Report On

Internship as a Software Engineer

By

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17301179

An internship report submitted to the Department of Computer Science and Engineering
in partial fulfillment of the requirements for the degree of
Computer Science and Engineering

Department of Computer Science and Engineering
BRAC University
22nd January 2024

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Declaration

It is hereby declared that

1. The internship report submitted is my/our 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/We have acknowledged all main sources of help.

Student's Full Name & Signature:

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Muhammad Tahsin Amin
17301179

Supervisor's Full Name & Signature:

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Muhammad Faisal Ahmed
Lecturer, Department of Computer Science and Engineering
BRAC University

Letter of Transmittal

Muhammad Faisal Ahmed
Lecturer,
Department of Computer Science and Engineering BRAC University
BRAC University
Kha 224 Pragati Sarani, Merul Badda, Dhaka 1212

Subject: Internship as a Software Engineer

Dear Sir,

This email is to inform you of the completion of the report on "Internship as a Software Engineer" which was assigned to me during my internship as a Software Engineer at W3 Engineers Ltd.

I have endeavored to compile a comprehensive report with essential data and relevant recommendations. I believe it presents the information in a concise and informative manner.

I trust that the report will meet the desires.

Sincerely yours,

_____

Muhammad Tahsin Amin
17301179
Department of Computer Science and Engineering
BRAC University
Date: January 21st, 2025

Non-Disclosure Agreement

This agreement is made and entered into by and between W3 Engineers Ltd. and the undersigned student at BRAC University…… Tahsin …….

Executive Summary

In the current information age, novel ideas are consistently emerging, many of which are available on the internet to enhance business prospects when there is a correlation. Consequently, it is imperative for a company to establish a significant online presence within the market. Fortunately, our firm has recently undertaken a project from a client, focusing on the development of an insurance website named 'Bike Insurance.' This project encompasses crucial pages including user information, dashboard, onboarding, payment record, and a payment gateway.

Keywords: Insurance Website; Web Development; User Interface; User Experience

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List of Acronyms

W3	W3 Engineers Limited

Chapter 1

1.1 Problem Statement

I was assigned to a new project, and the focus of the project was related to insurance. While the overall project was deemed simple, there were additional complexities specifically associated with the UI. We received a design from the client that required implementation. In response to this, our managers instructed us to conduct a brainstorming session. During this session, we thoroughly reviewed the design and compiled a list of questions to address with either the client or the manager.

1.2 Problem Statement

I compiled some crucial points for discussion:

1. Clarification on the limit for adding list items in the specified feature.
2. Recognition of the absence of tablet and mobile designs despite the complexity of the overall design, as the provided design only covers desktop.
3. Identification of specific pages lacking a clear redirection method to other pages, such as a missing homepage link from certain page layouts.
4. Uncertainty regarding the destinations of call-to-action buttons in some instances. Noting the absence of a homepage in the provided design.

Throughout this process, I also deliberated on strategies to achieve each design requirement, determining the suitable implementation for various elements. This involved visualizing transitions between features and assessing which technology stacks could facilitate the desired outcomes.

1.3 Project Objectives

At the conclusion of this internship, my goal is to finalize the application with the following key functionalities:

1. Implement a comprehensive dashboard presenting all enlisted Bikes and payment information tailored to the logged-in user.
2. Develop an onboarding form featuring multiple steps, characterized by a sophisticated and userfriendly UI

Chapter 2 Literature Review

Bike Insurance, an insurance company, has entrusted us with the creation of their website. The development involves utilizing micro frontends for the user interface, a database for storing user information, and Stripe integration for seamless payment transfers.

Key features of the website include

1. Onboarding:
    a. A pivotal component of the site, the onboarding process is a multi-step form where users provide information about themselves and the Bikes they intend to register. Completion of this process leads to a payment gateway for the initial payment.
2. Dashboard:
    b. Users access a comprehensive dashboard where they can view payment records, manage their profiles, and access Bike information. Admin privileges enable administrators to review payment history, provide discounts, and update specific sections of the form.
3. Authentication & Static Pages:
    c. Standard authentication features including Sign in, Sign Out, and Sign Up are implemented. Additionally, the site includes various static pages for enhanced user experience.

Chapter 3 Work Plan

Bike Insurance is primarily a client project that entered the development phase while still in its ideation stage. Recognizing the inherent uncertainty and potential for significant evolution in project requirements, we understood the need for a flexible approach. Consequently, the decision was made to adopt Agile methodologies for our Software Development Life Cycle (SDLC). Agile is particularly well-suited for projects characterized by evolving or unclear requirements, providing a framework that facilitates frequent client feedback and allows for timely adjustments.

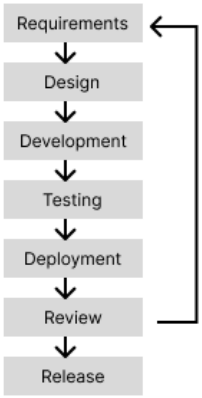

Figure 1: Agile Methodology

Chapter 4 Work Flow

The initial requirements analysis involves a thorough study and analysis of the provided information to discern aspects such as project flow, potential faults, and areas of confusion. This preparation is crucial before engaging with the client. In our team's approach, only the project lead and I will participate in the client meeting. I have been assigned the responsibility of understanding the UI aspects of the project and formulating any pertinent questions for discussion during the meeting.

