Internship Report

SWE-420

Submitted by

Abir Ahmed
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Software Engineering, IICT, SUST

Letter of Transmittal

August 07, 2023

Director
Institute of Information & Communication Technology
Shahjalal University of Science & Technology, Sylhet

Subject: ***Internship Report Submission***

Sir,

I am delighted to submit my internship report as a part of the internship program. The report is based on my learning and experiences during my internship, which lasted from February 07, 2023, to August 07, 2023.

I express my gratitude to the Department of Software Engineering and the Institute of Information & Communication Technology (IICT) for this opportunity.

The report showcases my active involvement in various projects, reflecting my growth and improvements during this period. I am confident that it demonstrates the overall outcome of my internship.

Thank you for your consideration.

Sincerely,

Abir Ahmed
Registration No. 2018831056
Dept. of Software Engineering, IICT
Shahjalal University of Science & Technology

Letter of Endorsement

To Whom It May Concern

Subject: **Approval of the Report**

This letter is to certify that all the information mentioned in this document is true and not confidential to the company. The projects mentioned here have the successful involvement of Abir Ahmed, Institute of Information & Communication Technology, Shahjalal University of Science & Technology.

I wish him all the best and hope that he will lead a successful career.

Internship Supervisors

Rafiul Islam
Chief Software Engineer & co-founder
LogiQbits Limited

M.M. Ahsan
CEO
LogiQbits Limited

Acknowledgements

I extend my heartfelt gratitude to all those who have played a vital role in making my internship and the preparation of this report successful.

First and foremost, I am deeply thankful to the Department of Software Engineering, SUST, especially our honorable director Prof M. Jahirul Islam sir, and our beloved class teacher Mohammed Raihan Ullah sir, for providing me with the invaluable opportunity to work as an intern at LogiQbits Limited. Their guidance and unwavering support have been crucial in my professional growth and learning.

I would also like to express my appreciation to the entire LogiQbits team, especially my mentor Rafiul Islam (Chief Software Engineer, LogiQbits Limited) and M.M. Ahsan(CEO, LogiQbits Limited), for their cooperation and encouragement throughout my internship. Their willingness to share knowledge and expertise has enriched my understanding of real-world projects and industry practices.

I am grateful to the faculty members and staff of IICT for their continuous support and encouragement during my academic journey, which has laid the strong foundation for this internship and report.

Lastly, I am deeply indebted to my family and friends for their unwavering support and motivation, which has been a driving force throughout this internship.

To all who have been a part of this remarkable experience, thank you for your invaluable contributions.

Executive Summary

This internship report documents my experiences and accomplishments during my six-month internship at LogiQbits Limited. The internship commenced on February 07, 2023, to August 07, 2023. The purpose of this internship was to gain practical knowledge and skills in various technical and non-technical aspects of software development.

During the internship, I actively engaged in real-world projects that allowed me to apply my software engineering expertise. One of the key projects I worked on was the development of the Shopap web application, which involved utilizing technologies such as ReactJS, Typescript, and Redux for front-end development and state management.

Additionally, I contributed to the Salesense project, where I tackled data science tasks related to analyzing sales data and creating APIs. This experience exposed me to the complexities of handling time series data and applying machine learning models with TensorFlow.

Throughout the internship, I honed my technical skills in various technologies, including ReactJS, Typescript, Redux, Next.js, MongoDB, GraphQL, and TensorFlow. Furthermore, I gained proficiency in version control using Git and worked with a monorepo for efficient code management.

Apart from technical expertise, I enhanced my non-technical skills, including code quality, professionalism, teamwork, punctuality, communication, and planning. Collaborating with the LogiQbits team taught me the importance of effective communication, mutual respect, and teamwork in achieving project success.

Overall, this internship has been an enriching and fulfilling experience, equipping me with practical skills, industry knowledge, and a deeper understanding of software development processes. I am confident that the lessons learned during this internship will serve as a strong foundation for my future endeavors in the software industry.

Keywords: ReactJS, Typescript, Redux, Next.js, MongoDB, GraphQL, TensorFlow, Git, Monorepo, Software Development, Data Science.

Contents

Chapter 1

Introduction

1.1 General Outline of Internship

During my internship, I had the opportunity to work at LogiQbits Limited, a leading technology company that specializes in providing smart software solutions for businesses across various industries. The internship program lasted for a duration of six months, starting from February 07, 2023, to August 07, 2023. Throughout this period, I was actively involved in real-world projects, gaining hands-on experience and exposure to different aspects of software development and data science.

1.2 Objective

The primary objective of my internship was to bridge the gap between theoretical knowledge acquired during my academic studies and its practical application in the professional world. I aimed to enhance my technical skills, particularly in web development, data analysis, and machine learning. Additionally, I sought to improve my soft skills, such as teamwork, communication, and project management, to become a well-rounded software professional.

1.3 Literature Review

As part of my internship preparation, I conducted a literature review to explore relevant academic and industry resources. I studied various research papers, articles, and online tutorials related to web development, data science, and software engineering. This literature review provided valuable

insights into the latest trends, best practices, and emerging technologies in the field.

1.4 Source of Information

During my internship, I gathered information from multiple sources. I received guidance and mentorship from experienced professionals at LogiQbits Limited, who shared their expertise and provided valuable feedback on my work. Additionally, I extensively used online resources, documentation, and research papers to augment my understanding of specific technologies and concepts.

1.5 Scope

The scope of my internship encompassed diverse areas of software development, including web application development, data analysis, and machine learning. I worked on various projects that required skills in front-end and back-end development, data manipulation, and predictive modeling. The internship scope also included collaborating with a dynamic team of developers, data scientists, and project managers.

1.6 Limitations

While my internship provided valuable learning opportunities, it also had certain limitations. Due to the confidentiality of some projects, I may not be able to share detailed information about specific tasks and technologies used. Additionally, time constraints and the scope of certain projects limited the depth of exploration for certain topics. Despite these limitations, I made the most of the opportunities available and strived to achieve the best possible outcomes.

The following chapters of this report will provide an in-depth overview of my internship journey, the projects I worked on, the skills I acquired, and the valuable experiences that contributed to my professional growth.

