

Performance Metrics Feature Development: Enhancing Business Insights Through Real-Time Data Visualization

by

Mohammad Tajrian Arafat Alvi

23241134

An internship report submitted to the Department of Computer Science and
Engineering

in partial fulfillment of the requirements for the degree of
B.Sc. in Computer Science

Department of Computer Science and Engineering

Brac University

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Declaration

It is hereby declared that

1. The internship report submitted is my own original work while completing degree at Brac University.
2. The report does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The report does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I have acknowledged all main sources of help.

Student's Full Name & Signature:

Mohammad Tajrian Arafat Alvi

23241134

Approval

The internship report titled “Performance Metrics Feature Development: Enhancing Business Insights Through Real-Time Data Visualization” submitted by

1. Mohammad Tajrian Arafat Alvi(23241134)

Of Fall, 2024 has been accepted as satisfactory in partial fulfillment of the requirement for the degree of B.Sc. in Computer Science on November 30, 2024.

Examining Committee:

Supervisor:
(Member)

Mr. Arif Shakil
Lecturer
Department of Computer Science and Engineering
Brac University

Co-Supervisor:
(Member)



Mohammad Yasin
Team Lead, Senior Software Engineer
Caction (Former Sales Connection)

Head of Department:
(Chair)

Sadia Hamid Kazi, PhD
Chairperson and Associate Professor
Department of Computer Science and Engineering
Brac University

Abstract

In today's data driven world business is becoming more and more dependent on visualizing their key metrics as a way to make informed decisions to fuel their growth. In my internship with Caction, I was fortunate enough to help build the Performance Metrics Feature: a tool that empowers businesses to see real time dashboards of their performance. I had the double role of frontend, backend where I was using Laravel for convenience of dealing with data and Vue.js for building an interactive user friendly interface. Challenges of the project included integrating real time data, optimizing for user experience, and making sure there was seamless communication between the frontend and the backend. These barriers forced me to work my creativity around technical adherence. It also showed me how value and important clear communication and time management is in remote work environment. What ultimately came out of this transformative experience was that it not only deepened my own technical knowledge, but also the confidence and foundation needed to continue to be great in an ever evolving field of software engineering.

Keywords: Performance metrics, Caction, Vue.js, Laravel, RAD, CRM, FSM, SFA.

Dedication

This report is dedicated to my parents and elder brother, who have been very expressive, supportive, encouraging, and believing in me, which has been the force behind my success. They have always been there to inspire me with their constant, loving, and guiding hand every day of my academic and professional life.

Acknowledgement

I want to begin by thanking Allah, for his endless strength, wisdom, and guidance has guided me all the way through this journey.

Heef-practically give heartfelt thanks to those who have mentored me and on the top of this list, I am becoming extremely grateful to my supervisor Mr Arif Shakil.

I owe much of gratitude for this project to his unwavering support and thought provoking insights along with his constructive feedback. I also would like to thank my co supervisor Mohammad Yasin for the continuous guidance, his encouragement and support during my internship, who has been a great inspiration for me.

I will always be forever indebted to my family, without whom love, belief and encouragement always served as the greatest strength — parents and elder brother, for their constant faith in me that holds me grounded.

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Chapter 1

Introduction

1.1 Preamble

This report follows my internship at Caction[1] (formerly Sales Connection[2]). It was an exciting opportunity for me, where I could put to use the theoretical knowledge I had acquired at BRAC University in this internship work on real-world software development challenges. It being all remote also required a balancing act of my academic obligations against work. For instance, I juggled classes, assignments, and meetings along with doing the work of my internship, so I learned to be able to manage my time properly and put my most urgent responsibilities on top.

I started off as an SQA engineer at Caction, so I would test the software to make sure new features and updates worked to the company's quality standards. This role provided me with good insight on the software development life cycle, and in particular I understood the key of quality assurance in achieving robust, error-free applications. After two months as an SQA Engineer, I got transitioned to the Junior Software Development Engineer position, a performance-based promotion. That gave me the opportunity to increase my skill set, going from testing to actually adding my contribution to the development of new features, especially so for the performance metrics feature.

This internship experience helped me to get hands-on experience with the software

development that brought me more hands-on skills in the technical part, and it also helped me to improve my communication skills, time management, and skills to work in remote work along with teams.

1.2 Objective

This report aims to give a whole reflection comparing my role, my contributions, my challenges during my internship within Caction. The goal is to capture my experience working remotely while studying at university, and shine a light on the special learning challenges and opportunities that were presented by such a dynamic. My desire is through this reflection is to demonstrate the technical and communication skills I have gained as well as identify the core competencies from which I will rely on to develop a career as a software engineer.

1.3 Information Sources

The information in this report was in most part obtained directly through my own experience at Caction. Through daily interactions with my supervisors, my colleagues, and other team members, as well as reading internal documents and resources available from the company, I collected insights. In addition, data from Caction's official website was used to complement the information, as well as secondary sources. Because of these sources, my understanding of the company's products and services, as well as their operational processes, was tremendously important. The experience of both firsthand and secondary research has allowed me to have a full and rounded representation of my internship.

1.4 Document Overview

I structured this report into several sections, the first being an overview of the company I did my internship with and, on the other hand, relating the details of

my responsibilities, the contributions, and the challenges. This report will also cover a whole top-to-bottom feature that I worked on. I'll also talk about my professional and technical growth and present recommendations for future changes to the internship process. I will go into detail to explain each section with examples, diagrams, and real-life scenarios from an internship.

Chapter 2

Company Profile

2.1 Company Overview

As a pioneer company, Caction is a leading business management software solutions provider in Malaysia that goes about bringing business operations to a whole new level. Founded as Sales Connection, the company has grown into a leader in software development with a series of advanced, prebuilt software tools that allow businesses to operate more efficiently. Caction provides software solutions for CRM, tracking performance, real-time business analytics, and more. These are tools designed to help businesses become more productive, make more decisions, and be more efficient with their operations.

Caction's flagship products are robust CRM systems that offer the ability to manage, analyze, and utilize customer interactions, sales processes, and customer data in a more efficient way. Other functionality the company offers includes customizable performance tracking tools that allow organizations to track key performance identifiers (KPIs) and monitor business success in real time. Caction's business intelligence solutions on top allow organizations to extract intelligence from complete data analysis to make better decisions.

The simple and powerful software solutions help businesses to make data-driven decisions. Caction's platform is fully scalable and flexible and is ready to be integrated with any industry like retail, finance, education, etc. Caction can help no matter if the customer companies are a small startup or a large enterprise.

Caction has gained a reputation among its growing client base for its ability to deliver custom solutions that are easy to implement in a variety of business operations. Companies from across different sectors trust Caction, and their commitment to continuous innovation ensures that their software suite is always keeping ahead of the game in the business software industry.

2.2 First Day of Joining Caction

On that wondrous first day of Caction, I was eyes wide open and filled with both excitement and nerves because it was my first day at my first real job. As my internship was remote, my first day was entirely virtual. There was a unique challenge to the remote setup, as it meant I would have to quickly adapt to a completely virtual work environment. My first time of interaction with someone was with my co-supervisor, Mohammad Yasin; he made me feel very comfortable, giving me a clear overview of what the internship encompassed. Supportive and understanding, full of tools and resources, he helped me to start it without straining myself.

On my first day, I was taught how Caction uses tools and technologies to project manage and communicate with other teams. For team communication, we used Discord and WhatsApp and Zoom for virtual meetings and daily check-ins. WhatsApp was our main hub for talking about team discussions, and Zoom was a key platform for video conferences and together work sessions. During the internship, these tools became essential, especially when coordinating tasks or when clarifying a technical issue with my colleagues in different time zones.

The first few days were all about onboarding, and so I learned about the operations and product of the company. I understood the company's mission and services by understanding Caction's product suite of customer relationship management (CRM), business performance tracking systems, and data analytical solutions. I understood about their current development life cycle and the ongoing projects that I would work in.