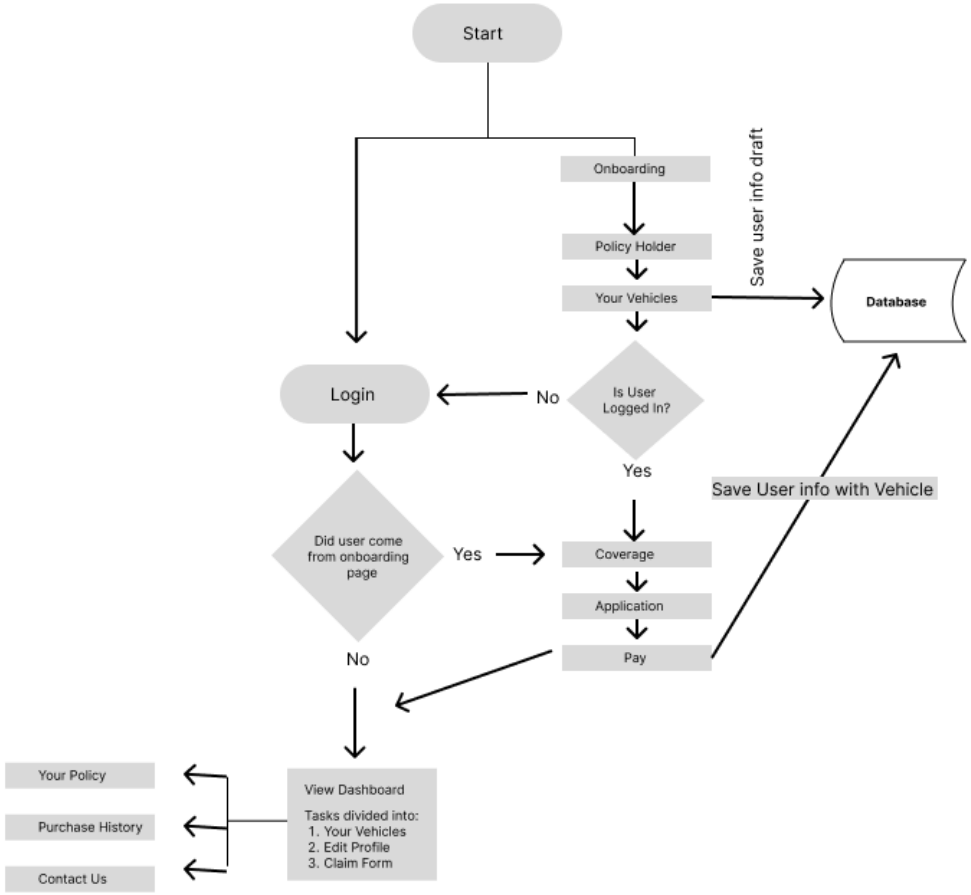

Figure 2: Work Flow

Chapter 5

5.1 Week 11: Research, Sprint Planning, Brainstorming, Meetings

Embarking on a new project within the same team, this initiative focuses on insurance with an added layer of complexity in the UI. The client has provided us with a design to implement, and our managers have emphasized the importance of a thoughtful and comprehensive brainstorming session. This phase is pivotal, as it influences critical aspects like data structure, UI implementation, staffing requirements, payment terms, project delivery duration, and database design.

Key points identified for discussion include:

1. Clarification on the limit for adding list items in the specified feature.
2. Noting the absence of tablet and mobile designs despite the design's complexity, which has implications for UI responsiveness.
3. Identifying specific pages lacking a clear redirection method to other pages, such as the absence of a homepage link from certain page layouts.
4. Uncertainty regarding the destinations of call-to-action buttons in some instances.
5. The absence of a homepage in the provided design.

In addition to addressing these points, considerations include devising strategies for each design aspect, determining the appropriate use of tools, visualizing transitions between features, and selecting technology stacks.

Additionally, I have been tasked with creating a project setup, utilizing another project as a base and updating it. This approach ensures the incorporation of essential pages, the design for which was not provided, such as the Authentication page and its functionalities, the Navbar, and its associated functionalities. This method streamlines the development process a leverages existing components for efficiency.

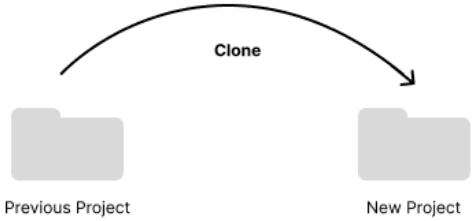

Figure 3: Cloning from one project to another to get reusable code

In addition to my responsibilities, I was tasked with revisiting the given technology stack to check for any updates or new versions. Recognizing the dynamic nature of the tech landscape, this practice ensures that we stay current and avoid falling behind.

Moreover, I took on the challenge of implementing the dashboard design. However, during the implementation process, I encountered a realization of the gaps in my knowledge, particularly concerning finer details:

1. The Sidebar's height requirement conflicted with the conventional approach, as it was expected to span the entire device height, not just the content height.
2. The content beside the Sidebar was occupying excessive space, despite having ample empty space available.
3. I needed to explore different layouts to accommodate diverse types of pages efficiently.

While reviewing tasks, I identified a potential issue with the layout being stored in a non-conventional folder. Addressing this now prevents potential challenges in the future.

Several improvements were made, including adding a favicon with the brand icon, decluttering code from previous projects in the new codebase, and introducing a basic footer to avoid an empty appearance.

Continuing with the implementation, I worked on both the Dashboard and Onboarding designs. The Dashboard features a form, while the Onboarding process involves a stepper form—a task I had long wanted to tackle.