Chapter 2

Company Profile

2.1 About LogiQbits Limited

LogiQbits Limited is a technology company with a vision to become a trusted one-stop solution provider for startup companies. They aim to enable the majority of retailers as D-Commerce users with innovative and affordable solutions. Their mission is to build industry-specific smart software solutions for business management across SME to enterprise industries, offering global-standard software at a local price. They prioritize scalability and maintain global standards, modern concepts, and emerging technologies to maximize profitability by resolving business challenges and pain points.

2.2 Company Mission

At LogiQbits Limited, their mission is to provide smart software solutions that empower businesses to thrive in a rapidly evolving market. Their approach is centered around the following key principles:

1. **Scalable Design & Architecture:** LogiQbits specializes in creating scalable solutions that allow businesses to grow and adapt seamlessly without the need for extensive software reconstruction.
2. **Maintaining Global Standards:** Quality, efficiency, and sustainability are at the core of LogiQbits' work. They are committed to meeting and exceeding industry benchmarks to deliver exceptional results.

3. **Embracing Modern Concepts & Emerging Technologies:** LogiQbits stays ahead of the curve by embracing modern concepts and leveraging emerging technologies. This enables them to drive innovation and provide cutting-edge solutions to their clients.

With its mission as its guiding principle, LogiQbits is dedicated to resolving business challenges and pain points while maximizing profitability for its valued clients.

2.3 Company Vision

Their vision is to envision a world where their innovative solutions and services empower individuals and organizations to achieve their full potential. Through their vision, they aspire to inspire progress, drive transformation, and leave a lasting legacy of excellence.

2.3.1 Core Values

Their core values shape their actions and decisions, guiding them to make a difference and create a positive impact in the world through their innovative solutions and services. Their core values include:

- **Quality and Excellence:** Maintaining high-quality standards, their focus on excellence seeks to surpass ordinary expectations.
- **Customer-Centric Approach:** Their dedication to understanding and fulfilling customer needs goes beyond meeting expectations. They aim to exceed customer expectations and foster long-term relationships.
- **Continuous Improvement:** They drive their organization to adopt best practices, embrace new technologies, and implement efficient processes for continuous improvement.
- **Ethical Practices**: A set of principles and guidelines govern the company's behavior, decision-making, and operations, ensuring ethical considerations in all aspects.

- **Impactful Solutions:** They are committed to the development and delivery of software products and services that create significant positive effects, solve real-world problems and drive meaningful outcomes for users.
- **Sustainability:** Their ability to operate in a manner that balances economic success with environmental and social responsibility is at the core of their business practices.

With these core values shaping their actions and decisions, they are dedicated to making a difference and creating a positive impact in the world through their innovative solutions and services.

2.4 Technologies

In this section, the technologies and capabilities of LogiQbits Limited across various languages, frameworks, and platforms are outlined.

Languages	**Frameworks**	**Platforms**
Go	.NET	Web
C#	NextJS	Android
Python	Flutter	iOS
Typescript	ReactNative	Cross-platform
Dart	FastApi	
Javascript	Django	
Java		
Kotlin		

Table 2.1: Technologies at LogiQbits Limited

2.5 Capabilities of LogiQbits Limited

LogiQbits Limited offers a range of capabilities to address diverse business needs, including:

- Building startup solutions from scratch

- Providing smart enterprise solutions
- Delivering smart SME solutions
- Offering business-IT advisory and consultancy services
- Providing offshore development services

2.6 Company Stack

LogiQbits' tech team possesses a diverse skill set to develop efficient solutions, including expertise in various technologies and programming languages:

- **Back End:** MSSQL, PostgreSQL, MongoDB, Redis, InfluxDB, Go, C#(.NET), Python, C/C++
- **Front End Mobile / Web App:** JavaScript, TypeScript, Dart, Flutter, React Native, NextJS, ReactJS, Kotlin
- **DevOps:** Linux, Bash Script, Nginx, WebRTC, CI/CD webhook Integration & Orchestration, RabbitMQ, MQTT, gRPC, RESTful, Webhook
- **UI/UX Prototyping:** Figma, Canva, Draw

2.7 Current Projects

- **SaleSense - CRM & Sales Force Management Solution:**
  CRM & Sales Force Management Solution
  `https://logiqbits.com/products/salesense`
- **SHOPAP - Shop Automation Platform:**
  You can create your shop right now & manage it digitally. Try it for free.
  `https://shopap.io`
- **Dynamic CMS by LogiQbits:**
  Headless CMS to manage your contents & static website builder at one place
  `https://dcms.logiqbits.com/`

2.8 Why Choose LogiQbits' Solution

At LogiQbits Limited, all solutions are designed and architected in a scalable way, ensuring they can be taken to the next level without the need for extensive reconstruction. The company takes pride in maintaining global standards and incorporating modern concepts and emerging technologies to provide innovative solutions that address various business challenges and pain points.

With expertise and dedication, LogiQbits aims to empower businesses with cutting-edge solutions that drive growth and success.

Chapter 3

Overview of Internship Activities

Throughout my enriching 6-month internship, I had the privilege of working closely with my dedicated mentor, who was actively involved in the development of the Rock app. His constant guidance, support, and availability to address any queries or confusion played a pivotal role in shaping my learning journey. His mentorship extended to every aspect of my internship, from understanding complex concepts to implementing real-world projects. Moreover, he encouraged me to share my knowledge and experiences with the broader community by writing blogs, fostering a culture of continuous learning and knowledge sharing. This chapter provides an overview of the diverse activities and projects I undertook during my internship, showcasing the valuable experiences that shaped my growth as a software developer and data scientist.

3.1 Conceptual Phase

During my 6-month internship, I experienced two distinct conceptual phases, each contributing significantly to my growth and learning.

3.1.1 Phase 1: Web Development Focus

In the initial phase, my primary objective was to gain a comprehensive understanding of HTTPS and RESTful API for web development. I actively

engaged in studying relevant blogs, documents, and online resources provided by my mentor. Additionally, I extensively researched on the internet to enhance my knowledge in these areas. Simultaneously, I immersed myself in the company's environment, embracing its culture and values, which laid the foundation for a productive journey.

