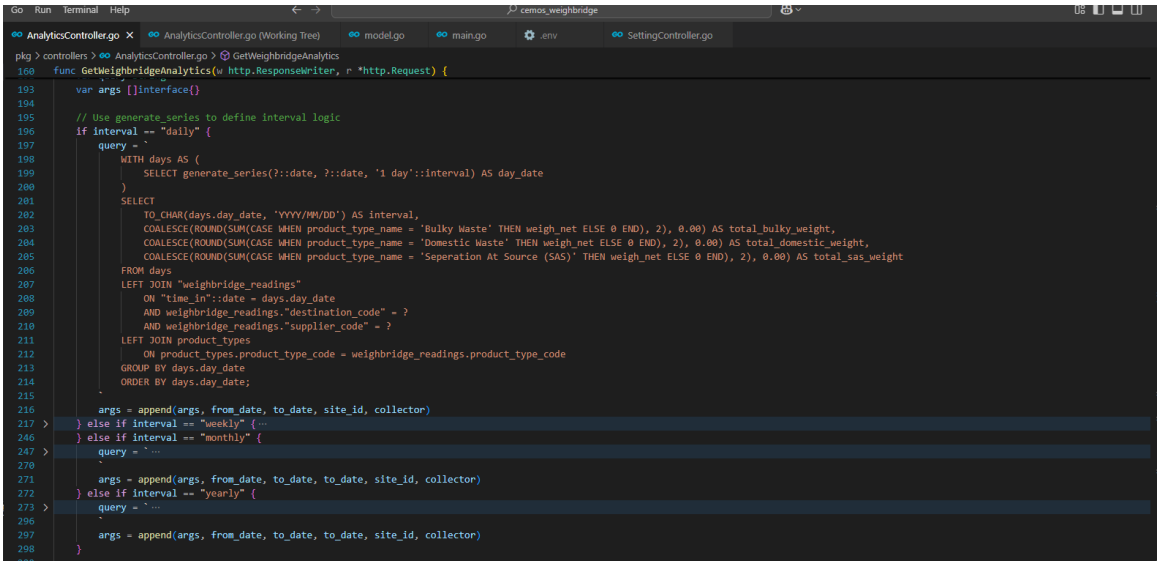


Figure 2.14 Improved option interval time Code

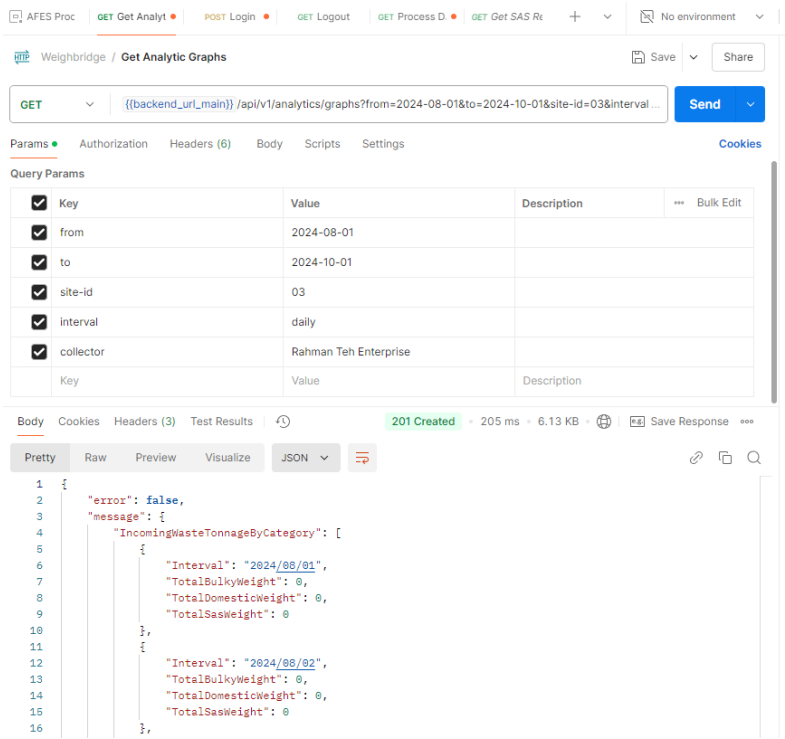


Figure 2.15 Testing response in Postman

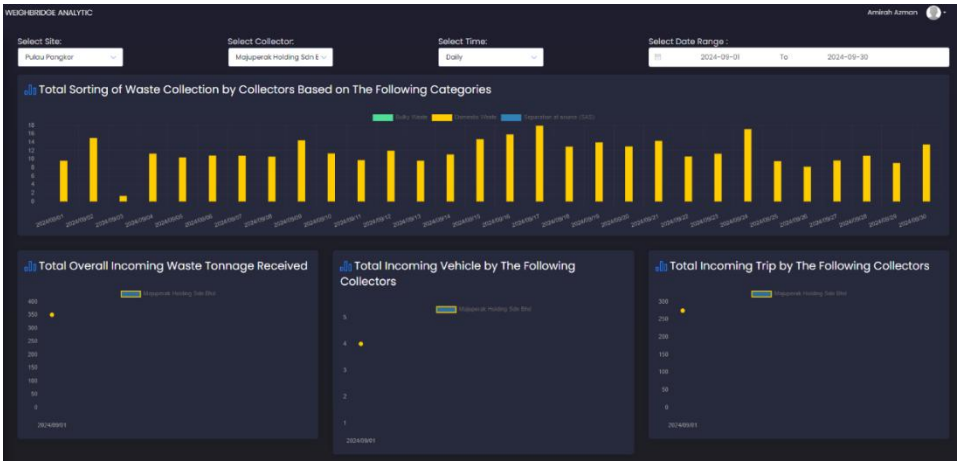


Figure 2.16 Daily interval

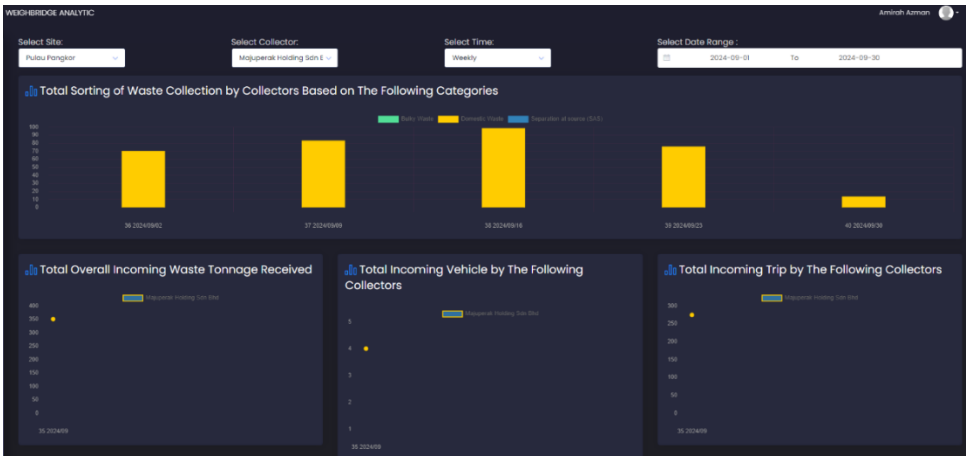


Figure 2.17 Weekly Interval

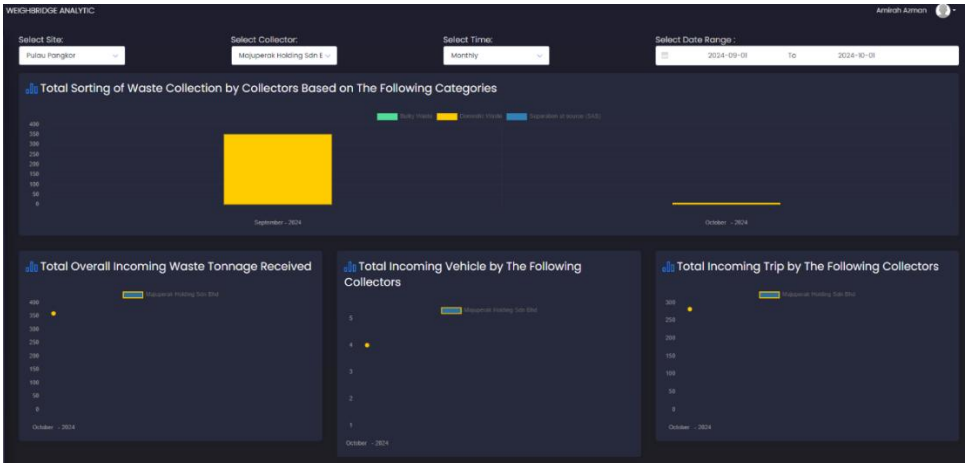


Figure 2.18 Monthly Interval

## 2.4 Side Tasks

Throughout the internship period, additional tasks are assigned to utilize free days. It's important to note that these side tasks hold equal significance as the main responsibilities. One key rationale behind assigning these tasks is to offer comprehensive training before delving into the development of arms AFES.

Moreover, these supplementary tasks serve as valuable opportunities for interns to gain insights into the company's workflow and operations. Beyond skill development, the tasks contribute to a broader understanding of how the company functions, fostering a holistic learning experience during the internship period. The tasks will be explained in the following subsections. There were additional tasks but they were not related to this course, hence it will not be included in this report.

### 2.4.1 RGBW light change

This task is creating a tab that can select a light id in a single tab to be tested. The selected light has many colors to be tested and to know if the light has the correct response it uses MQTT Box to see the response by connecting and matching the MQTT Client between the MQTT Box and input configuration setting in the .env file.