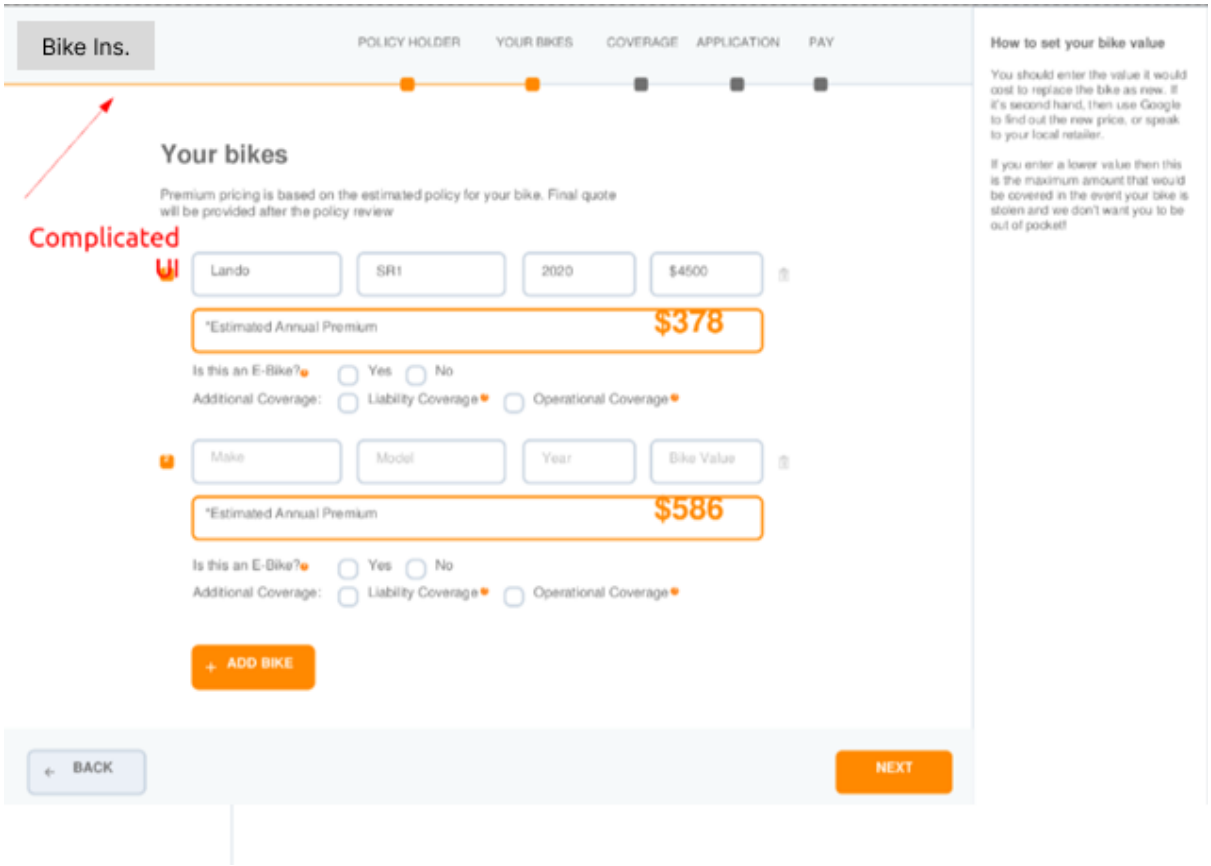

Figure 3: The progress bar which is the complicated UI part in the whole design

5.2 Week 12: Repo Clone, clean up unnecessary files & Polish UI by adding Components

I was assigned the task of cloning the previous repository, eliminating unnecessary files, and refining the user interface by incorporating additional components. I successfully completed the development of several pages, including Sign in, Sign Up, Forget Password, and Reset Page. Notable adjustments were made to the Navbar, displaying the Sign In button when a user is not authenticated and a profile icon when authenticated. Throughout this process, I

systematically replaced the previous theme color with the current theme color across all relevant components.

Additionally, I conducted an extensive review of packages available on NPM, a package manager for the JavaScript programming language. NPM allows the sharing of code within the programming community for reuse. For our project, I utilized source code that facilitated the management of form inputs, requiring some self-study on Formik.

The primary focus was on cleaning up files and implementing the user interface. Ongoing tasks include code refinement, content addition, and continued UI implementation. Periodically, I also delved into form packages. Given that our project involves a white-label service, I introduced a feature that dynamically takes the color from the admin user and applies it to the header and loading animation.