Moreover, I was trained on software quality assurance (SQA) processes to be my

common work, the responsibility of the things I was doing during the first few months. How the company tests, tracks bugs, and maintains quality standards came up in this training. During that time, I became familiar with all QA tools and processes and established myself as a contributor to the delivery of software that strictly adheres to Caction’s very high quality standards before release.

2.3 Products and Customers Overview

Caction has a full package of tools aimed to boost operational efficiency, boost revenue growth, and improve customer satisfaction. The company’s flagship software suite is comprised of solutions for:

2.3.1 CRM (Customer Relationship Management):

Caction’s CRM system helps businesses communicate with customers and track leads appropriately. This gives you a clear picture of what your customer is doing and strengthens your relationship with them over time. Businesses have reported remarkable results after implementing Caction’s CRM system, including:

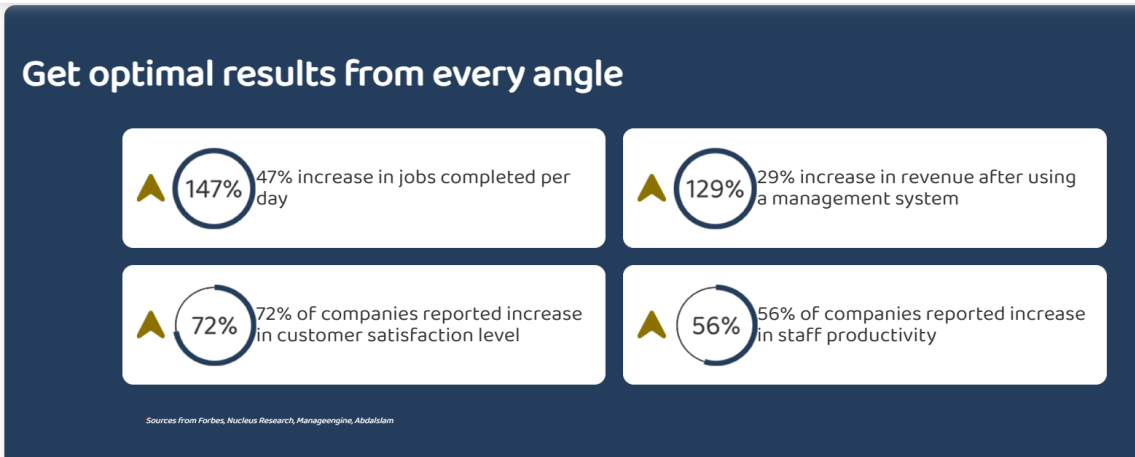


Figure 2.1: CRM

2.3.2 Sales Force Automation (SFA):

It automates routine tasks, tracks sales performance metrics, and provides real-time visibility into sales pipelines in order to maximize the productivity of sales teams. SFA eliminates manual processes that slow down teams closing deals faster and overall sales cycle efficiency.

2.3.3 Field Service Management (FSM):

The FSM module is for optimizing field service operation (like scheduling, dispatching field technicians, and tracking the field technicians). Benefits include: Field service productivity increased by 35 percent.

- A 34% rise in cost savings.
- 27% improvement in customer retention and loyalty.
- Reduction in training time for staff by 41%.

Optimize every aspect of your field service operations

Job scheduling & service quality

- Schedule jobs and site visits with calendar view
- Assign teams and control their access to sensitive data
- Ensure workflow control and SOP compliance for field teams
- Quickly access customer details and service history

Job Schedule February - May 2022

User Department: > Drivers, Sales, Technician Access Type: > Assign Assign User: > 8 Selected

Order By: Asc Total Job: 8

Duty Roster

Staff	February	March	April
Staff 1	- Feb 10: 10:00 AM - 12:00 PM: [Job Entry] - Feb 11: 10:00 AM - 12:00 PM: [Job Entry] - Feb 12: 10:00 AM - 12:00 PM: [Job Entry] - Feb 13: 10:00 AM - 12:00 PM: [Job Entry] - Feb 14: 10:00 AM - 12:00 PM: [Job Entry] - Feb 15: 10:00 AM - 12:00 PM: [Job Entry] - Feb 16: 10:00 AM - 12:00 PM: [Job Entry] - Feb 17: 10:00 AM - 12:00 PM: [Job Entry] - Feb 18: 10:00 AM - 12:00 PM: [Job Entry] - Feb 19: 10:00 AM - 12:00 PM: [Job Entry] - Feb 20: 10:00 AM - 12:00 PM: [Job Entry] - Feb 21: 10:00 AM - 12:00 PM: [Job Entry] - Feb 22: 10:00 AM - 12:00 PM: [Job Entry] - Feb 23: 10:00 AM - 12:00 PM: [Job Entry] - Feb 24: 10:00 AM - 12:00 PM: [Job Entry] - Feb 25: 10:00 AM - 12:00 PM: [Job Entry] - Feb 26: 10:00 AM - 12:00 PM: [Job Entry] - Feb 27: 10:00 AM - 12:00 PM: [Job Entry] - Feb 28: 10:00 AM - 12:00 PM: [Job Entry] - Feb 29: 10:00 AM - 12:00 PM: [Job Entry] - Feb 30: 10:00 AM - 12:00 PM: [Job Entry]		

Figure 2.2: FSM

2.3.4 Inventory Management:

Caction's Inventory Management tool is aimed at helping businesses keep track of inventory levels, optimize stock replenishment, and better forecast demand. This leads to better stockholding levels and lower carrying costs.

2.3.5 Reporting and Analytics:

Caction is a business platform that gives you powerful dashboard reporting and analytics tools. These resources allow business to monitor and utilize data driven insight in what key performance indicators (KPI) to maximize efficiency and to increase sales volume. Caction provides actionable analytics to help businesses make better decisions to improve the performance of the whole business.

2.4 Key Benefits of Caction's Product Suite

Caction's solutions deliver significant benefits across various aspects of business operations:

- **Increased Efficiency and Productivity:** Caction's software automates workflows and delivers real-time operational insights so businesses can perform more tasks faster, thereby increasing efficiency across operations.
- **Improved Customer Satisfaction:** Integrated tools for managing customer interaction and tracking service requests help businesses offer better, faster services and thus develop stronger customer relationships.
- **Sales and Revenue Growth:** Caction's solutions help businesses close sales faster, increase revenue, and transform sales pipelines, tracking leads and better managing the sales.
- **Cost Savings:** Caction uses task automation, resource optimization, and streamlined warehouse management to help businesses cut their operational costs and improve resource utilization.
- **Better Decision Making:** Caction's reporting and analytics capabilities help businesses find the answers they need, so they can make better data-driven decisions to improve performance.

Chapter 3

Workplace Details

3.1 My Responsibility

My first two months of my internship were spent as a Software Quality Assurance (SQA) engineer. As a part of this phase, my responsibilities were to test the software for bugs, perform regression testing on the software, and ensure that new features are to the company's quality standards. After two months I was shifted to Junior Software Development Engineer in my performance. It was a gigantic step, and it was a turning point in my internship, transitioning from working on the product to the building of new features directly. In this new role, I was involved in:

- Working on various features with other team members and designing as well.
- Independently developing performance metrics features for real-time data visualization.
- Working with frontend and backend teams to avoid any rough patch between the existing system and new feature.

This was a good transition from SQA to development because it let me learn software testing and software development in parallel, which has been a great help in my software engineer growth.