3.1.2 Phase 2: Delving into Data Science

After four months, the second conceptual phase emerged as I delved into the realm of data science. My focus shifted to learning the fundamentals of data science, encompassing data analysis, visualization, and essential machine-learning techniques. Practical application of these concepts to real-world data scenarios further enriched my understanding and honed my skills in data science.

3.1.3 The Conceptual Phase Divided into Four Steps

To optimize my learning experience during the conceptual phase, it was structured into four key steps:

Reading Events

Engaging in reading events allowed me to delve into a plethora of content, including blogs, documents, and other resources recommended by my mentor. Furthermore, I proactively sought relevant information from the internet to augment my knowledge in the targeted areas.

Discussion Events

Regular discussions with my mentor and team members were instrumental in addressing any confusion or queries that arose. These discussions took place at the beginning and end of working days and during the deadlines of assigned tasks.

Presentation Events

Upon completing tasks within the set deadlines, I presented my work to the team. These presentations provided me with valuable opportunities to showcase my deliverables and receive feedback from my mentor and colleagues.

Question-Answering Events

Following the presentations, question-and-answer sessions with my mentor ensued. During these sessions, my mentor posed insightful questions related to the topic, enabling me to clarify doubts and receive further guidance. These interactions served as a final review and reinforcement of my understanding.

These structured steps in the conceptual phase facilitated an enriching and focused learning journey, propelling my growth and competency in web development and data science.

3.2 Coding Phase

During the coding phase of my internship, I was actively involved in various development tasks, contributing to the company's projects and gaining hands-on experience in software development.

3.2.1 Development of Small-Scale Projects

During this sub-phase, I had the opportunity to work on developing several small-scale projects, including:

1. **Next.js CRUD with MongoDB:** I created a full-stack web application using Next.js and MongoDB, implementing CRUD (Create, Read, Update, Delete) operations. The project's code is available at `https://github.com/abirahmed56/nextjs-fullstack`.
2. **Next.js CRUD with MongoDB, NextAuth, and Vercel Deployment:** In this project, I expanded upon the previous one by integrating NextAuth for authentication and deployed the application on Vercel. The live version of the blog application can be accessed at `https://blog-application-updated.vercel.app/`.

3. **GraphQL Demo:** I developed a GraphQL-based application, exploring the capabilities of this powerful query language. The code for this project is available at `https://github.com/abirahmed56/GraphglDemo`.

4. **Other Small Projects:** In addition to the mentioned projects, I actively worked on several other small projects whenever I learned new concepts. These projects served as practical exercises to solidify my understanding and apply the knowledge gained during my internship.

Furthermore, as part of the data science aspect of my internship, I worked on various notebooks using Google Colab and Kaggle notebooks to perform data analysis and visualization. One notable project involved analyzing Amazon data sets, where I focused on ratings and made several insightful observations. This analysis was well-received in the data science community, receiving 7 upvotes on Kaggle. It was a significant milestone as my first analytical notebook. The link to this project can be found at `https://www.kaggle.com/code/abirahmedsohan/amazon-data`.

Engaging in these small projects and data analysis notebooks allowed me to practice and reinforce my learning while exploring diverse topics in software development and data science. These hands-on experiences played a crucial role in broadening my skillset and building my confidence as an aspiring software engineer and data scientist.

3.2.2 Understanding Existing Project

In this phase of my internship, my mentor assigned me an existing Content Management System (CMS) project developed by the company. The main objective was to thoroughly understand the codebase, analyze coding patterns, and observe the overall project structure. I was given approximately 3-4 days to comprehend the intricacies of the project.

During this period, I immersed myself in the project's codebase, carefully examining how different components interacted and understanding the organization of various modules. This experience exposed me to the principles of writing clean, maintainable code. I learned the significance of proper code organization, adhering to coding standards, and ensuring code readability.

Through this exercise, I gained insights into software maintenance and the importance of keeping code organized and structured. Working on a real-

world project provided me with practical knowledge and equipped me with valuable skills that I can apply to future software development tasks.

Throughout this phase, my mentor offered guidance and support, encouraging me to explore the codebase independently while providing valuable insights into best coding practices and software architecture. This opportunity to work on an existing project under the mentorship of experienced professionals has been instrumental in shaping my understanding of software development in a professional environment.

3.2.3 Adding and Changing in Existing Project Clone

During this sub-phase, I had the opportunity to work with an existing project clone. I actively contributed by adding new features, fixing bugs, and making necessary changes to enhance the project's functionality and user experience. This collaborative effort provided me with invaluable insights into version control systems, teamwork, and effective code collaboration practices.

It is important to note that this phase was primarily a learning experience. The main objective was to encourage hands-on learning and gain confidence in making changes to the existing codebase. Working with an established project allowed me to understand the importance of clean code, code organization, and adhering to coding standards in a real-world software development environment.

In the context of the Content Management System (CMS) project, I took on the task of adding new features to improve its capabilities. While working on these enhancements, I had the freedom to experiment with different approaches and solutions, promoting an iterative learning process. This experience was crucial in developing my problem-solving abilities and understanding the impact of code changes on the overall project.

For the data science aspect of my internship, I was given specific notebooks to work on. It was emphasized that the goal was not just to achieve results but to learn and explore various data analysis techniques. This learning phase encouraged me to delve deeper into data science concepts and fostered a data-driven mindset.

Throughout this sub-phase, I actively engaged with the development team, participated in code reviews, and received feedback from experienced professionals. This dynamic environment furthered my understanding of software development processes and encouraged continuous learning.

The coding phase was a valuable experience that honed my coding skills and exposed me to real-world challenges in the field of software engineering. Both the CMS project and data science tasks allowed me to make meaningful contributions to ongoing projects while also deepening my knowledge and expertise in software development and data analysis. This learning phase provided a solid foundation for my internship journey, instilling confidence and readiness for future challenges.

3.3 Real World Task Phase

During the real-world task phase of my internship, I had the opportunity to work on a significant project called "Shopap." This project involved utilizing a mono repo architecture and Next.js framework.