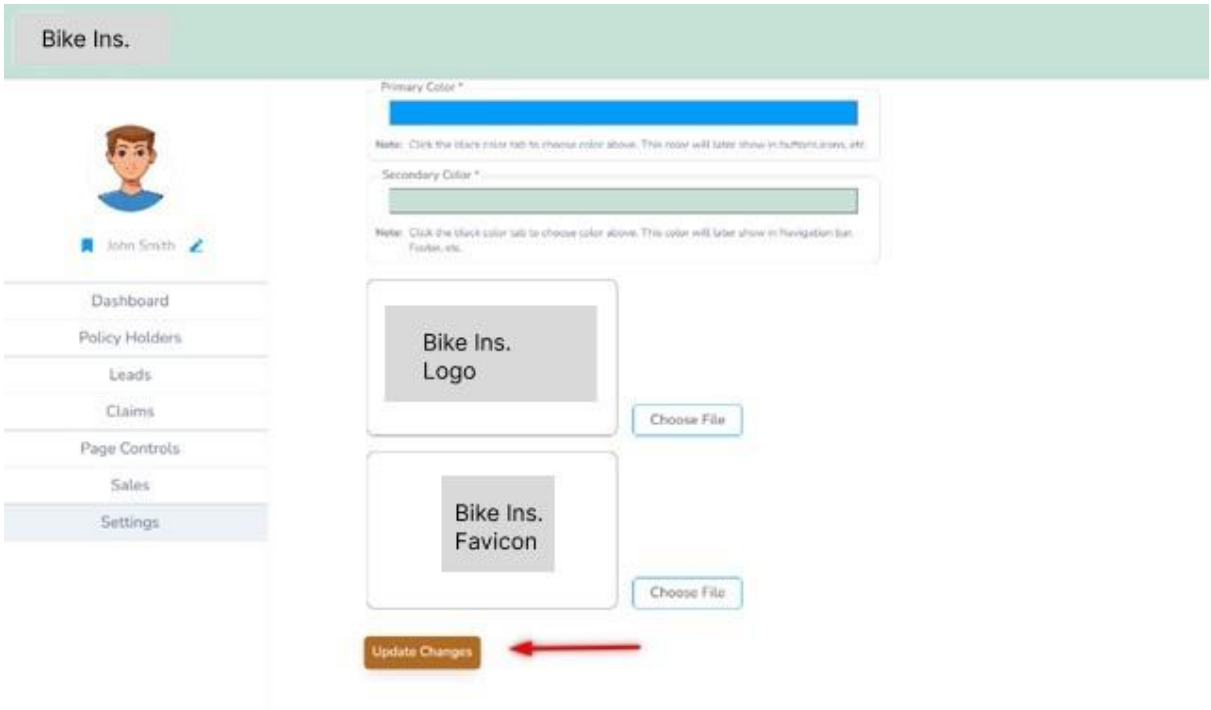

Figure 4: White Label solution. Here the logo, favicon and theme color are changeable

5.3 Week 13: UI Design completion & R&D on Stepper Form

This week, I was tasked with initiating the implementation of the stepper form UI, a challenging aspect of the design pages. In the quest for a suitable package featuring the stepper functionality, I concurrently designed the features for each step.

I successfully completed the design for the Coverage section, Application section, and Pay Section, specifically tailored for desktop devices. Despite encountering an issue in the Tabs section, I was able to resolve it and ensure completion.