3.2 Organization Structure

The Caction works in a hierarchical organizational structure, with clearly defined roles and responsibilities at all levels. The structure of the company is such that it smoothens communication and so that one can have an efficient workflow among the company's core teams. Below is an overview of Caction's organizational structure:

- **CEO:** All the departments are run by the Chief Executive Officer (CEO), who makes strategic decisions in making the company go in the right direction. The CEO makes sure the company's mission and vision align with the company's goals and works with the CTO and other senior leadership to map out high-level priorities.
- **CTO:** Their function is to take care of the company's technology strategy and to supervise the development and involvement of all technical solutions. The software development team is led by the CTO to build software products in accordance with industry standards and in line with customer expectations.
- **Team Leads:** At Caction, each department has a Team Lead who is responsible for overseeing the direction of the team, managing day-to-day operations, and making sure that the departmental goals are aligned with the broader company goals. Team Leads for Software Development, Quality Assurance (QA), and Customer Support are critical to supporting their teams and reporting progress to the CTO and CEO.
- **Software Developers & Engineers:** At Caction, the Software Development Team includes Software Developers and Engineers who are responsible for writing code, developing new features, maintaining the company's software products, and making sure all technical specifications are met. Application design and process fit with QA to test new features and products to standards.
- **Quality Assurance Engineers:** QA Engineers at Caction do testing of the software, find bugs, and make sure that any new feature passes the company's

standards of quality. The QA team closely works with the developers and helps to receive feedback on the final product and eliminate errors and good work of the good product.

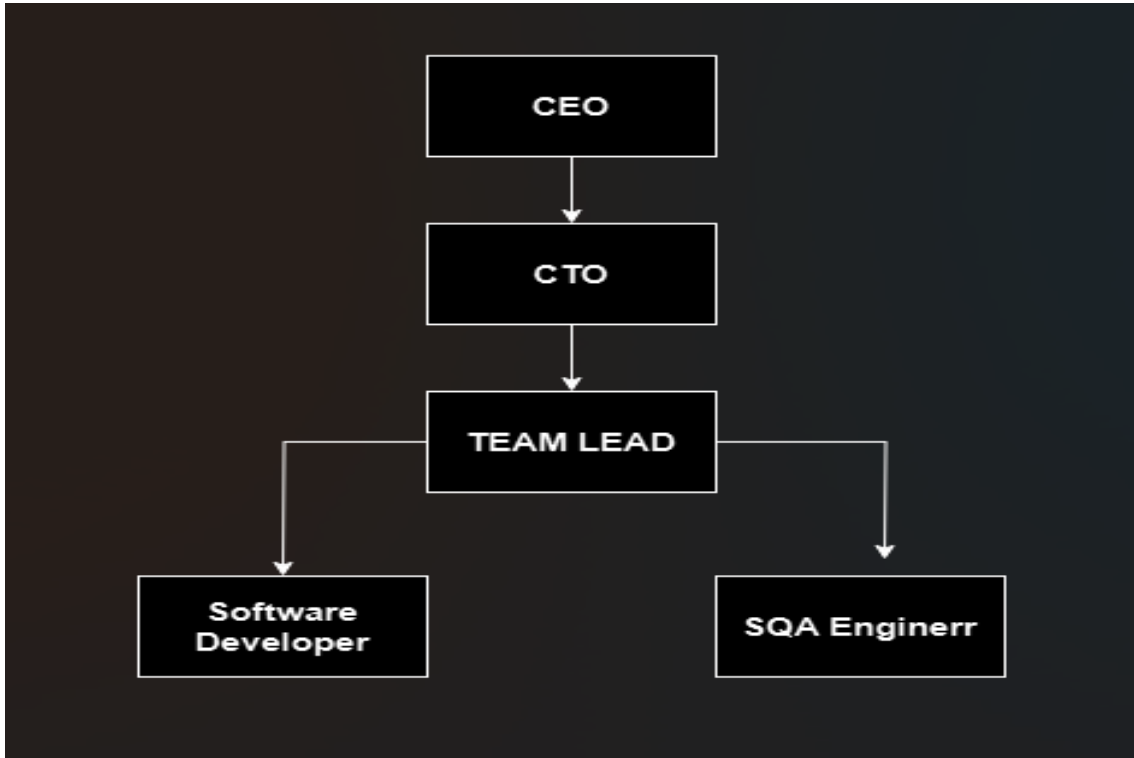


Figure 3.1: Organization Structure

This structure ensures that Caction can develop the technical aspects of products and offer quality assurance at the same time so products can be both innovative and reliable. Most of the time I worked with the software development team and the quality assurance team to build features, test them, and make sure all releases were of the highest quality.

3.3 Technologies and Frameworks

Caction's extensive software platform is a success due to the use of a highly available, elastic, resilient, and scalable technology stack. This technology stack guarantees such efficiency of this platform having large amounts of data and regular user interaction without downtime. Here are the core technologies and frameworks that power the platform:

- **Core Frameworks:**

- Laravel: Laravel is the PHP framework used for API development to create backend services and come with a full set of features to build scalable web applications.
- Vue.js: This is a front-end framework for building dynamic user interfaces. Vue.js makes it easier to develop reactive and efficient UIs for dealing with real-time updates in dashboard pages.
- Node.js: Within the platform, microservices are built using Node.js. It provides an efficient, non-blocking I/O operation, which makes it possible to build high-performance applications.
- Express.js: Express.js is another core part of the microservices architecture, a lightweight framework built on Node.js that's used to create robust back-end APIs.

- **Programming Languages:**

- PHP: In the backend services development, the primary programming language is PHP, more specifically Laravel if we are developing the API.
- JavaScript: JavaScript is used for building interactive web applications and for backend development as a core language.
- TypeScript: TypeScript is a tool that adds static typing and helps you with large-scale apps in JavaScript.

- **Frontend Languages:**

- HTML5, CSS, and SCSS: The structure, the design, and the layout of the web applications are created using the core technologies, which are to give you a responsive layout and a visually appealing experience to the users.

- **Scripting Languages:**
 - SQL: Querying databases, managing data relationships, and doing complex database operations are the purposes of using SQL.
- **Database Engines:**
 - MySQL: The primary database engine of the platform is MySQL, which is a reliable, high-performance relational database management system.
 - MongoDB: In some parts of the system, MongoDB is a NoSQL database that allows flexible, schemaless data storage.
- **Real-Time Notification Channel:**
 - One Signal: Push notifications are implemented using One Signal and allow for updates to users in real time for time-sensitive actions, for example, such as system alerts or user engagement.
- **API Testing Tools:**
 - Postman and Insomnia: Both of these tools are used for API testing and validation. Postman and Insomnia provide a great approach for testing and debugging RESTful APIs by sending requests and scanning responses.
- **Version Control:**
 - GitHub: Version control and collaboration happen on GitHub, and teams are able to revision, branch, and do pull requests to each other because of a working version control system, as GitHub is the primary platform for version control and collaboration.
- **Documentation:**

- Notion: For maintaining internal documentation, Notion is used so that there is documentation of development processes, project timelines, and technical specs that is easy to access.
- **Task Management:**
 - Jira: Task management and issue tracking in the team is taken care of by Jira. The tool can keep the team organized, assign tasks to the team, and can track the progress of the project.
- **Code Editors:**
 - Visual Studio Code and Sublime Text: Developers write code efficiently with these code editors; there are extensions, syntax highlighting, and version control integration.
- **Communication Channels:**
 - Discord and WhatsApp: These communication platforms are used to facilitate team collaboration by bringing together everyone to discuss and share relevant issues and updates via a space of this kind.
- **Development and Deployment Tools:**
 - Docker: In containerization, Docker is used to create isolated environments (test and deployment) for developers.
 - Amazon AWS: Amazon Web Services (AWS) is used to host and deploy programs, with the ability to scale up or down and to ensure high availability throughout the platform.

3.4 Remote Office

With Caction, they offered a flexible, portable remote work environment that allowed me to do my internship remotely. As I could attend classes at BRAC University and do my internship work, this flexibility was good for me. Through virtual

channels, the company made the open-door policy that remote workers could get help when they needed it.