3.3.1 Shopap: Monorepo and Next.js

Introduction

Shopap is a substantial Next.js project developed within a monorepo. The primary objective of this phase was to deliver different UI designs for the website while reusing the same codebase for state management. By implementing a monorepo architecture and transitioning to Redux, I aimed to achieve efficient code management and make it easier to maintain multiple UI variations.

Project Stack

The technology stack used in the Shopap project includes:

- **Frontend:** React with Next.js
- **Backend API:** Next.js API routes
- **State Management:** Redux
- **Database:** MongoDB
- **Languages:** TypeScript, JavaScript

- **Version Control:** Git
- **Package Manager:** Yarn or npm
- **Linting:** ESLint

Monorepo Architecture

The monorepo architecture used in Shopap allows for managing multiple Next.js projects within a single repository. This approach offers several benefits, including simplified development, code sharing, centralized dependency management, and streamlined testing and CI/CD processes.

Refactoring to Redux

During this phase, I actively worked on converting the existing codebase to use Redux for state management. By doing so, I ensured that all state-related logic was centralized and shared across different UI variations. This approach made it possible to deliver different UI designs without duplicating the core code.

Enhancing User Interface (UI)

Another aspect of the project involved focusing on delivering multiple UI designs for the Next.js projects. By separating the UI components and state management logic, I could create distinct UI variations (e.g., theme-one and theme-two) while reusing the same Redux codebase. This approach significantly reduced development efforts and improved maintainability.

File Structure

The file structure of the monorepo follows a well-organized pattern to manage the different projects and shared components effectively.

Workspace Configuration

The monorepo is set up using the `package.json` file with the following workspace configuration:

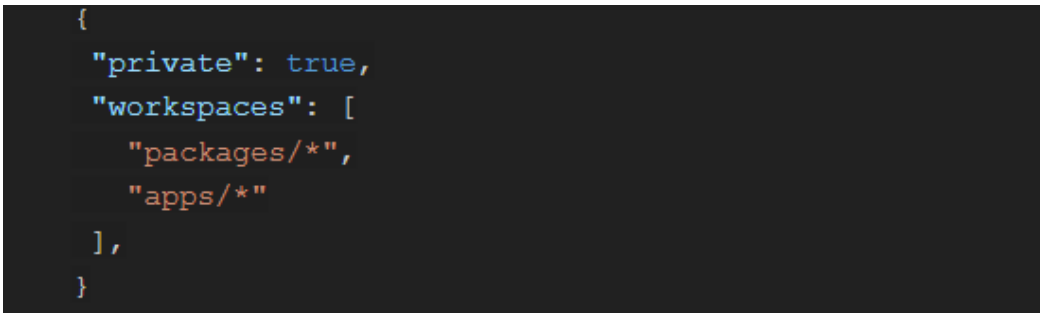

Figure 3.1: workspaces configuration code snipped

Work Flow

1. **Understanding Existing Project:** Received an existing project from the company and analyzed the codebase, architecture, and functionalities.
2. **Refactoring to Redux:** Transitioned from Context API to Redux for efficient state management and centralized state-related logic and actions using Redux.
3. **Separating UI Components and State Management:** Created separate projects for different UI variations (e.g., theme-one and theme-two) and separated UI components from state management logic.
4. **Leveraging Monorepo Architecture:** Implemented monorepo architecture to manage multiple projects within a single repository and ensured code sharing and centralized dependency management.
5. **Delivering Multiple UI Designs:** Delivered distinct UI designs without duplicating core code and enhanced user experience by implementing intuitive designs and interactive components.

Contributions

During this project, I made significant contributions beyond the development tasks:

1. **Blog on React State Management:** I wrote a blog post explaining how to manage the state in React, highlighting the importance of

state management and various approaches. The blog received positive feedback in the dev community. You can find the blog at `https://dev.to/abirahmed/react-state-management-327m`.

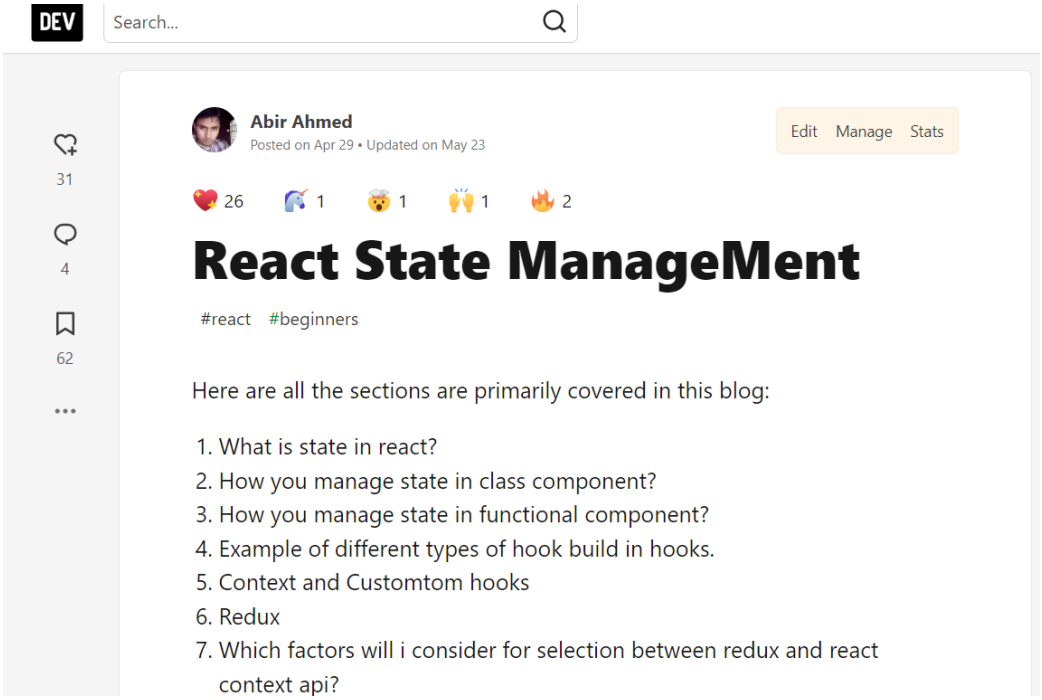

Figure 3.2: React State Management blog in dev community

2. **Yarn Monorepo Starter Template:** As part of sharing knowledge with the community, I created a Yarn monorepo starter template to help developers set up their monorepo projects easily. The starter template can be accessed at `https://github.com/abirahmed56/yarn-monorepo`, with detailed instructions provided in the README file. This initiative aimed to encourage code sharing and collaboration among developers using the monorepo architecture.