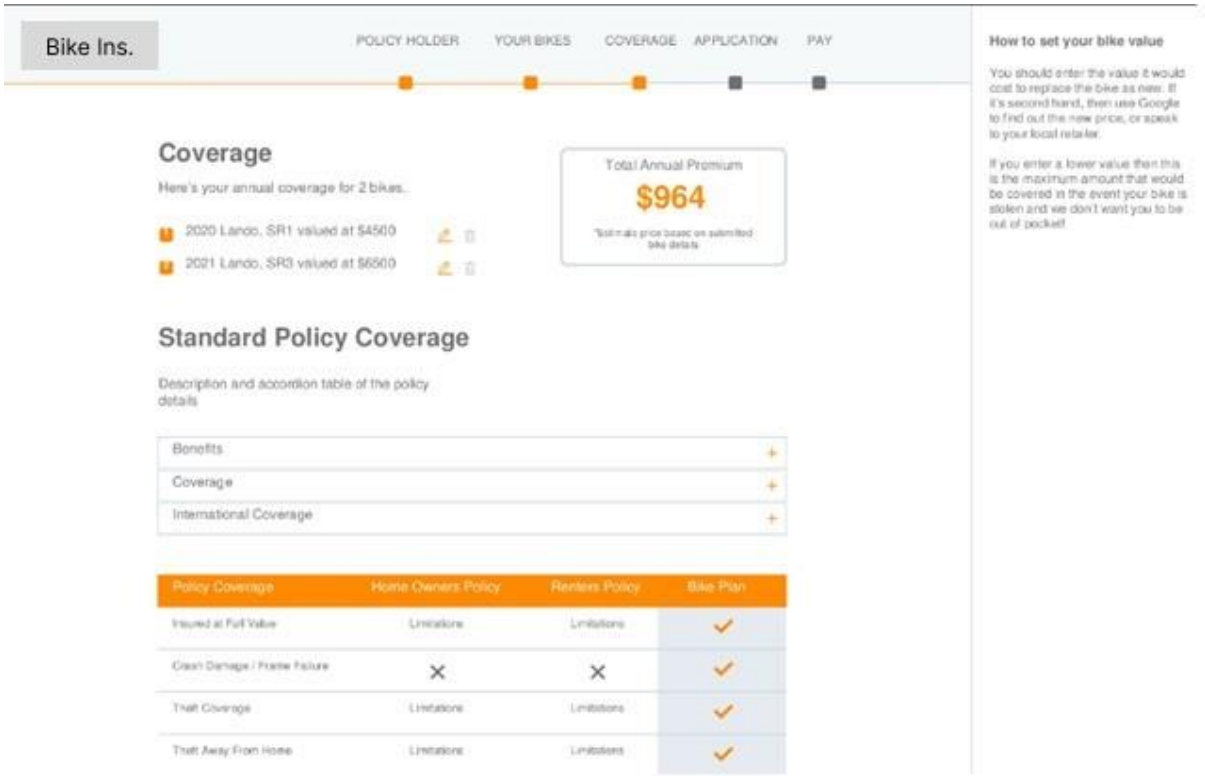

Figure 5: Coverage Section

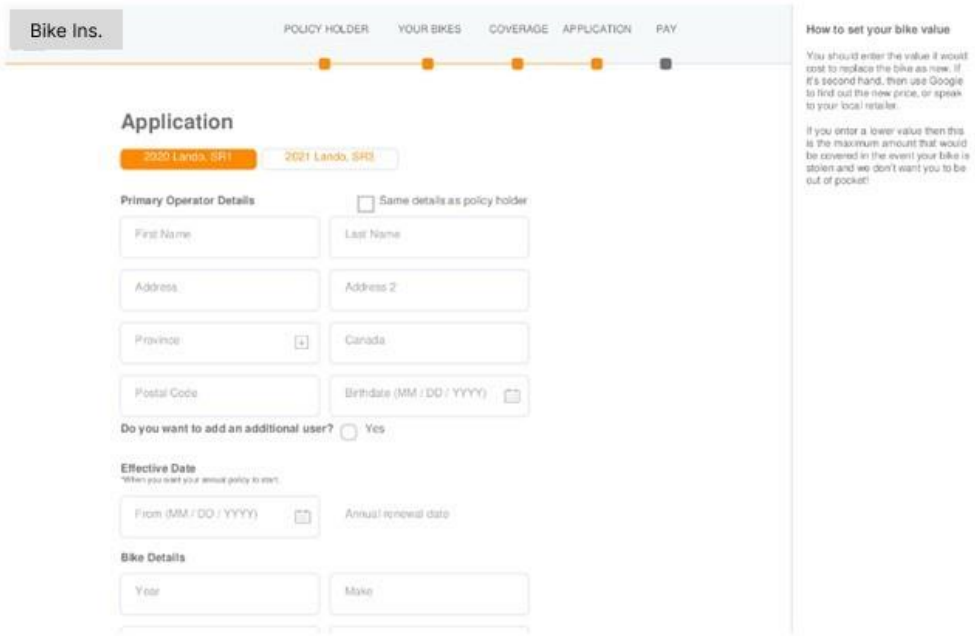

Figure 6: Application Section

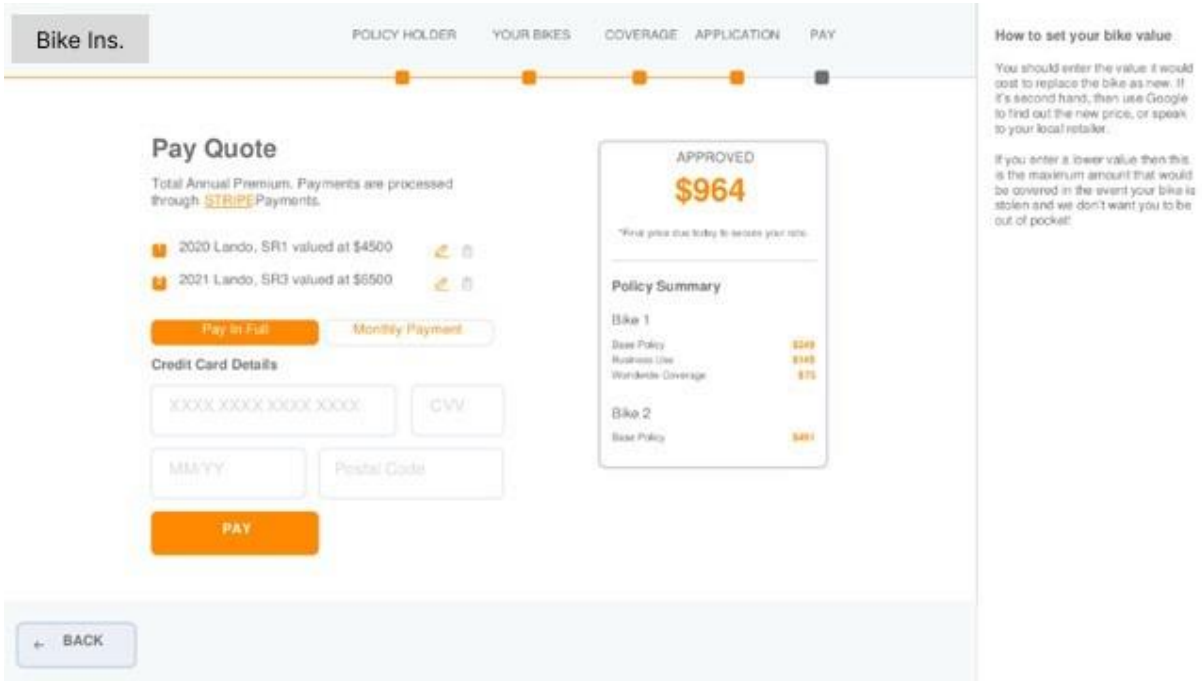

Figure 7: Payment Section

Noteworthy features incorporated include:

1. Scroll functionality that directs to the missed input when the call-to-action button is clicked.
2. A call-to-action button on the homepage, redirecting to the onboarding form, visible only to users who haven't signed in. Once signed in, it displays alternative content.
3. Code adjustments based on feedback, including a new UI layout for the authentication page, addition of icons to buttons, and the display of selected countries in the onboarding form's select tag, as the insurance website is limited to specific countries.
4. Implementation of buttons visible exclusively in the dashboard layout.
5. UI refinements following feedback, particularly concerning the input value type as a number, not a string.

Subsequently, I conducted research and development on a date picker package intended for use in our project.

I then proceeded to implement separate edit functionality for the User Profile image and information, completing the responsive layout for the Profile.