3.5 Workspace Facilities

My internship took place remotely, but I had the chance to get to know company culture and different workplace facilities via virtual interaction and even once in a while team celebrations. Caction extends beyond the work-related and instead makes employees feel valued and connected even in a remote setting. Here's an overview of the office facilities and how they contribute to a positive and engaging work environment:

- **Snacks and Coffee Corner:** There's a little area in the office where employees can eat the snacks and have coffee. I wasn't in this corner in person while I was working remotely, but I didn't have to put my coffee break on pause—I was able to skip coffee breaks at my leisure while working from home or from a café.
- **Lunch Facilities:** The company also tends to feed its employees lunch to encourage a sense of community. Since I was working from Bangladesh, I didn't have access to the office lunch facilities but enjoyed the flexibility of working from home and having the option of eating in local cafés for lunch or during breaks, making my own.
- **Indoor Games:** Indoor games are offered by the office to help employees relax. I didn't have the pleasure to enjoy these amenities myself, but I could feel the sense of relaxation these amenities bring to the physical office environment, and that helped to build the positive workplace culture.
- **Birthday Celebration:** And on the 18th of August, the virtual celebration for my birthday was one of the great memorable highlights of my remote internship. We cut a cake in the office and sent me some warm wishes virtually.

It's a great feeling to join the celebration even though I couldn't be physically present; the thoughtfulness and spirit of teamwork shared in those video calls made me feel appreciated, and I felt connected to my colleagues.

- **Achievement Celebrations:** To celebrate success, the company goes for having casual treats like getting KFC or McDonald's for a special day. While I didn't get to attend these events, the idea behind them made me feel that the culture at Caction is supportive.
- **Iftar Party:** Caction had an Iftar party in the office during Ramadan. Although I was working remotely, the company did their part by covering my expenses so I could enjoy an Iftar meal at any restaurant in Bangladesh. The geographical distance did not prevent me from feeling like a part of the team.



Figure 3.2: Iftar In office



Figure 3.3: My iftar in Bangladesh

- **Relaxing Lounge:** There is a relaxing lounge in the office where employees can have a break during a jam-packed day. While I couldn't actually see this for my own eyes, since the company makes an effort to create a comfortable and stress-free working environment, I still have much more appreciation towards the company culture.

3.6 Conclusion

Working for Caction from home allowed me to maintain a nice work-life balance. While at times it was hard, having the ability to work from university, cafes, and even while on the road meant it was easier to balance my internship alongside study. The environment where the company operates and the celebration of important events such as birthdays and Iftar were enjoyable and much appreciated.

Chapter 4

My Work

4.1 Work Overview

Primarily, I worked on a key feature called the Performance Metrics Feature, as requested by Hyundai Elevator Co. Ltd. during my internship in Caction. This feature is designed to enhance the business insights for Caction's clients along with Hyundai Elevator Co. Ltd.[3] through real-time data visualization. This feature aimed to provide users with a customizable dashboard that tracked key performance indicators and visualized data in a user-friendly interface.

For this feature, I selected the **Rapid Application Development** (RAD) methodology in order to meet tight deadlines by Hyundai Elevator Co. Ltd. If traditional Software Development Life Cycle (SDLC) focuses on delivery within a specific time-frame, RAD is all about delivering it quickly and, thus, using constant feedback with iterative improvement on the way. In this feature, I took care of frontend and backend development separately and combined the real time data, interface user friendly development and providing a backend support for updating dynamic data. This feature gave me the opportunity to apply my knowledge of Vue.js for frontend development and Laravel for backend development, as well as learn new technologies and refine my coding skills.

4.2 RAD Methodology

By using RAD methodology[4], I was not only able to deliver the product faster, but I was also able to refine my design and build process. The RAD process for this project was broken down into several key phases:

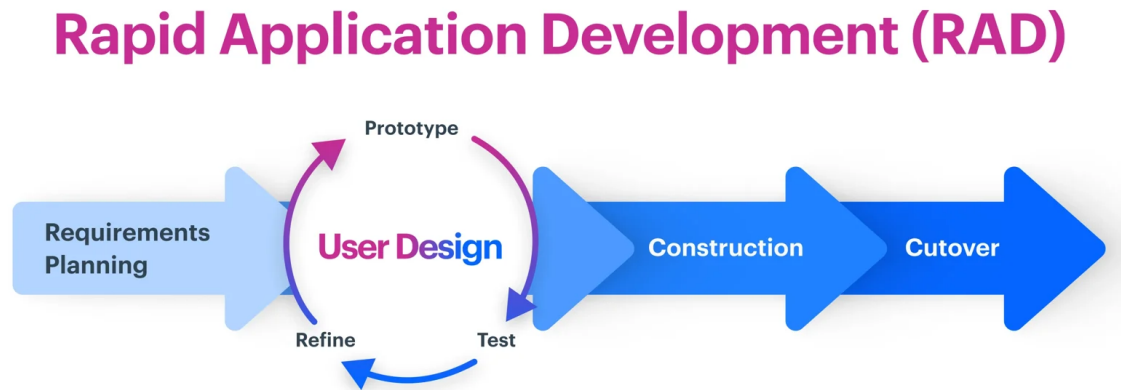


Figure 4.1: Rapid Application Development

- **Requirements Planning:**

- The first phase of this project consisted of gathering and analyzing business requirements by meeting directly with the stakeholders, which are the people working at Hyundai Elevator Co. Ltd.
- Through interviews and collaborative sessions key performance metrics and functional needs were identified.
- These requirements were provided with a clear foundation for the project's design in a structured documentation.

- **User Design:**

- During this phase we used iterative prototyping to create an intuitive and resilient user interface for Performance Metrics feature.
- With Vue.js we were able to create dynamic UI components and user feedback was critical for refining the design.

- To represent the system’s workflows and align the features with the user needs, I have created use case, activity, ER and class diagrams.
- **Rapid Construction:**
 - This phase was when I developed the backend with Laravel to make it easy to integrate with the existing Caction system.
 - We used the Agile approach, with several sprints built around building, testing and refining individual modules.
 - Since the approach was modular, we were able to test and churn the frontend (Vue.js) and backend (Laravel) parts continuously to optimize for performance.
- **Cutover:**
 - In the final phase, cutover, the Performance Metrics feature was deployed into the production environment.
 - The last phase (but not least) was final testing, UAT, and training so the new users were comfortable with the new functionality.
 - Given priority were smooth integration into the system they already have and feedback they gathered during this phase point out challenges for the future.

By applying this approach we were able to meet time constraints and deliver a functional and high quality product with the help of RAD’s iterative process and its development driven by feedback.

4.3 Work Analysis and Design

The **Performance Metrics Feature**’s analysis phase involved a meticulous examination of the requirements presented by Hyundai Elevator Co. Ltd., particularly focusing on the urgency and alignment of the Performance Metrics feature with

broader business processes. The analysis phase also employs various methodologies, such as SWOT analysis and stakeholder interviews, to ascertain the precise requirements and potential challenges. Depending on the analysis, I came up with a **activity diagram** and **Class diagram**.

4.3.1 Activity Diagram

The Activity Diagram represents the detailed workflow of the Performance Metrics feature, starting from pre-existing user login, where the user's role is checked to determine if they are an admin, sub-admin, or employee. Depending on their role, the user can proceed to two main components: the **Dashboard Settings Page** and the **Dashboard View Page**.

- **Explanation:**

- If the user has admin/sub-admin rights, they can either create a new group, edit an existing group, or delete a group. Upon creating a group, they add a group name, assign group members, and save the configuration.
- Once groups are set up, the user can manage charts by either creating new charts, editing existing charts, or deleting charts. During chart creation, domain selection and chart configuration are done before saving.
- This page displayed the selected metrics in the form of interactive charts and graphs.
- The frontend had to dynamically render these visualizations based on the metrics configured in the settings page, ensuring a real-time, smooth user experience.
- The Dashboard View provides functionality to apply filters (date/user) and edit chart alignment.
- Finally, the user can log out of the system.