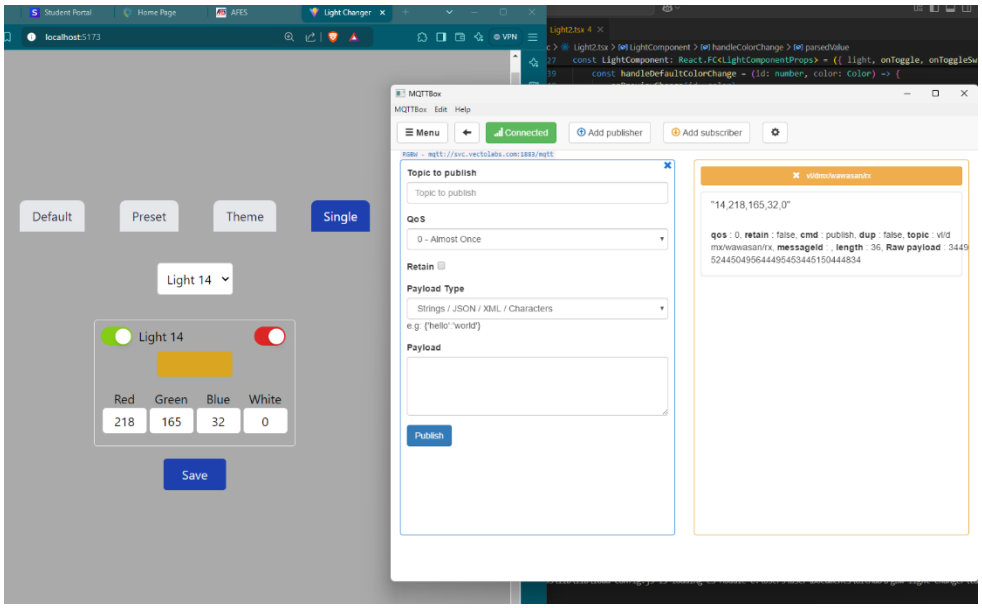


Figure 2.19 RGBW light changer

### 2.4.2 Face Recognition Testing

The project involved downloading the code from a public GitHub repository and setting up the environment as specified in the documentation. By testing one by one from the existing repository to find the better result. The process included installing necessary dependencies, configuring the project for compatibility with the system, and running the application to verify its functionality. Various test cases were conducted to assess the accuracy of the recognition system, including uploading images, testing detection speed, and verifying results against expected outcomes. Any discrepancies or errors encountered during the tests were documented, and suggestions for improvements were noted to enhance the system's performance.

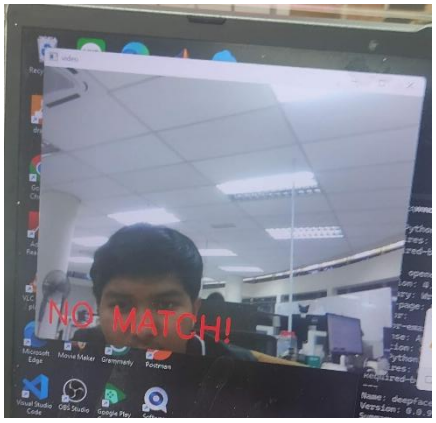


Figure 2.20 Face Recognition

### 2.4.3 Check Bugs, errors, and document formatting.

These tasks required my documentation and quality assurance skills. Although it looks simple, it still requires detailed precision to make sure the report and documentation are covered in small detail. To check bugs or errors going through the development website and testing the functionality feature available. Make the report based on the bugs or error findings.

The document formatting is mostly in the UAT report for the AFES ePRF website. This task needs to match content between the UAT report and the website. If there is found difference between those, take note or revise the UAT report.

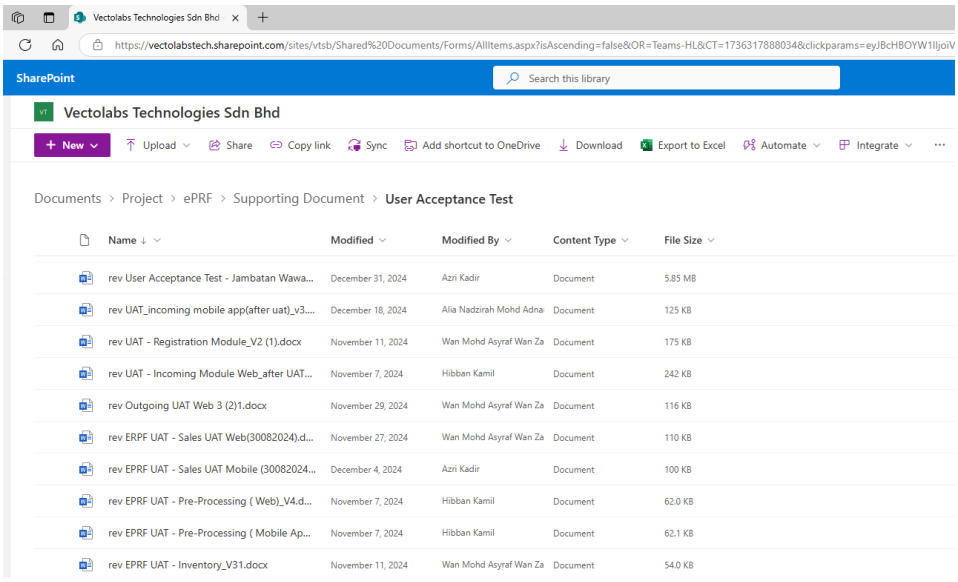


Figure 2.21 User Acceptance Test (UAT) Report

### 2.4.4 TRB-145 Configuration

Configuring the TRB-145 device to connect with the RS485 for data communication and modifying its wire setup to ensure proper data reception. Testing involved setting up the device at various predefined points to evaluate signal strength, with optimal responses being identified within a specific range. Data from the TRB145 was inserted with termite and validated through MQTT Box to confirm the response.

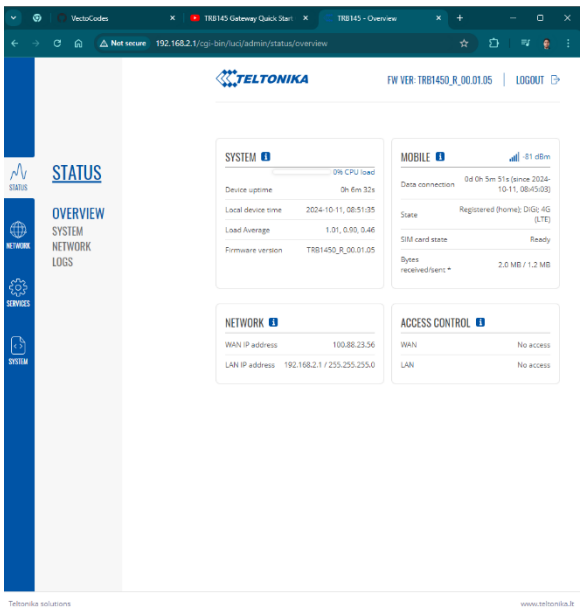


Figure 2.22 Configuration device TRB-145

### 2.4.5 Developing MQTT – Websocket Code with Postman

The activity focused on developing MQTT and WebSocket code to enable real-time communication between IoT devices and a dashboard. MQTT was used to subscribe to specific broker topics and process received messages, while WebSocket broadcasted this data to connected clients in real time. Additionally, SQL queries were written to fetch and join relevant data from the database to ensure accurate information was displayed. The entire flow was tested and validated using Postman to simulate API calls, ensuring that the system functioned correctly and delivered precise responses. This work aimed to establish a seamless communication pipeline for IoT data integration with user-facing platforms, supporting real-time monitoring and interaction.