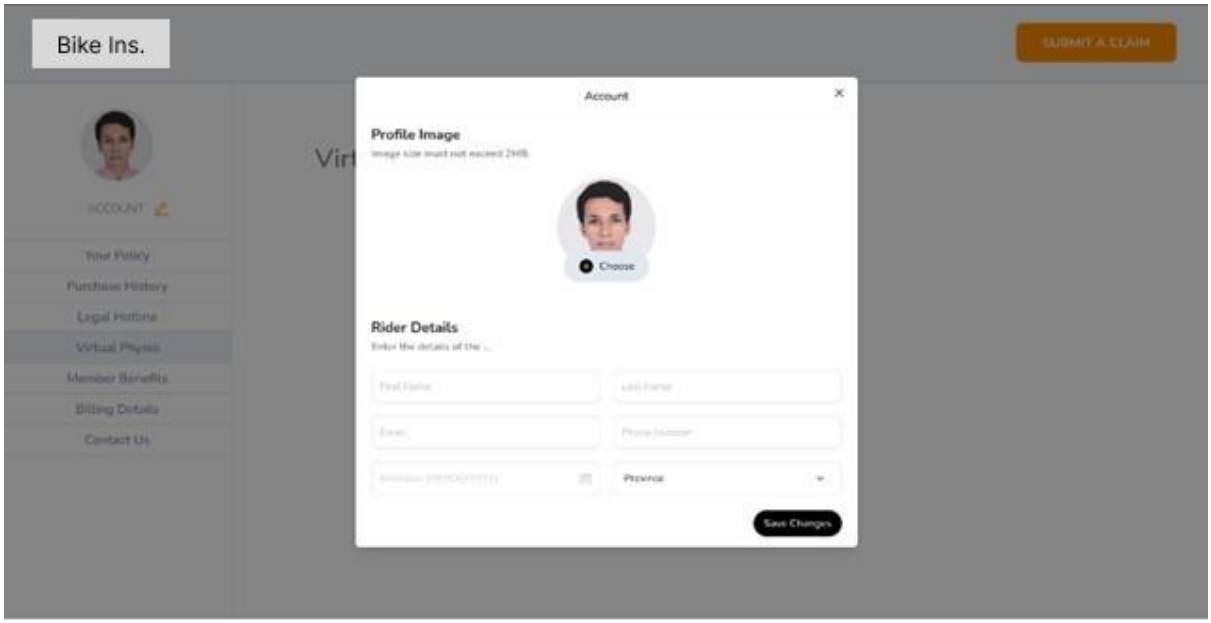

Figure 8: Edit Profile

Finally, I addressed responsive design for onboarding, successfully completing it up to step 2.

5.4 Week 14: UI Design completion & UI/UX Flow for Admins

This week, I successfully finalized the Contact Us page within the Dashboard section. Additionally, our platform comprises two distinct Dashboards—one for customers and the other for administrators tasked with overseeing all activities. To ensure privacy and data segregation, I initiated the implementation of private routing, restricting one type of user from accessing the other.

A noteworthy feature introduced this week involves dynamic changes in the Onboarding form. Upon completing specific steps, the Next button transforms into a 'Create Account' button. Clicking this button redirects the user to the Sign-Up page. Upon successful registration, users are redirected back to continue the onboarding process.

While we already had a Contact Us page, I implemented the use of Formy for synchronization across all instances. Recognizing the need for efficient data storage in the onboarding process, particularly for later editing, I delved into state management, focusing on 'Your Bike.' The state management for 'Your Bike has been progressed to 60% completion.

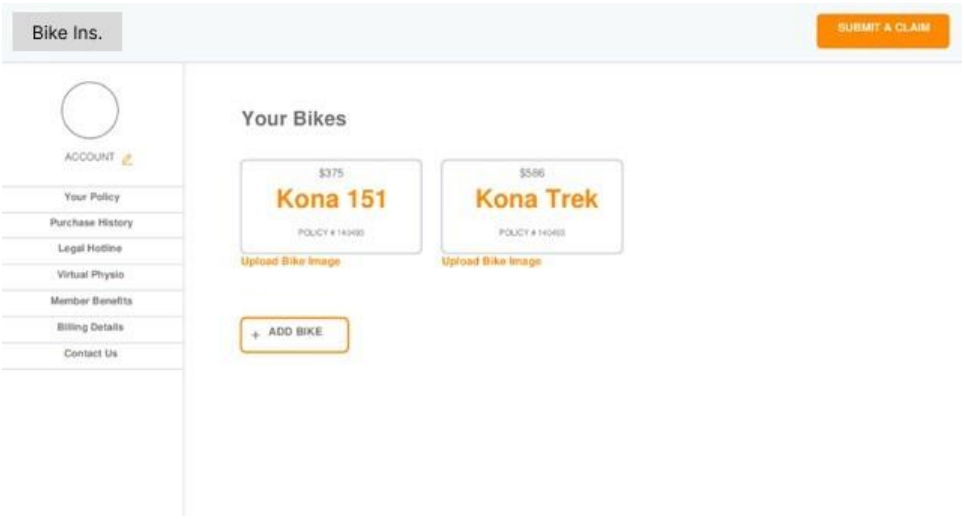

Figure 9: All listing of your Bikes here

5.5 Week 15: UI Adjustment in Admin Side and Form Validation

In response to an edit button next to each Bike list in the Design, I modified. Given the absence of a predefined modal design, I had to create one from scratch, and I successfully accomplished this task.

Subsequently, further feedback was received, indicating the need for additional input requirements in the onboarding process. Consequently, I made necessary adjustments to the code to accommodate these additional inputs.

I also focused on implementing the data fetching for the Side note UI and Coverage Page within the onboarding page.