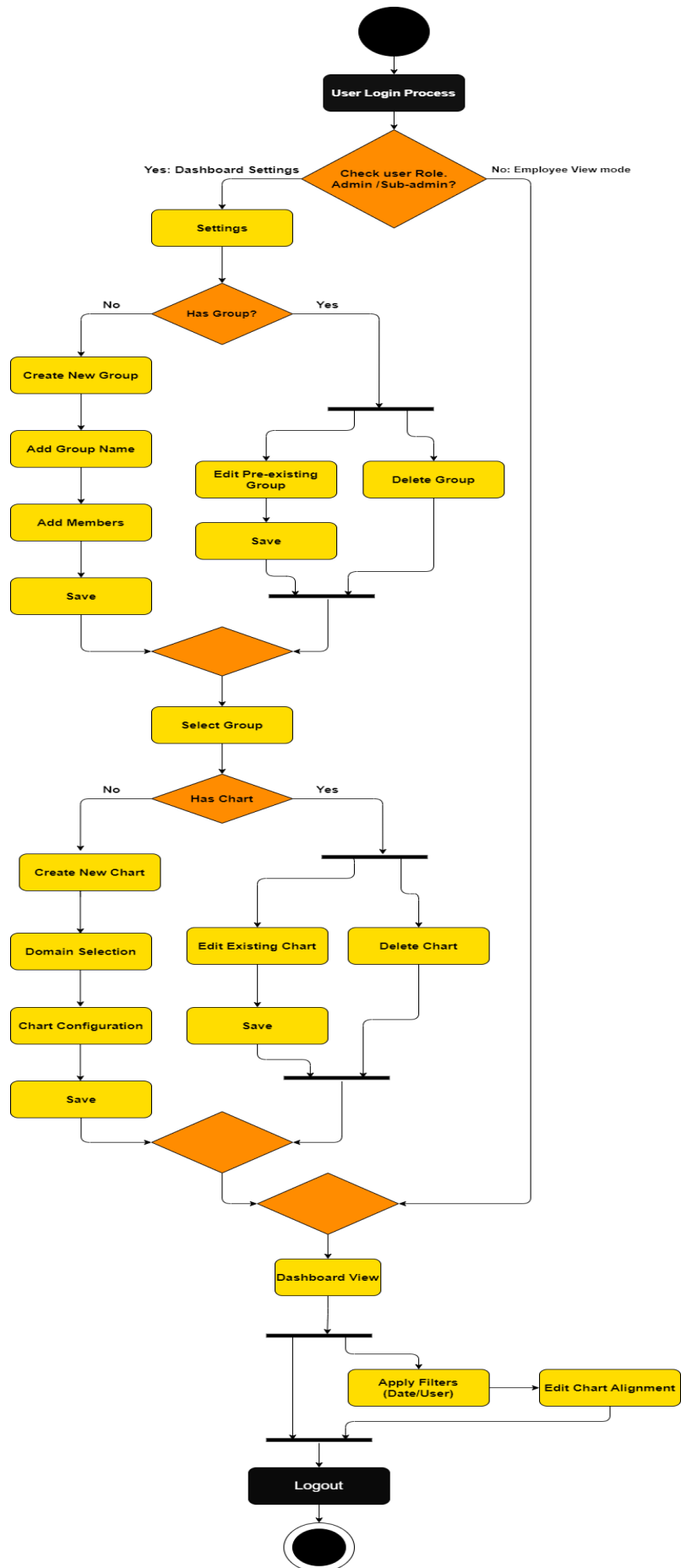


Figure 4.2: Activity Diagram

4.3.2 Class Diagram

The class diagram of the Performance Metrics feature showing structure and operations of classes in the feature with their attributes, Methods and relationships to other classes in the feature.

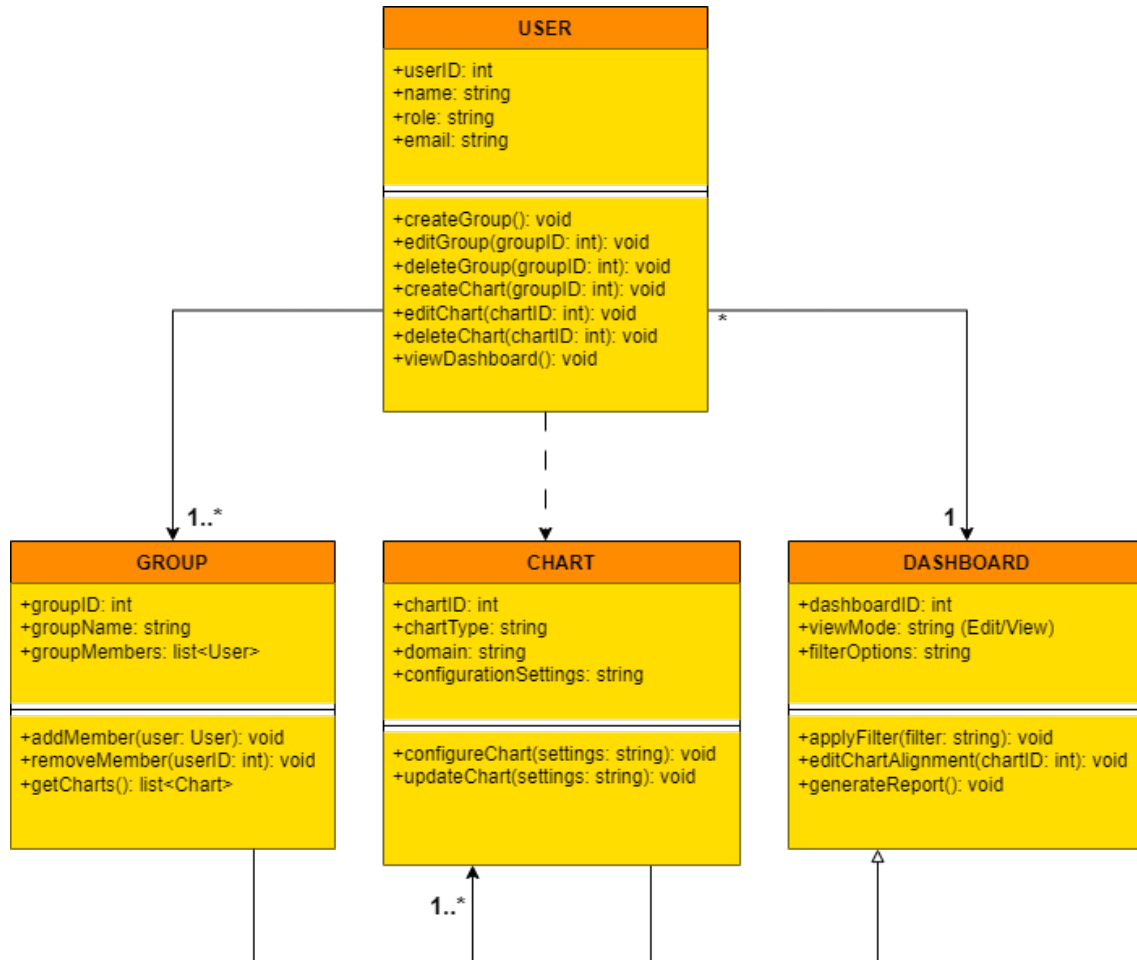


Figure 4.3: Class Diagram

Explanation of the Components:

- User Class:
 - Attributes: user_id, name, role, email.
 - Methods: Creating, modifying or deleting groups and charts and viewing the dashboard.
- Group Class:

- Attributes: `members`, `group_id`, `group_name`.
- Methods: Retrieve charts any group can represent, add or remove members.
- Chart Class:
 - Attributes: `domain`, `settings`, `chart_type`, `chart_id`.
 - Methods: Set up and change chart settings.
- Dashboard Class:
 - Attributes: `View_mode` and `filter_options` are also passed, in addition to `dashboard_id`.
 - Methods: You can work with applying filters, modifying its alignment or generating the report.