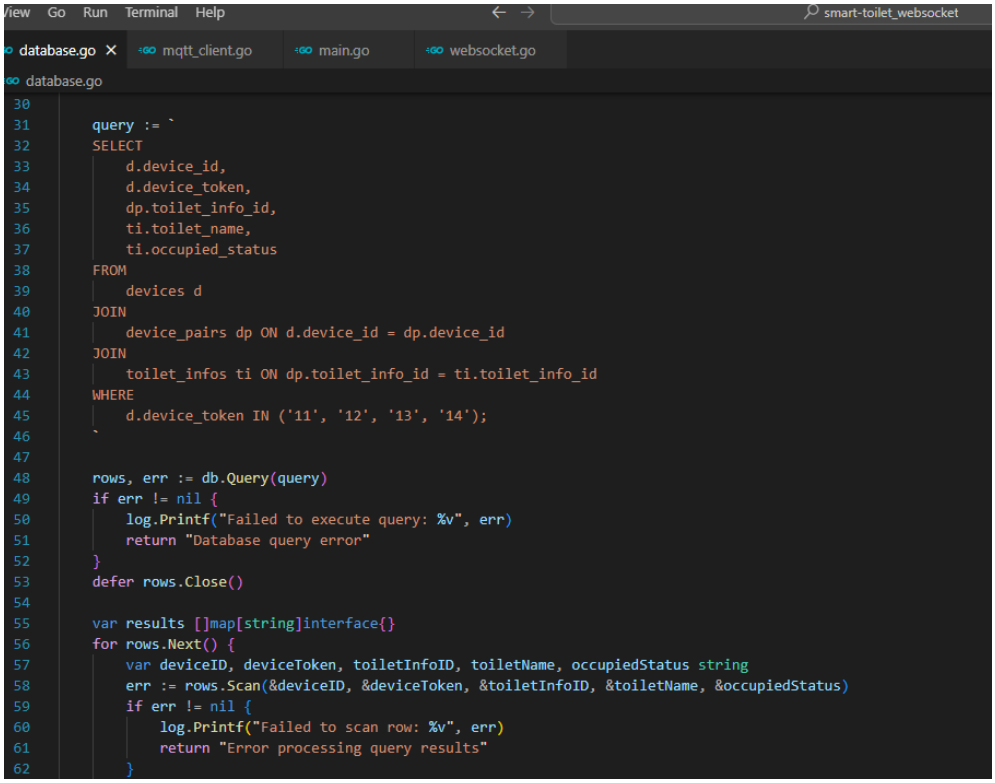


Figure 2.23 SQL queries script

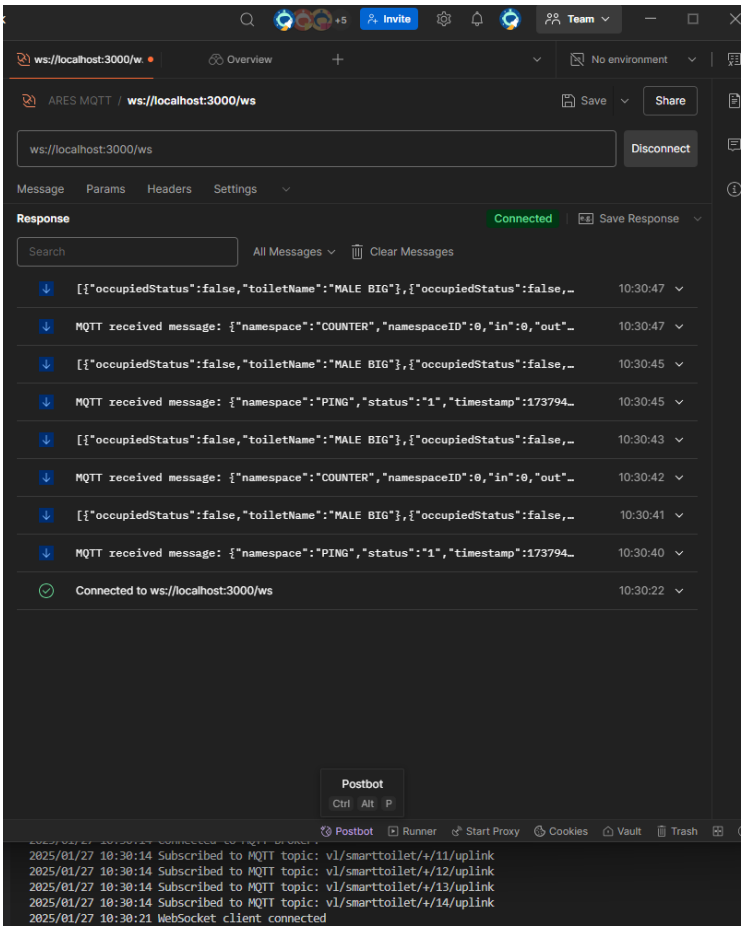


Figure 2.24 Websocket tested in Postman

### 2.4.6 Developing Image Resizer with Postman

The activity involved developing an image resizer API using JavaScript to resize uploaded images dynamically into multiple predefined sizes. The API accepts image files and requires parameters via Postman, processes them using image manipulation libraries, and generates resized versions. These resized images are then uploaded to an AWS S3 bucket for storage, ensuring scalability and accessibility. Testing with Postman ensured the API handled different image formats and sizes correctly, providing consistent responses. This task aimed to create a robust and efficient solution for managing image assets, enabling streamlined integration into larger systems requiring optimized image handling.