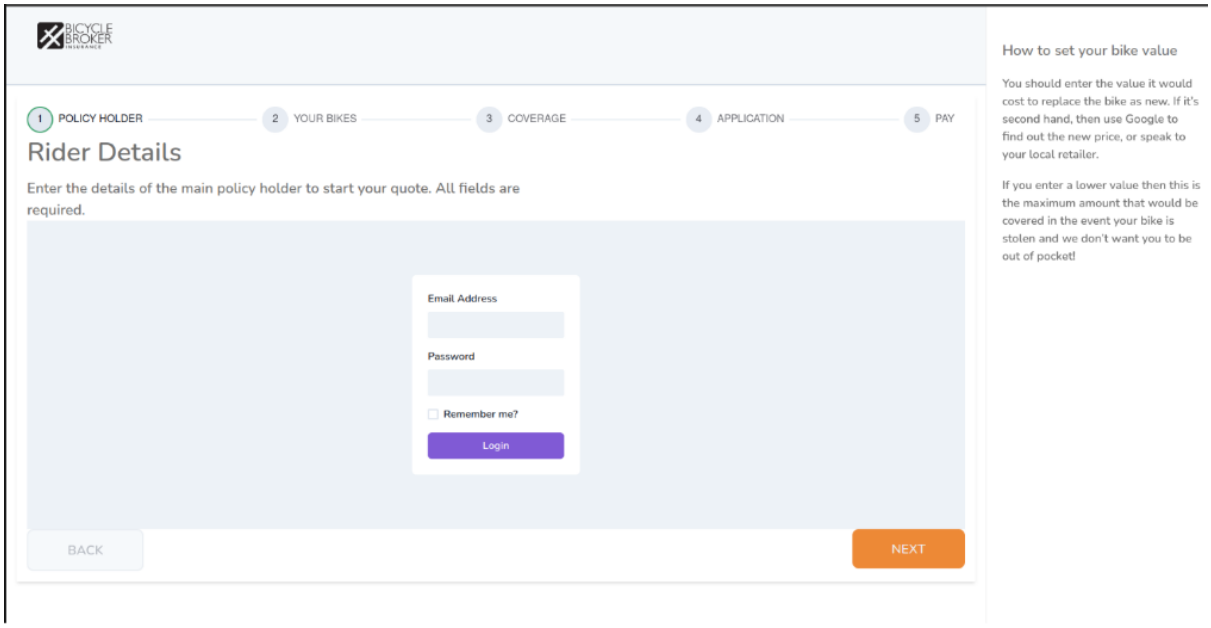

Figure 10: The initial stage of the stepper form

Conducted UI adjustments for the Brand page, specifically addressing the modification of the theme color.

I removed the Back button from the onboarding page and successfully implemented input validation up to step 2. Additionally, I continued making adjustments to the branding code.

I initiated the implementation of the Claim form UI, incorporating form validation.

I configured the display of the Admin and User dashboards according to their respective layouts, ensuring restrictions to prevent unauthorized access between parties, including limiting user access to specific admin routes.

Furthermore, I completed the development of the 'Your Bike Edit modal.

5.6 Week 16: UI Adjustment and Form Validation

Upon successful login, redirection is configured to direct users with existing accounts to the User Dashboard page rather than the homepage. Subsequently, I focused on the implementation of the password change feature.

I successfully completed the implementation of the coverage table and incorporated a floating label in the Contact Us page.

The UI design for Admin Settings and Side Notes UI was finalized.

Within the Admin Dashboard, I introduced a paginated table displaying user claim form submissions to prevent overwhelming the page for administrators. Despite the complexity, I successfully completed this task.

The implementation of Formik Floating Label was applied to the Claims form, and Yup was employed for input validation, although this task is not yet fully completed.

5.7 Week 17: UI Adjustment and Form Validation and Finalize all UI

I received minor UI feedback, all of which were promptly addressed within the given timeframe.

Furthermore, I received instructions to maintain a consistent UI format across all pages containing input fields. Given that a floating label was predominantly used in the existing designs, I ensured its uniform application across various forms throughout our site.

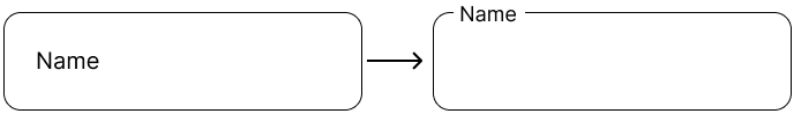

Figure 11: Floating Labe1

I received additional feedback to conduct research and development on a specific datepicker package. If feasible, I was instructed to implement it across the entire site wherever dates are utilized. Throughout the week, I dedicated time to enhancing the responsiveness of the Onboarding pages, recognizing the time-intensive nature of this process.

Subsequently, I successfully translated the Datepicker improvements to the remaining pages.

Another package that I studied and implemented was React Quill. This tool is designed for displaying editable content and visualizing how it appears on the webpage. Notably, this feature is exclusive to admins, and any content they save here will be displayed in the side note of the Onboarding page.