Screenshots of UI Designs

Include screenshots of UI designs for Home Page, Cart, and Checkout for both theme-one and theme-two variations.

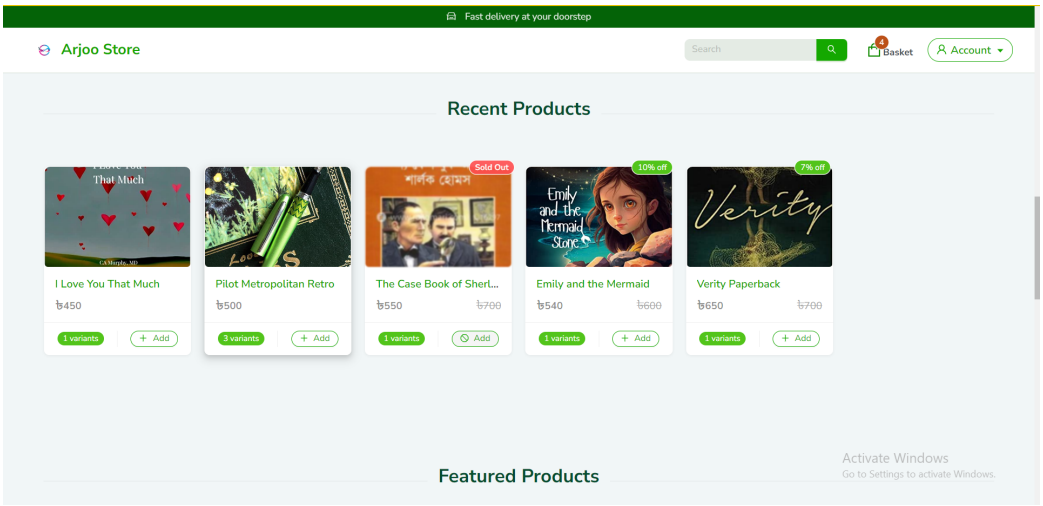

Figure 3.3: UI Design 1: Home Page

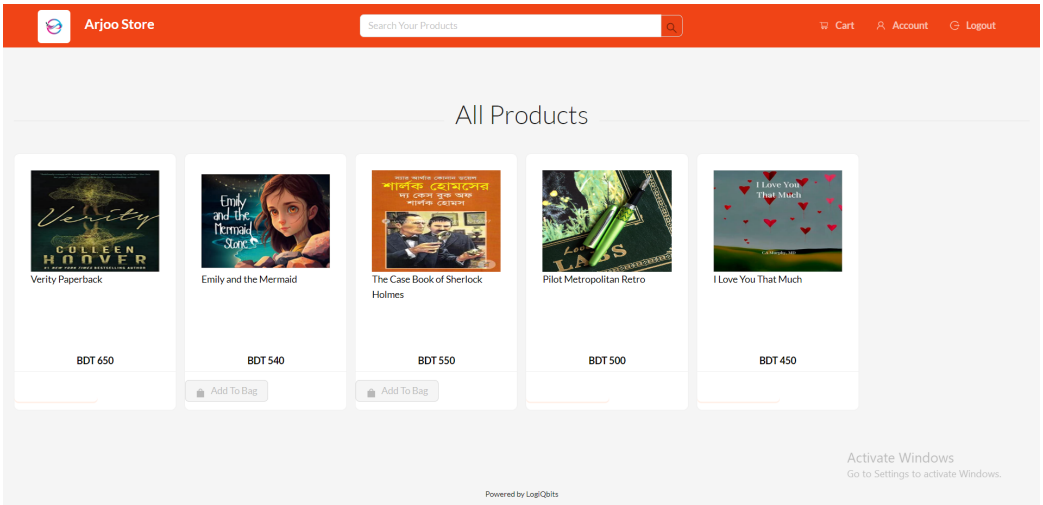

Figure 3.4: UI Design 2: Home Page

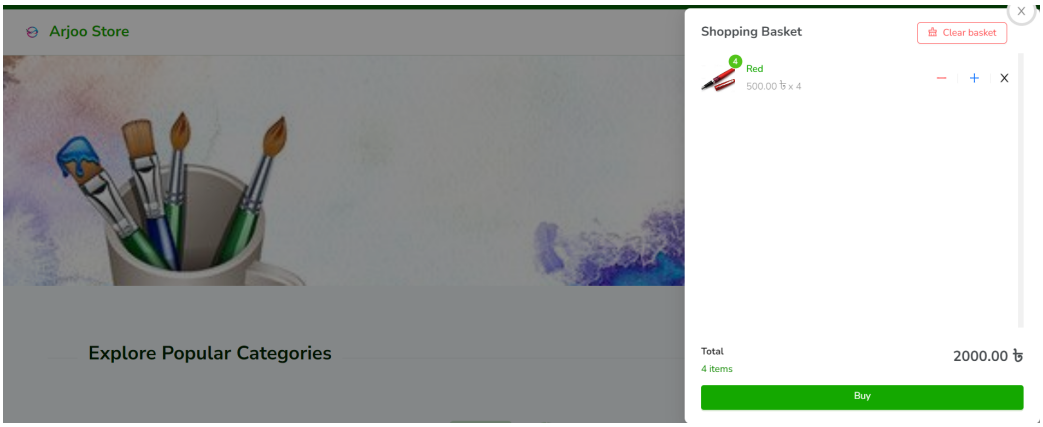

Figure 3.5: UI Design 1: Cart

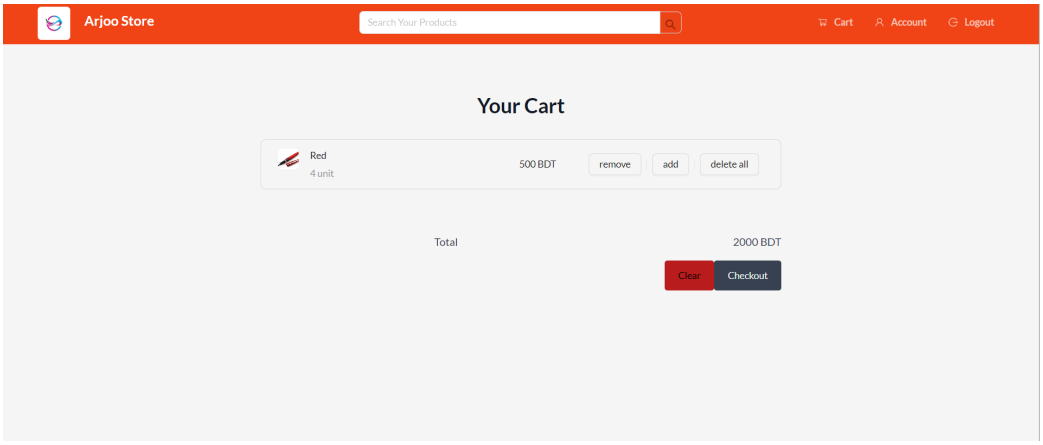

Figure 3.6: UI Design 2: Cart

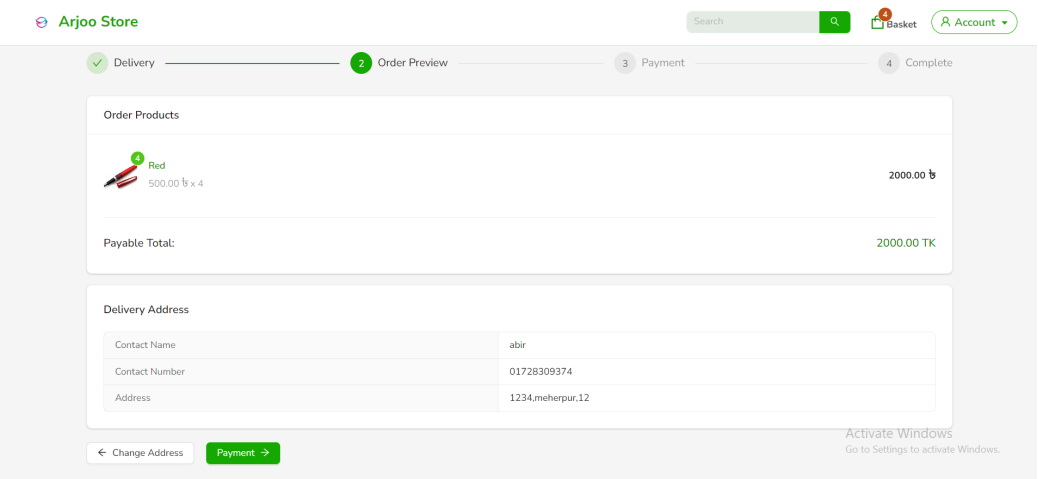

Figure 3.7: UI Design 1: Checkout

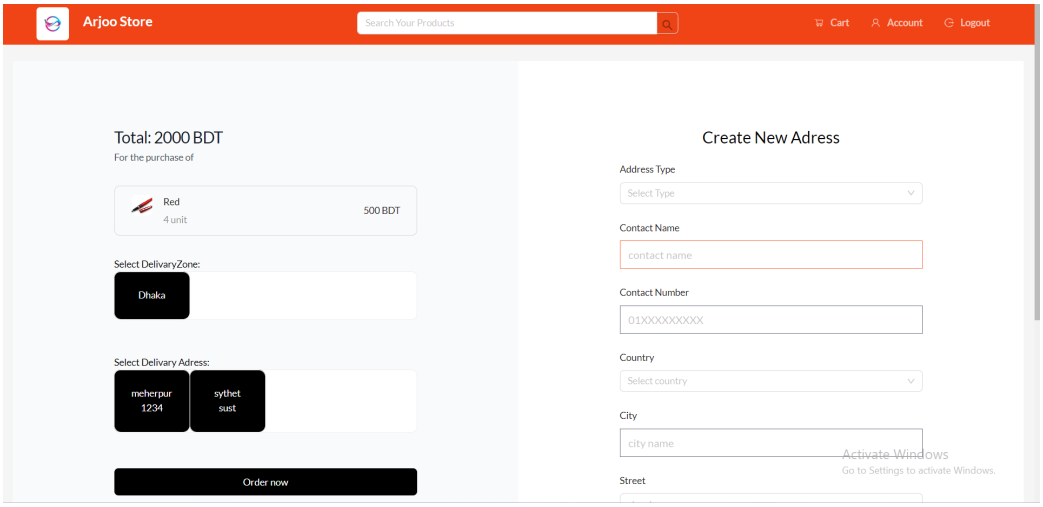

Figure 3.8: UI Design 2: Checkout

Conclusion

Shopap's development within a monorepo using Next.js and Redux provided valuable insights into efficient code management, state management, and delivering different UI designs without duplicating code. The monorepo architecture facilitated streamlined development and encouraged a collaborative approach to coding. The experience gained during this phase helped me gain confidence in handling complex projects and implementing best practices for scalable web development.

3.3.2 Mapbox Integration

During my internship, I had the opportunity to work on an exciting feature - integrating Mapbox to display the movement of any person's geolocation on a map. The main goal was to visualize geolocation data accurately on an interactive map. Later, this feature can be integrated into multiple projects, including the Salesense project, where it was used for sales force management and tracking.

Objective

The main aim of this task was to create a solution for visualizing geolocation data on a map. The integrated map should show markers at specific coordinates to indicate the persons' locations and draw lines to display their movement path.

Implementation

To achieve this, I used the Mapbox GL JS library, which offers tools for creating interactive maps. Here's how I implemented it:

1. **Mapbox Setup:** I registered for a Mapbox account and obtained an API key to access Mapbox services.
2. **Geolocation Data:** I received geolocation data in a JSON file, containing latitude and longitude coordinates for different points along their movement path.