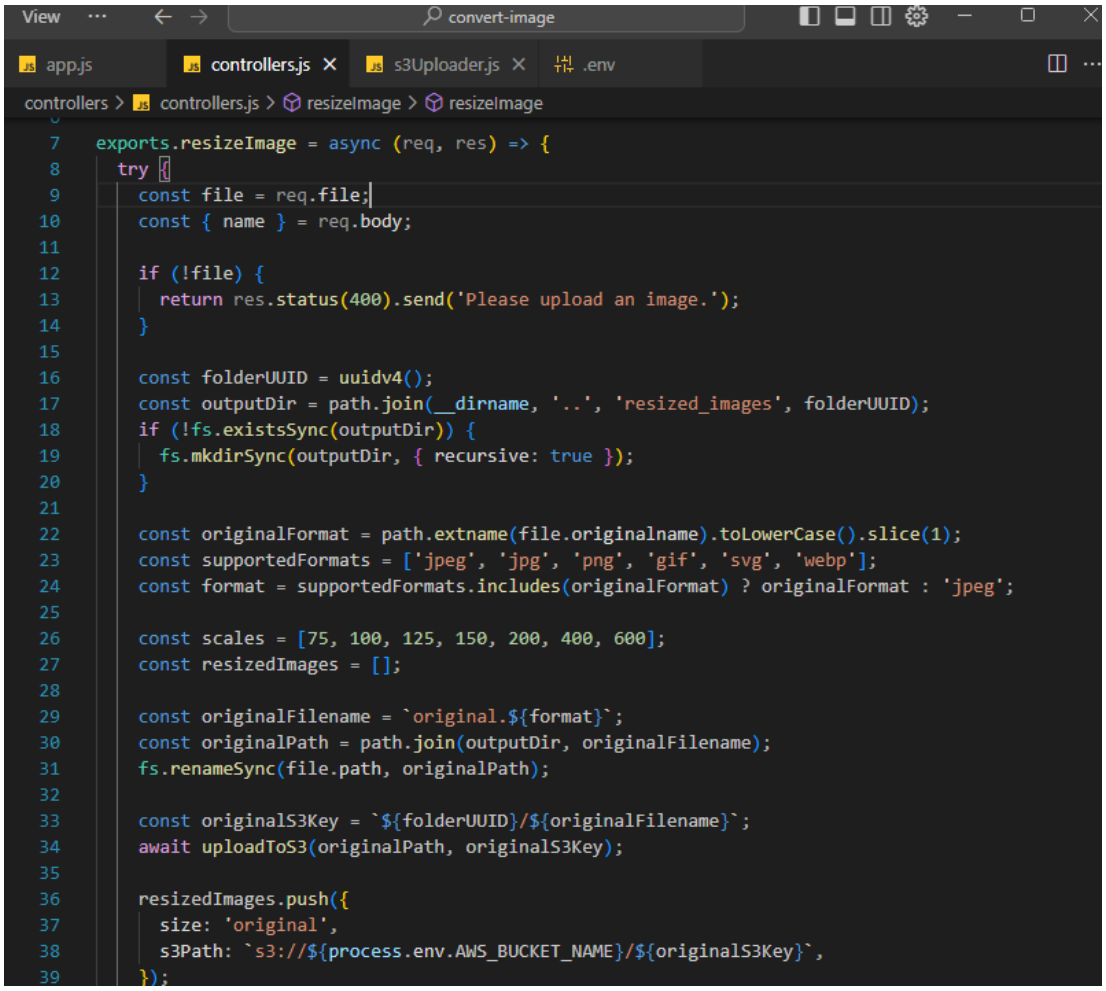


Figure 2.25 Image resizer code

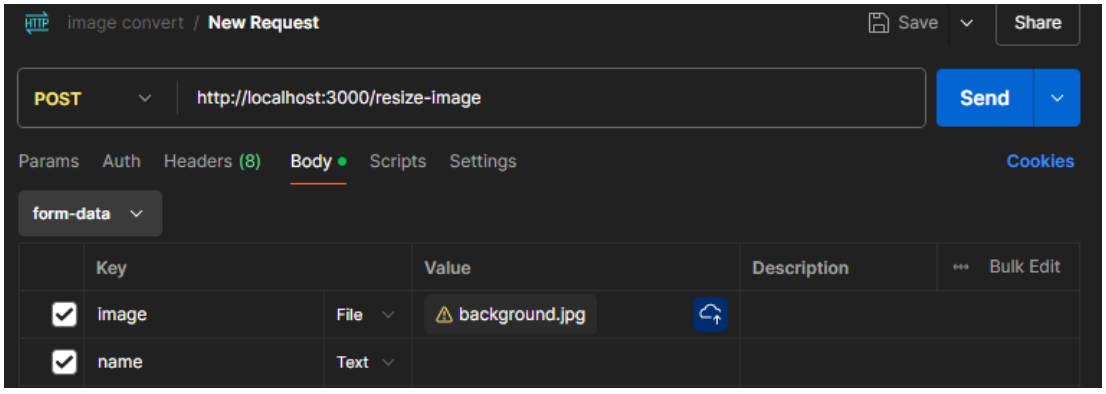


Figure 2.26 Test image resizer via Postman

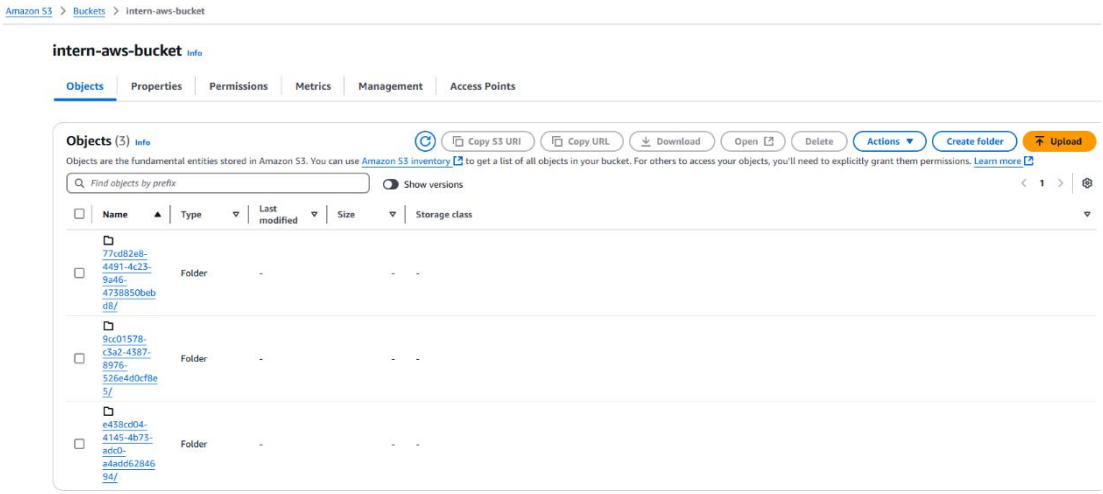


Figure 2.27 Resized image folders in AWS S3 bucket

## 2.5 Tools and Technology Used

This segment will detail the hardware, software, programming languages, and libraries employed in completing both the primary and additional tasks during the course of this internship program.

### 2.5.1 Hardware

The table below will present specifications for the hardware.

| INFINIX INBook X1 | |
|---|---|
| Hardware | Specifications |
| CPU | Intel Core i3-1005G1 |
| GPU | Intel UHD Graphics |
| Memory | 8 GB |
| Storage | 256 GB |

Table 2.1 Laptop Hardware

### 2.5.2 Software

The software used in the development of the projects:

| Name | Description |
|---|---|
| Visual Studio Code | A streamlined code editor with support IDE |

| | |
|---|---|
| Eraser.io | Proprietary software for making Diagrams and Charts |
| Postman | A software application that allows developers to test, document, and share APIs (Application Programming Interfaces). |
| DBeaver | Cross-platform database of client software application and a database administration tool |

Table 2.2 Software Used

### 2.5.3 Programming Languages Used

The programming languages that are involved in the development of the projects:

| Name | Description |
|---|---|
| Go | Programming language focused on simplicity, reliability, and efficiency. |
| Vue.js | JavaScript framework for building user interfaces |
| JavaScript | Scripting or programming language that allows the implementation of complex features on web pages |
| TypeScript | An enhanced version of JavaScript that eases the writing of code |

Table 2.3 Programming Language Used

## 2.6 Time Period to Complete All Tasks

The internship program spans a total of 20 weeks and is structured into segments to efficiently complete all assigned tasks. However, it doesn't follow a strict sequential order where the completion of one project leads directly to the next. Instead, upon finishing a primary project like arms AFES, Mr. Asyraf assigns side tasks to occupy and optimize my time effectively.

## 2.7 Theoretical And Practical Knowledge

The development of each of the pages necessitates a comprehensive understanding of the foundational principles, initially covered in university classes. However, the practical implementation and "how-to" aspects require independent learning. During the process of implementing the code, Azri and I collaborated and assisted each other.