Relationships Between the Classes:

- User to Group: A relationship of one user to many groups, a single user can belong to many groups.
- Group to Chart: It is a one to many relationship, where you can have many charts under one group.
- Dashboard to Charts: Enables aggregation of multiple charts for displaying together on a single interface.

The diagram detailedly describes classes, their attributes and methods relationship in order to implement the Performance Metrics feature.

4.4 Development

4.4.1 Dashboard Settings Page

Create Group: Admin/sub-admin can create group.

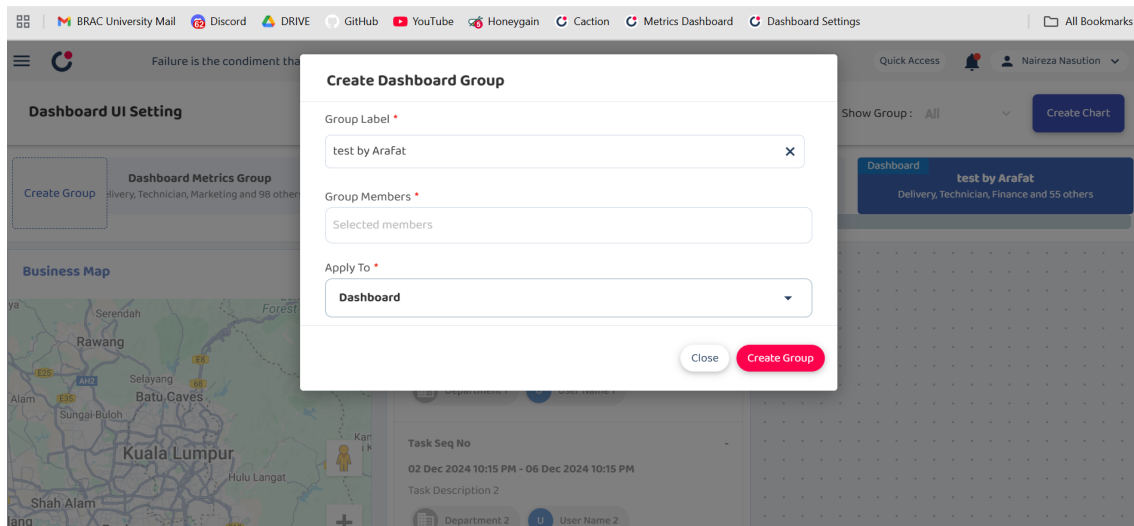


Figure 4.4: Creating Group

Edit Group: Admin/sub-admin can Edit group.

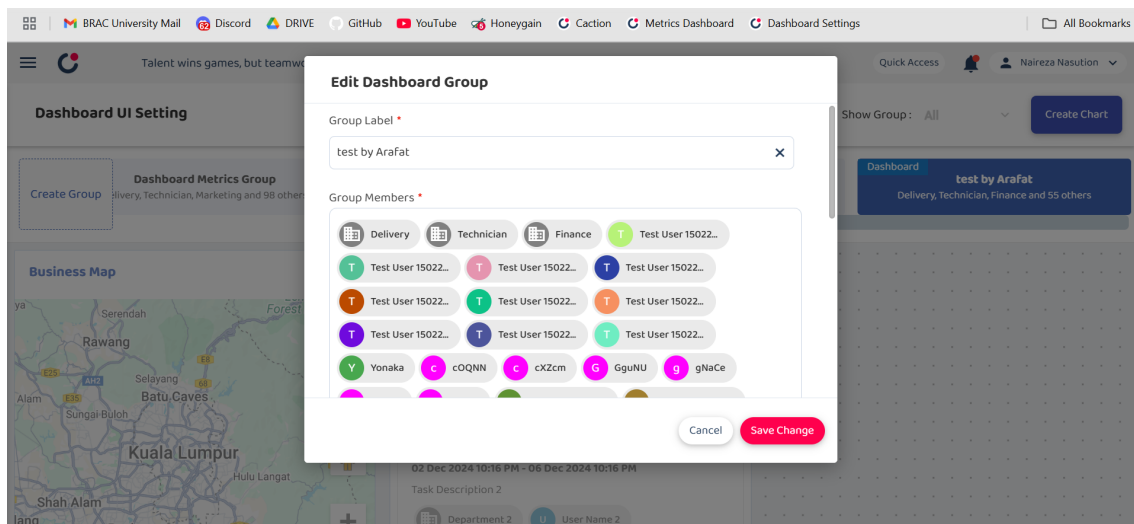


Figure 4.5: Editing Group

Create and Edit Chart: Admin/sub-admin can create and edit charts inside group

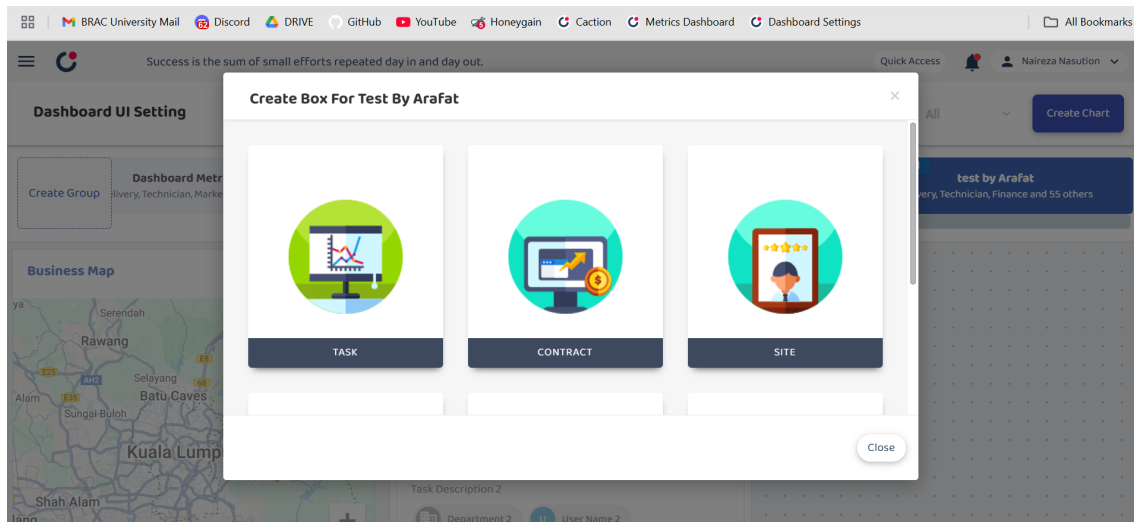


Figure 4.6: Creating Chart



Figure 4.7: Selecting Chart Type

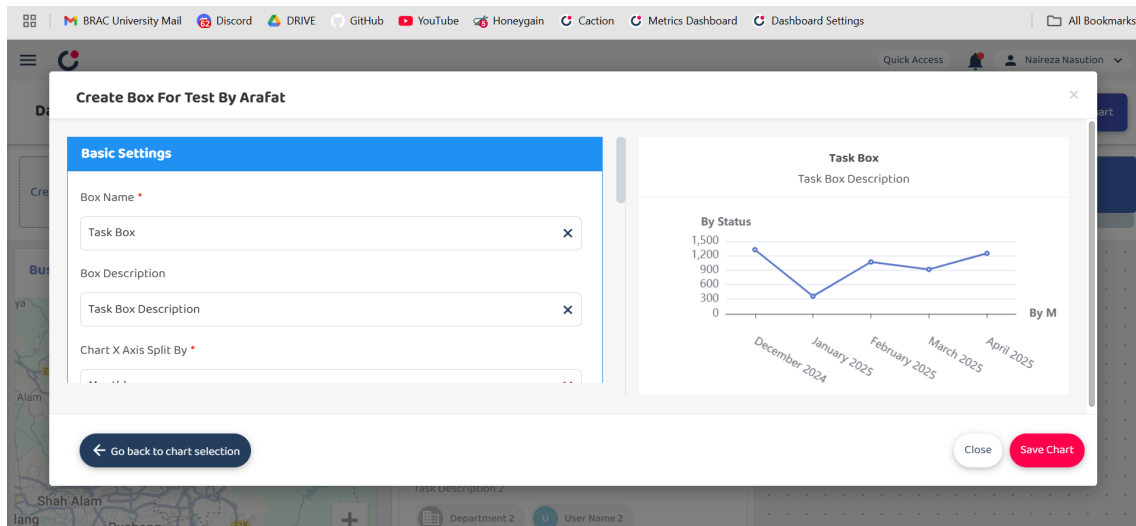


Figure 4.8: Selecting Domain Type

Delete Group/Chart: Admin/sub-admin can Delete existing groups and charts.