3. **Rendering the Map:** I created a dedicated page in the Salesense project to display the map. Using Mapbox GL JS, I initialized the map, set the style, and added controls like zoom and rotation to enhance the user experience.

4. **Markers and Lines:** Based on the geolocation data, I placed markers at each coordinate to represent the persons' locations at different times. Additionally, I drew lines connecting the markers to visualize the movement path.

5. **Interaction and Information:** To make the map more interactive, I added pop-ups to the markers, displaying relevant information about the individuals at each location. This allowed users to gain insights into their activities and movements.

The resulting interactive map was successfully integrated into the Salesense project, providing valuable insights into the sales officers' movements and locations.

Usage in Other Projects

The Mapbox integration proved to be versatile and useful beyond the Salesense project. Another client of the Salesense project was impressed with the geospatial data visualization feature and adopted it for their own project. This showcases the potential and value of the feature for future development endeavors.

The Mapbox integration has become a reusable component that can be utilized in various projects, providing a powerful solution for visualizing geolocation data on interactive maps.

Blog Post

To share my experience and knowledge with the development community, I created a detailed blog post on the popular development platform, Dev Community. The blog post titled "Creating Interactive Maps with React and Mapbox GL JS in a Next.js App" provides step-by-step instructions on how developers can implement interactive maps using Mapbox GL JS in a Next.js application.

The blog post aimed to serve as a helpful resource for developers interested in incorporating interactive maps into their Next.js applications. It received positive feedback from the developer community, with several readers finding the guide clear and informative.

You can read the blog post here: `https://dev.to/logiqbits/creating-interactive-maps-wi`

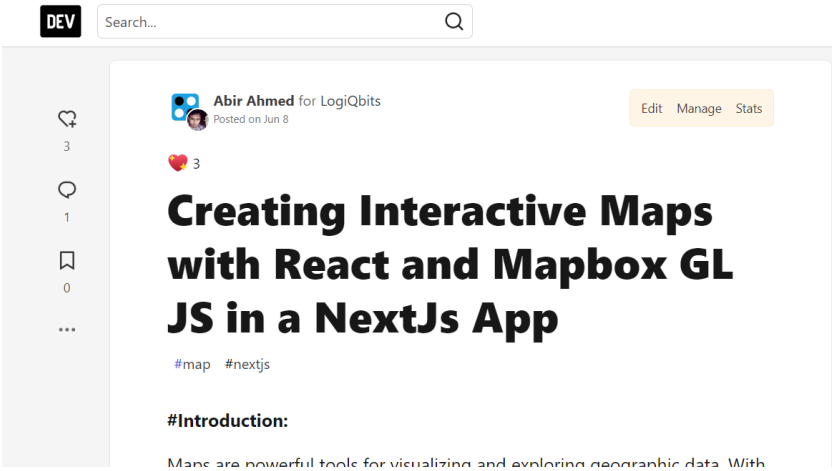

Figure 3.9: Screenshot of Blog for Interactive Maps in dev community

The Salesense Mapbox integration was a rewarding experience, allowing me to work with geospatial data, improve my frontend development skills, and contribute to a meaningful feature in the Salesense project.

3.3.3 Screenshots

Here are some screenshots showcasing the Salesense Mapbox integration:

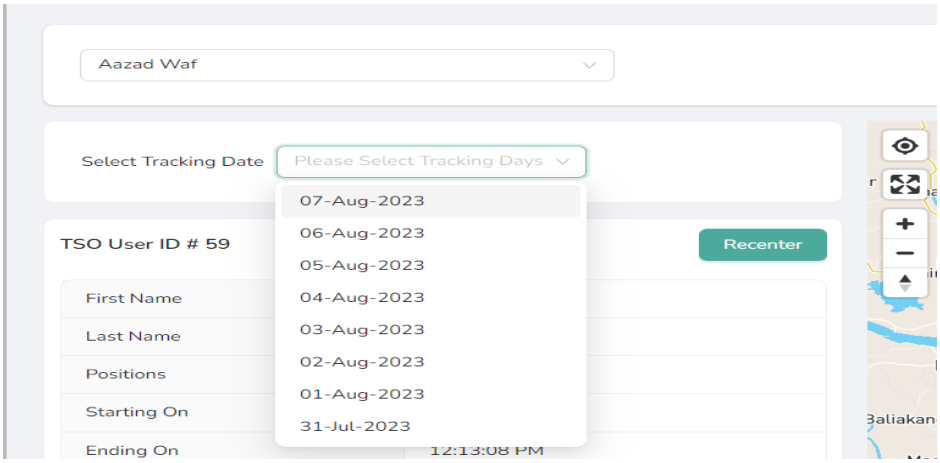

Figure 3.10: Select Sales Officer and date

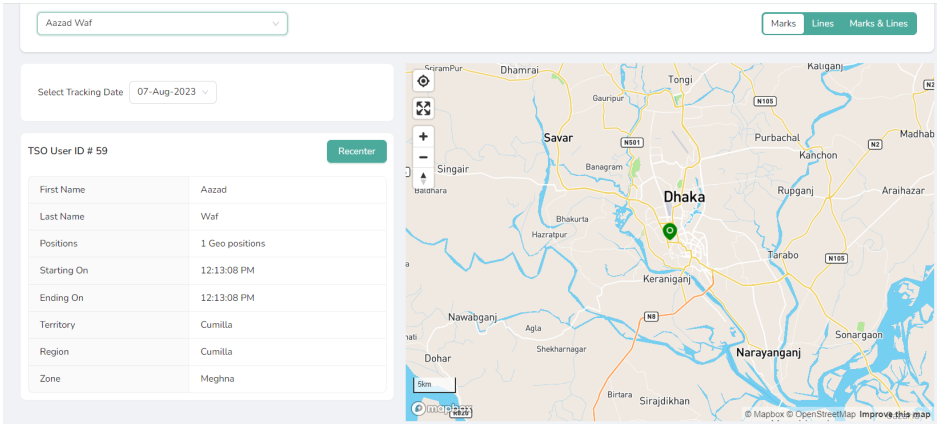

Figure 3.11: Interactive Map with Pop-up Information

3.3.4 Salesense Analysis API

Project Overview

The Salesense Analysis API was a significant component of my internship, focused on a data science task that played a crucial role in analyzing sales data for different products and customers across various zones, regions, and territories. The project aimed to provide valuable insights and visualizations to aid the company in making informed decisions regarding sales strategies, identifying top-selling areas, and understanding customer preferences.