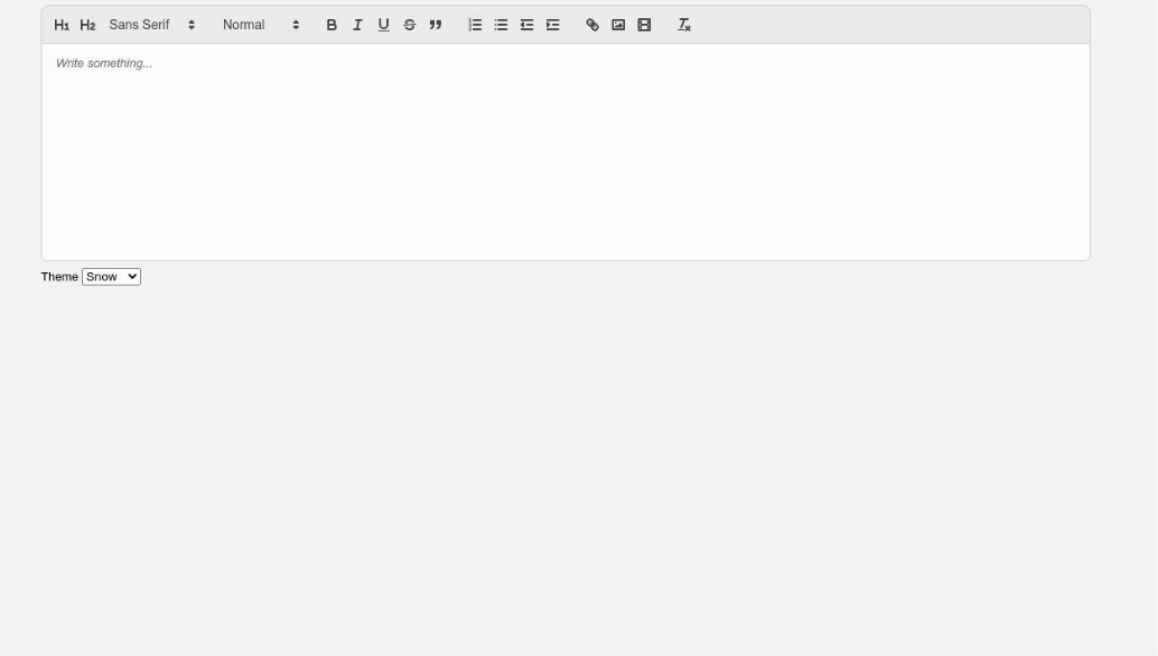

Figure 12: React Quil

I successfully finalized the Onboarding Stepper UI, ensuring that its functionalities align with the provided mock-up. However, the responsive design aspect is yet to be completed.

5.8 Week 18: Admin Functionalities and finalize all UI

I managed to finish the responsive design for the Onboarding Application and Payment Section. And couldn't finish the Coverage Section.

Since it's a white label solution as well. I was told to implement a feature we have to give 2 colors as default for the site and an image for the logo. As a fallback option. Responsive Design for Claims Layout is also remaining.

By the end of this week, I was able to complete all responsive design for Dashboard for both Admin and User Layout. Some feedback for date picker was also given.

5.9 Week 19: Complete Pending Admin Functionalities, Bug Fix and enhancing public and policyholder feature

I received feedback regarding the Application Tabs Section and promptly addressed the identified issues. Subsequently, I focused on the responsive design of the Coverage Section.

I initiated the development of a new feature involving the generation of promo code quotas. This feature allows users affiliated with specific bike clubs to receive discounts. Implementation required handling API responses appropriately.

Following this, I dedicated time to enhancing the responsive design of various components.

Next, I realized the omission of the implementation of CRUD operations for bikes within the Coverage section, where users should be able to edit or delete entries. I promptly began addressing this oversight.

Additionally, I addressed several bugs and encountered issues that required resolution:

- Determining the appropriate redirection if a bike is deleted from the Coverage section.
- Addressing concerns related to the Application Tabs' behavior when there are more than two bikes or a bike has a very long name.

I successfully resolved these issues, including adjusting the UI of badges in the admin dashboard table and optimizing the table column width for different device sizes.

5.10 Week 20: Bug Fixing

Resolved responsive issues in the Onboarding process, making necessary adjustments to the overall code before merging. Addressed feedback on table functionality, including sorting, color changes for expired dates, and adjustments to column widths.

Implemented a feature improvement by displaying a new badge beside recently created tokens. Received feedback to include an asterisk beside the placeholder. Given the use of a floating label input, this proved to be a challenging task. The focus of this week was primarily on addressing feedback and fixing bugs.

5.11 Week 21: Learn Programming language basic, it's Frameworks' architecture and explore the project

I received a new project assignment, requiring me to familiarize myself with a new programming language, understand its basic syntaxes, and explore the project structure.

Additionally, I addressed and fixed some bugs in the previous bike insurance project, specifically related to applying the theme color to checkboxes, radio buttons, and the progress bar.

This week, I performed PC installation and setup for the new project, reviewing key concepts. The given timeframe for learning these components was within the week. The learning objectives included gaining proficiency in Python basics, understanding Django architecture, and exploring the project structure.

5.12 Week 22: Learn Programming language basic, it's Frameworks' architecture and explore the project

During the first half of the week, I dedicated time to research and development, focusing on learning relevant concepts. Subsequently, I was reassigned to a high-priority task that required transitioning to a new programming language framework unfamiliar to me. This project involved multilingual capabilities, generating translations for a given text in multiple languages, and facilitating bulk translation from a spreadsheet.

A significant portion of my time was dedicated to the thought process and researching specific packages to determine their utility for the project.

Later in the week, I acquired knowledge on uploading a file, reading its content, and updating it in a database. By the end of the week, I successfully implemented these concepts in our new project.

5.13 Week 23: Develop a tool to manage multilingual data

I received feedback on the feature and its user interface, and I made the necessary adjustments to address the feedback.

5.14 Week 24: UI Design completion & UI/UX Flow for Admins

I was assigned to a new project tasked with storing data from HTML files, utilizing a specific stack unfamiliar to me. Consequently, I had to concurrently undertake the task and familiarize myself with the associated procedures.

During this process, I received feedback on my progress, leading to necessary adjustments that continued into the following day.

I proceeded with bug fixing, specifically addressing issues related to data post to field size. Additionally, I conducted research and development regarding user roles for read and edit access within the designated stack. My focus was on optimizing code and fortifying access control measures for user roles.

Key accomplishments during this period include:

1. Resolution of issues regarding successful data import by users.

2. Implementation of functionalities reserved for admins, such as restricting Brand access to root users.
3. Addition of features facilitating the insertion of new languages into the database.
4. Introduction of a group feature enabling users to assign privileges.
5. Integration of the django-simple-history package for enhanced history tracking in tables related to BandLanguageData, Group, User, and BrandGroupAccess.
6. Successful implementation and functionality of BrandGroupAccess.
7. Analysis of response data and understanding its access through Postman.

Chapter 6 Conclusion

In the last three months of my internship, most of my time were passed on the Bike Insurance project. I have been congratulated for my work even to this day which I cherish going forward with my career. The project was shipped successfully and later I was assigned to a new in-house project.

Here are some additional details that I learned during my internship:

- The importance of finishing it under a deadline.
- The importance of having every requirement on the table beforehand.
- The importance of continuous learning and improvement.

References

[1] W3 Engineers Limited. (2023, Jan 24). About Us (https://w3engineers.com/about.html)