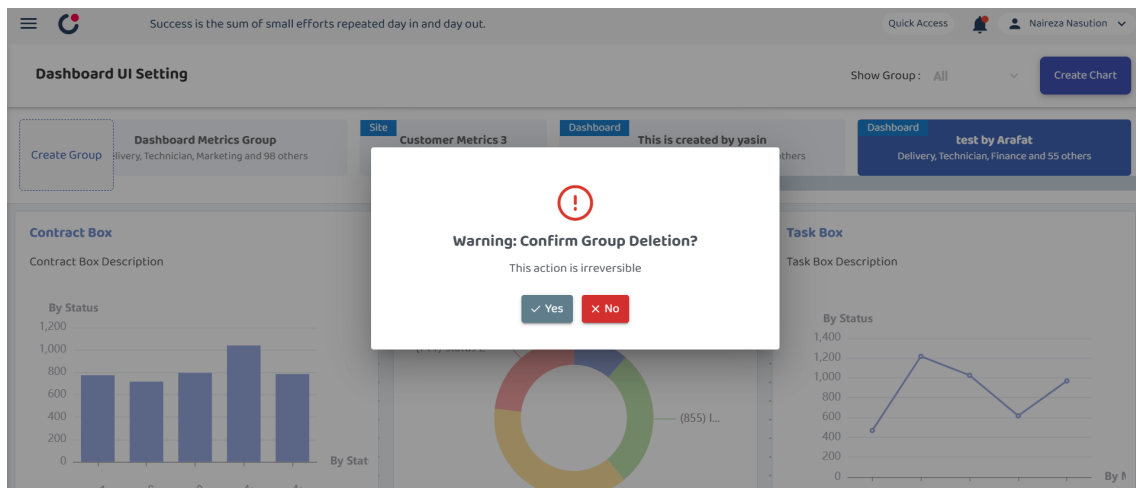


Figure 4.9: Deleting Group

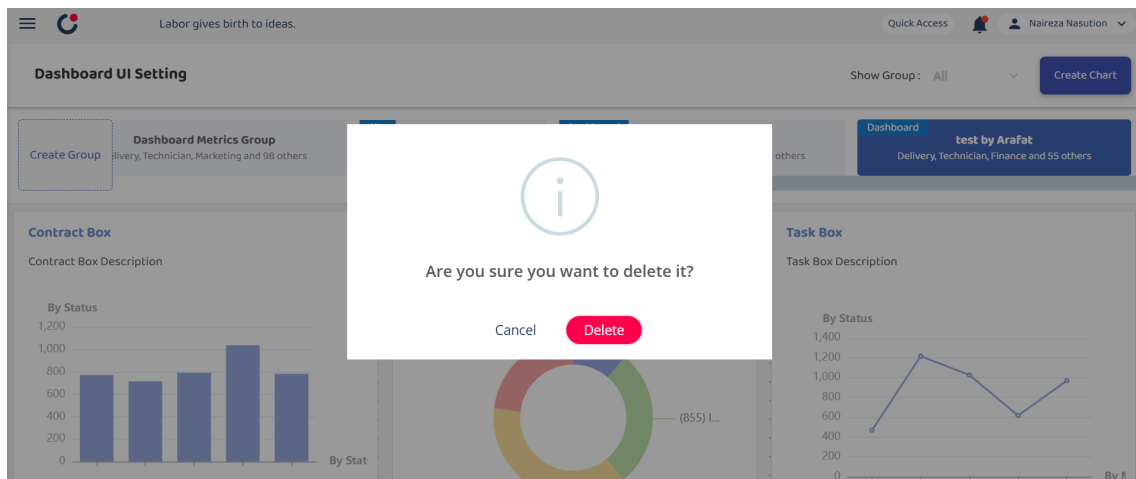


Figure 4.10: Deleting Chart

4.4.2 Dashboard View Page

In Dashboard view page users can view charts in group using filters and more.

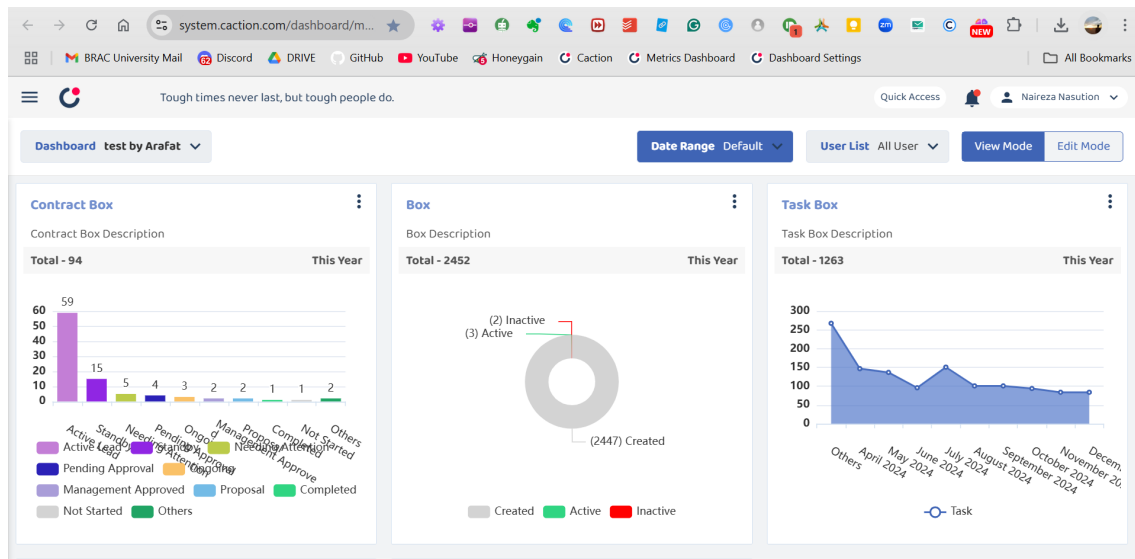


Figure 4.11: Dashboard View Page

4.4.3 Frontend Development

- Developed the **Dashboard Settings Page** and **Dashboard View Page** using **Vue.js**.
- Created dynamic forms and components for the settings page, allowing users to select which metrics to display and track.

4.4.4 Backend Development

- Built the backend using **Laravel**, developing **APIs** to fetch real-time data and handle user requests.
- Integrated **MySQL** for data storage and retrieval, ensuring seamless data handling for the dashboard's metrics.