## 2.8 Problems faced during task execution, general skills, and implementation management of task

A lot of problems were faced during this internship, because this is the first time experiencing industry-type work. I had quite a bit of time adjusting to this type of work. I realized how a little of my actions can affect the flow of the team, so I needed to catch up a lot. But thanks to Mr. Asyraf and my colleagues' guidance, I was able to overcome this hurdle and can adjust accordingly now.

## 2.9 Conclusion

This chapter provides details on the goals, supplementary assignments, primary tasks, and the tools utilized in the projects. In summary, this internship program's training and tasks hold significant value as they offer an opportunity to engage in authentic software projects and put into practice the knowledge acquired in previous semesters.

# CHAPTER 3

# OVERALL INFORMATION OF THE INDUSTRIAL TRAINING

## 3.1 Introduction

In this section, we will outline the skills acquired during the industrial training at VectoLabs Technologies Sdn. Bhd. Additionally, this chapter incorporates positive feedback and constructive comments about the company.

## 3.2 Skills Improvement

This 20-week industrial training proves to be an exceptional learning opportunity, offering valuable skills that prepare the intern for their future career. The acquired skills encompass programming, ensuring quality software, as well as documenting and, problem-solving detailed in the subsequent subsection.

### 3.2.1 Front End Programming Skills

Working on various projects has significantly enhanced my front-end programming skills, particularly in modern frameworks like React, Next.js, TypeScript, and Vue.js. These experiences deepened my understanding of creating dynamic, user-friendly interfaces while adhering to best practices for performance and maintainability. Tasks such as designing and implementing complex components, managing state efficiently, and integrating APIs strengthened my ability to translate design sketches into functional, interactive web applications. By working on real-world problems, like improving UI elements for interval type selections, creating responsive forms, and optimizing user interfaces, I gained practical insights into debugging and enhancing user experiences. Additionally, integrating advanced tools and libraries such as tRPC, Axios, and Vue-specific features provided hands-on

exposure to building scalable and robust front-end systems, refining my skills and confidence in delivering high-quality solutions.