4.5 Challenges

The development of the Performance Metrics feature came with several challenges that tested my problem-solving skills and technical knowledge:

- **Tight Deadlines:** Since I worked independently, I had a certain amount of time to distribute for meeting the deadlines. For this one, it means setting clear goals, making priorities of tasks, and working up to the mark in compression.
- **Integration Complexities:** The biggest challenge was to make the new "Performance Metrics" feature, part of the Caction business management system, work flawlessly with existing modules without affecting other functionalities on the backend. To be able to scale and integrate with a large number of endpoints, the feature was built on the Laravel framework. Due to Laravel's great API capabilities, I could easily communicate with the other system components, and the Vue.js frontend helped me to integrate dynamic and responsive user interfaces for the interactions with the backend.
- **Changing User Requirements:** The requirements for the dashboard were always updated several times throughout the development process. Tricking these changes without having any adjustments to the project timeline was actually quite workable as long as you have good communication and time management.
- **User Experience Optimization:** The biggest hurdle of this project was making the dashboard work while still making it intuitive and easy to use. To do that, I iterated over the design to make the interface as user-friendly as possible without compromising the data being presented clearly and understandably.

Chapter 5

Growth

Besides that, Caction gave me an opportunity to grow technically, professionally, interpersonally, and personally. Some of the challenges in implementing the Performance Metrics feature are discussed in relation to the challenges resolved on the road towards scrum by the teams working on this feature. In this section I am also talking about the things that I had grown with this project as a software engineer.

5.1 Professional Growth

5.1.1 Office Environment

Even though my job was remote, I was still a part of the company because that's how the company worked, and I did get to experience some of the work environment that was offered. With Caction's open communication culture and supportive and collaborative virtual atmosphere, I felt integral to the team. Since the company has been very much focused on employee engagement on the emotional side, I participated in all of these things that we had, like birthday anniversaries and Iftar events, so that kept me connected with the people around me because of the distance. Working from home was flexible, but having a team also gave me the needed structure, which helped me thrive and learn in a place that was supportive and motivating.

5.1.2 Teamwork

The delivery of the Performance Metrics feature was only successful because of the collaboration between development and quality assurance teams. I was working on the feature independently but communicating all the time via Discord and Zoom with the team. My co-supervisor and peers were providing me regular feedback that led me into the refining of my approach and also made sure I was within our team expectations. I worked remotely, and as a result, I gained specialized insights into how to be a part of a team when working remotely and how to actively participate in virtual meetings, still contributing meaningfully despite working in isolation.

5.1.3 Time Management

A remote internship coupled with university classes was, in fact, a huge challenge, but it taught me how to juggle things. I learned quickly about how to prioritize your work, break big projects into small tasks, and reserve the time between academic commitments and work deadlines. By being required to manage multiple responsibilities, I learned how to remain organized and proactive with my work while taking the needed steps to solve any challenges without harming the quality of that work. Software development is a fast-paced job, and the fact that software is built under tight deadlines reinforced my ability to manage time well.

5.2 Technical Growth

5.2.1 Frontend

When I did my internship, I built the frontend of the Performance Metrics feature using Vue.js to construct dynamic and interactive dashboards. I got good at building responsive UIs, data viz, and integrating real-time data into the frontend interface. With Vue.js' component-based architecture, it helped me manage creating modular and reusable components, which was a big boost in managing my efficiency. I also

picked up some best practices related to state management and frontend optimization to make sure the dashboard was both performant and user-friendly.

5.2.2 Backend

For the backend, I made use of Laravel in order to write the API endpoints that serve as the middleman between the Vue.js frontend and the database. I had hands-on experience in RESTful API development and made sure data was served properly and securely. I was able to interact with the database and confidently and easily handle relationships between some of our entities. This helped our development process flow pretty smoothly. I got to learn more about backend architecture, how to handle data, and the importance of API optimization for real-time applications from this.

5.2.3 Git

During the development process, I have been using Git for version control and have been collaborating with other developers with GitHub. I used Git in a very practiced way: how to manage branches properly, solve merge conflicts, and follow some Git best practices, like writing nice commit messages and committing often. Then Git became an indispensable tool to manage my workflow, and I could track my changes and easily integrate my changes in the main codebase. I also got some feel for pull request management and code review; this helped to make code better and more maintainable.

5.3 Interpersonal Growth

5.3.1 Questioning

Throughout my internship, I began to become more comfortable with asking questions and questioning things when I didn't understand or I hit a roadblock. To start with, it took me time to ask for help as my internship started, but as I gathered

more confidence in my role, I understood how critical it is to clear your doubts early. For whatever I was working on—whether it was technical issues or project requirements—knowing what questions to ask engaged me further in the project and made me a better contributor.

5.3.2 Logical Argument

When I was interning, I was told to defend my technical decisions and to join the discussion. Whether it was design choices or implementation approaches, I learned to build logical arguments based on facts and evidence. It helped me to articulate ideas better and to justify decisions with good reasoning, which is important in the tech industry if you wish to grow. This increased my confidence for presenting solutions and ideas to the team because of my ability to argue logically and to be persuasive.

5.4 Personal Growth

5.4.1 Working Independently

More likely, working independently was one of the most significant personal growth experiences I got from my internship. Being provided with the task of having to develop the Performance Metrics feature by myself taught me how to deal with my workload, find my own solutions, and take on responsibility for delivering the project on time. My skills in problem solving improved tremendously while working independently; not only did I learn to trust my own judgment, but I also learned how to make decisions confidently.

5.4.2 Handling Uncertainty

The challenge presented was rapidly changing requirements and tight deadlines, which caused numerous moments of uncertainty. I figured out I can just embrace this uncertainty and stay flexible. I learned to cope with evolving user requirements

and changing technologies and keep my cool under pressure and adjust workflow accordingly. What I learned was, with this experience, how to accept ambiguity and to meet challenges with a solution mindset.

5.4.3 Remote Work Communication

The challenge was how to keep good communication when working remotely, especially in a virtual context. But I picked up skills in how to communicate effectively using WhatsApp, Discord, Jira, Zoom, and GitHub, which enabled us to work in real time and provide feedback for each other. I started being more proactive about reporting progress, requesting feedback, and providing progress updates to those who mattered—my supervisor and team members. Working on this experience helped me to work on my own but still in sync with the team and the larger project goals.

5.5 Professional Networking and Mentorship

During my entire internship, I got a chance to meet people experienced in the software development field. My growth had a lot to do with mentorship, and my co-supervisor, Mohammad Yasin, was a huge help who gave me lots of guidance and feedback along the project. His understanding of technicality and career stuff associated with being in software development was awesome, and also regular meetings and check-ins made sure I stayed focused on improving my profession. Also, thanks to team members working on other areas, I also built my professional network, learnt from their experiences, and saw how different technical approaches drive products forward.

Chapter 6

Conclusion

6.1 Conclusion

Interning at Caction has been a transcendental and enriching experience where I've grown both professionally and technically. Working on the Performance Metrics Feature independently, while juggling my university commitments, I was given the opportunity to practice handling complex technical tasks, meeting deadlines, and producing high-quality work under pressure.

What I especially gained from these challenges were tight deadlines, integration complexities, and ever-changing user requirements, which made me hone my problem-solving skills and gave me technical capabilities going into future software development careers. While working remotely was different than working in the office, I learned lessons about how to be self-disciplined with time management and how to effectively communicate, and I know these skills will serve me well in my career. The internship offered me an opportunity to network with professionals in the industry and get mentored by my co-supervisor and other senior developers. All of this exposure has helped me to understand more clearly what the realities of the software industry are, as well as how to tackle technical challenges.

6.2 Recommendations

Caction should continue to have a place for interns to work on both SQA and development roles, and I would recommend that. It opens up a broad skill set to know about the software development lifecycle much more deeply. Additionally, clearer, more structured communication with the feature requirements given from the start helps to minimize last-minute changes and overall development. Lastly, interns would also be given even more valuable insights into other areas of the software development process through more mentorship sessions and encouraging cross-departmental work. I would definitely recommend this company to anyone that is interested in doing an internship in a good place and learning something new from some awesome leaders.

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