### 3.2.2 Back End Programming Skills

My back-end programming skills have improved significantly through various real-world projects and challenges. I gained hands-on experience in building RESTful APIs, database design, and implementing business logic using Laravel, Node.js, and Go. Tasks such as creating CRUD operations, handling user authentication, and integrating database operations with PostgreSQL and SQLite allowed me to understand core concepts like data validation, error handling, and performance optimization. Additionally, working on tasks like implementing automating data insertion, and integrating IoT devices, such as the TRB145, with backend systems deepened my understanding of handling asynchronous processes and real-time data updates. Through these experiences, I enhanced my ability to build scalable and maintainable backend solutions while ensuring seamless communication with the front end for a complete application ecosystem.

### 3.2.3 Software Quality Assurance Skills

My software quality assurance skills have significantly improved through various tasks that involved testing, reporting, and refining system functionalities. I gained experience in creating and updating User Acceptance Test (UAT) documents to ensure that application features align with user requirements. By walking through entire systems and modules, I developed a keen eye for identifying inconsistencies and bugs, which I documented in detailed bug reports with clear, actionable feedback. Additionally, I worked on validating data accuracy, such as matching reports across systems, and testing generated outputs to ensure reliability. These activities enhanced my proficiency in systematic testing methodologies, improved my attention to detail, and equipped me with the ability to effectively communicate findings and collaborate with developers to enhance software quality.

### 3.2.4 Documenting Skills

My documenting skills have significantly improved through various tasks that required creating, updating, and refining technical and non-technical documents. I worked on generating comprehensive reports, such as bug reports, UAT documents, and research findings, ensuring clarity, organization, and accuracy. By structuring content into readable formats, including tables and categorized sections, I enhanced the usability of these documents for stakeholders. Additionally, creating step-by-step guides and project documentation, such as testing procedures for face recognition and API integration, has strengthened my ability to convey complex information in an accessible manner. These activities have honed my ability to produce clear, detailed, and professional documentation that supports collaboration and knowledge sharing.

### 3.2.5 Problem Solving Skills

The internship has been instrumental in fostering the development of robust problem-solving skills. This includes the ability to tackle challenges and devise practical solutions within the design process, taking into account both user requirements and technical constraints. This emphasis on problem-solving is essential for navigating complex design scenarios, ensuring that solutions are not only user-centric but also align with the technical aspects of the project.

My problem-solving skills have been greatly enhanced through hands-on experience in addressing real-world challenges across various projects. Tasks like debugging API integration issues, optimizing code for frontend and backend systems, and resolving connectivity problems with IoT devices like the TRB145 required critical thinking and methodical approaches. I frequently analyzed data discrepancies, matched outputs between systems, and refined features based on stakeholder feedback. Additionally, troubleshooting signal quality during onsite tests and implementing features like automated UUID generation for database entries further solidified my ability to identify, analyze, and resolve complex technical

issues efficiently. This experience has refined my adaptability and logical reasoning in tackling diverse technical challenges.

## 3.3 Reference Materials

The primary source of reference for completing assigned tasks has been online materials and tutorials. This approach has proven to be the most effective method for addressing challenges and overcoming difficulties related to Angular. Utilizing resources such as YouTube videos, engaging with developer communities on platforms like Discord, participating in the Angular community, and following an online course on Udemy.com have all played a crucial role in providing valuable insights and solutions. These diverse references have been instrumental in supporting and enriching the internship experience.

## 3.4 Constructive Comments

VectoLabs Technologies Sdn. Bhd functions as a tight-knit family, comprising a compact team of developers. Despite our small size, we maintain a harmonious work environment where conflicts are minimal, and any challenges faced are promptly addressed with effective solutions.

They are also exceptionally open in sharing their knowledge and offering valuable guidance. The given time period for task completion is ample, allowing tasks to be carried out without the need for hurried efforts.

## 3.5 Conclusion

This chapter provides a comprehensive overview of the internship program conducted at VectoLabs Technologies Sdn. Bhd. It covers key aspects including the acquired skills, reference materials utilized, and constructive feedback gathered during the internship period.

# CHAPTER 4

# CONCLUSION

## 4.1 Introduction

This chapter serves as a conclusion to the industrial training information, summarizing the overall achievements gained. Additionally, it includes a section dedicated to discussing problems encountered during the internship program along with corresponding suggestions for improvement.

## 4.2 Overall Achievement

After an extensive 20-week internship, I had the valuable opportunity to familiarize myself with the working environment of the software engineering industry, specifically in the role of a developer. This period not only exposed me to the practical aspects of the field but also allowed for significant growth in communication skills, as effective communication was crucial while working on tasks assigned by Mr. Asyraf and Mr. Yahya and collaborating with CTO and Internship partner like Azri. Although I was under the guidance of my senior and did not contribute to the main frame, I was able to learn a lot, especially how to meet industrial requirements, this I believe is what the internship program was for, to learn before eventually experiencing it.

The internship has been a transformative experience, significantly improving my research skills. This involved gathering insights from user research, competitor analysis, and staying updated on industry trends. Additionally, it played a vital role in developing robust problem-solving skills, honing the ability to address challenges and devise practical solutions within the design process. These skills were applied while considering both user requirements and technical constraints, marking a crucial aspect of the learning process.

Furthermore, the internship provided a platform for in-depth exploration of development, contributing to a more professional and nuanced approach. Collaborating with developers during this period offered valuable insights into the fundamentals of software development, encompassing languages like Go, Vue, JavaScript, and TypeScript. This hands-on experience not only built upon the theoretical knowledge from previous semesters but also allowed the practical application of these skills to real-world projects, enriching my overall skill set.

## 4.3 Issue And Challenges During LI

Developing a web scraping solution using Puppeteer also required overcoming obstacles in automating data extraction from dynamic pages, ensuring accurate filtering by date, and reconciling data across systems like AFES ePRF and AFES WFM websites. Debugging and maintaining synchronization between the frontend and backend for data flow and real-time updates further added complexity.

Additionally, preparing user acceptance test (UAT) and bug reports required structuring detailed findings into clear, actionable formats, while improving report clarity for stakeholders was an iterative process. Learning and implementing new technologies, such as React, Next.js, TypeScript, Laravel, and AWS Lightsail, demanded a balance between self-study and project deadlines, especially for complex tasks like implementing tRPC and deploying websites efficiently.

## 4.4 Opinion And Suggestion

After an extensive 20-week internship, I had the valuable opportunity to familiarize myself with the workingIn my perspective, VectoLabs Technologies Sdn. Bhd proves to be a highly suitable company for interns to undergo their industrial training. Despite being a startup, it provides a conducive environment for learning, although human resources are limited. This limitation, however, has become an opportunity for interns to enhance their communication skills, especially in

interactions with my supervisor, Mr. Asyraf. The company adopts a balanced approach, presenting tasks that are challenging enough to stimulate growth but not overly difficult or unrealistic.

Working with VectoLabs Technologies has been an eye-opening experience, emphasizing the development of crucial skills. The limited resources have encouraged us to sharpen our communication abilities, and the tasks assigned have been well-aligned with our skill set. As a result, I highly recommend future interns to consider undergoing their industrial training at VectoLabs Technologies for a valuable and enriching experience.

## 4.5 Conclusion

After an extensive 20-week internship, I had the valuable opportunity to familiarize myself with the In conclusion, VectoLabs Technologies Sdn. Bhd emerges as a commendable choice for interns seeking a fulfilling industrial training experience. Despite being a startup with limited human resources, the company provides a conducive environment for learning and emphasizes the development of communication skills. The tasks assigned strike a balance between challenging interns to grow and ensuring that they align with the available skill set. This experience proves to be both eye-opening and enriching, making VectoLabs Technologies an excellent recommendation for future interns seeking a valuable training opportunity

## REFERENCES

Object Relation Mapping library for Golang:

https://gorm.io/docs/

AFES dashboard system

https://www.afeswfm.com/

https://arms.afes.com.my/

https://eprf.vectolabs.com/

## Appendix A

## INDUSTRIAL TRAINING CHECKLISTS (PLACEMENT)

| No. | Activities/Tasks | Tick (√) | Endorse by and date |
|---|---|---|---|
| 1. | Report Duty To The Organization Approved by faculty | √ | |
| 2. | Perform Report Duty Verification on ITS, verified by organization supervisor. | √ | |
| 3. | Contact faculty supervisor to inform the job scope and organization information | √ | |
| 4. | *Update of Industrial Training site (address). Inform faculty supervisor and JKLI, if any changes.* | √ | |
| 5. | Updating Industrial Training Logbook online – daily basis | √ | |
| 6. | Ensure that the organization supervisor is able to login to ITS successfully (Organization supervisor gets ITS userid and password). | √ | |
| 7. | Faculty Supervisor Visit. Date (physical): 14 Jan 2025 | √ | |
| 8. | Industrial Training Presentation. | √ | |
| 9. | Performance evaluation by organisation supervisor in ITS | | |
| 10. | Submission of Industrial Training Logbook. | | |
| 11. | Submission of Industrial Training Report with checklist and achievement form as Appendix. | √ | |
| 12. | Fill in Industrial Training Performance Evaluation by student in ITS. | √ | |
| 13. | End Industrial Training | | |

*Note:*

1. *Italic activities are optional depending on student situation.*

**IIMPORTANT: This checklist must be put as attachment in the industrial training report.**

## Appendix B

## INDUSTRIAL TRAINING ACHIEVEMENT

**Sekretariat Latihan Industri**
**Fakulti Komputeran,**
**Universiti Teknologi Malaysia,81310 SKUDAI, JOHOR**
**Fax: 07-5565044 Tel: 07-5532008**

## INDUSTRIAL TRAINING ACHIEVEMENTS

(This form must be filled by student and must be attached in the Industrial Training report)

Student's Name : Hibban Kamil Hizbuttahrir

Organisation : VectoLabs Technologies Sdn Bhd

| No. | Task (List all tasks have been completed) | Month of Task Achieved | | | | |
|---|---|---|---|---|---|---|
| | | Month 1 | Month 2 | Month 3 | Month 4 | Month 5 |
| 1 | Understanding of company's background and objectives | √ | | | | |
| 2 | Create an ERD for Data Model | √ | | | | |
| 3 | Develop backend code for new data and display the interface (SCADA module) | | √ | | | |
| 4 | Develop backend code for time intervals and improve format date (WEIGHBRIDGE module) | | | √ | | |
| 5 | Handle documentation, side task and task as Quality Assurance | | | √ | √ | √ |

| **Deliverable/Training reflection** (Outcomes that have been achieved) |
|---|
| The main achievement is the development of the backend code and some frontend for modules SCADA and WEIGHBRIDGE, which use Go programming language that I have never used previously. Enhance knowledge about proper way to implementing REST API and use Postman to test it. This Industrial training has given me a lot of knowledge regarding how the industry work. Hopefully I will be able to work hard and diligently to meet requirement. I will strive to be a better developer. |

**Approval**

Student Signature: _____ Date: 28/01/2025

| Organisation's Supervisor: | Faculty Supervisor : |
|---|---|
| ..... | ..... |
| (Signature) | (Signature) |
| Name: Wan Mohd Asyraf Wan Zawawi | Name: Chan Weng Howe |
| Date: 28/01/2025 | Date: 02/02/2025 |