Technology Stack

The project leveraged the following technologies:

- **Backend Development:** FastAPI - A modern web framework for building APIs with Python, providing high-performance and easy-to-use features.
- **Database:** PostgreSQL - A powerful open-source relational database management system used for efficient data storage and retrieval.
- **Data Science Libraries:** NumPy and Pandas - Essential Python libraries for data manipulation, cleaning, and processing.
- **Data Visualization:** Matplotlib - A comprehensive library for creating static, interactive, and animated plots and charts in Python.
- **Frontend Integration:** React and Recharts - Recharts is a charting library for React applications, enabling the visualization of data from the APIs on the Salesense website.

Flow Process

The project's workflow can be summarized as follows:

1. **Data Collection:** The project involved gathering sales data for various products and customers from the company's databases.

2. **Data Processing:** Raw queries were employed to fetch the necessary data from the PostgreSQL database. The data was then processed using NumPy and Pandas for analysis.

3. **Data Analysis:** The processed data was subjected to data science techniques, enabling the identification of sales trends, top-selling areas, and customer behavior patterns.

4. **API Development:** The backend was developed using FastAPI, where the analysis results were transformed into APIs to be utilized on the Salesense website.

5. **Data Visualization:** Matplotlib was utilized to create interactive and insightful charts and graphs, providing a visual representation of the analysis results.

6. **Frontend Integration:** The Salesense website integrated the APIs with Recharts, allowing the data visualizations to be displayed on the website for users to interact with.

Project Significance

Due to the sensitive nature of the data and the project's strategic importance, specific details of the analysis results and APIs cannot be disclosed. However, the APIs generated through this analysis played a critical role in empowering the company to make informed business decisions.

The data visualizations, displayed on the Salesense website, provided actionable insights to optimize sales strategies and enhance customer experiences. By identifying top-selling areas, understanding sales trends, and gaining valuable customer behavior insights, the company could align its sales efforts with market demands, thereby driving business growth.

Throughout the project, I engaged in continuous learning, creative problem-solving, and close collaboration with mentors and team members. The project allowed me to gain practical experience in backend development with FastAPI, perform data analysis with NumPy and Pandas, and create informative data visualizations using Matplotlib and Recharts.

Sample Data Visualizations

Below are some sample data visualizations created using Matplotlib and integrated into the Salesense website:

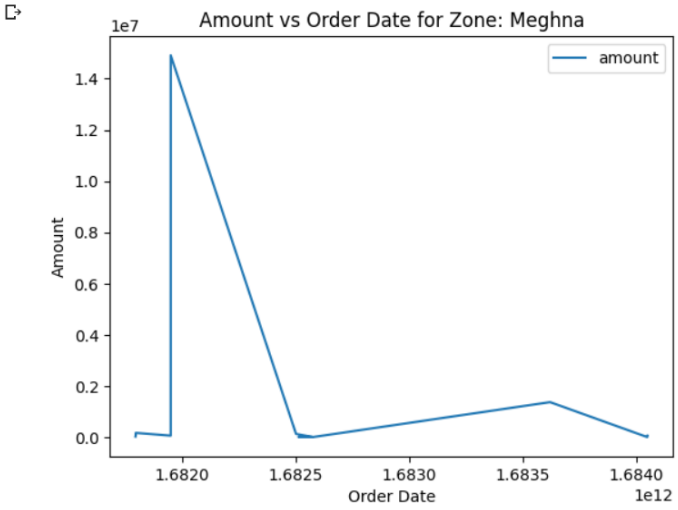

Figure 3.12: Sample Sales Analysis Chart 1

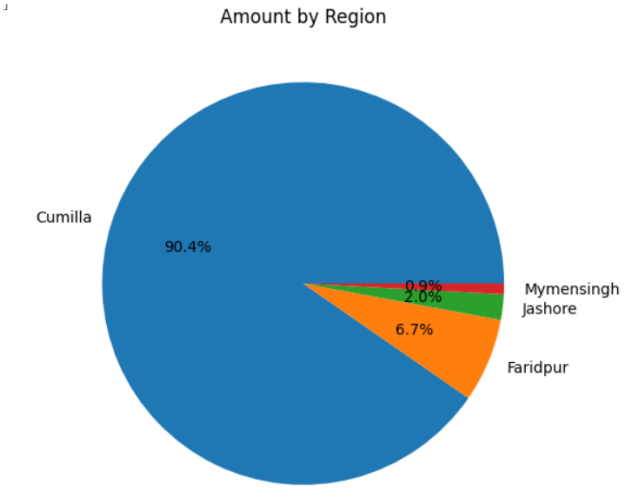

Figure 3.13: Sample Sales Analysis Chart 2

These visualizations provided valuable insights into sales trends, allowing the company to make data-driven decisions to enhance its business strategies and achieve its sales objectives. The Salesense Analysis API project

proved to be a rewarding experience, further enhancing my technical skills and contributing to the company's growth and success.

3.3.5 Stock Market Forecasting

The stock market forecasting project was a challenging endeavor that focused on forecasting time series data. This project involved various experiments with models such as Random Forest, LSTM, and others. As the project is still in its initial stages, detailed analysis and research on which features or factors to use are ongoing. Due to the sensitivity of the project, specific details cannot be shared. However, working on this project provided valuable insights into machine learning techniques and their application in the stock market domain. The complexity of time series forecasting further honed my skills and knowledge in this field.

Objective

The main objective of the stock market forecasting project was to build accurate and reliable predictive models for time series data in the stock market. The task involved analyzing historical stock market data, identifying relevant features, and experimenting with different machine learning models to achieve the best forecasting results.

Experiments and Models

During the project, I conducted several experiments with different machine learning models, including Random Forest, Long Short-Term Memory (LSTM), and potentially other models based on ongoing research. The goal was to determine which model would provide the most accurate and robust predictions for stock market trends and price movements.

Challenges and Ongoing Research

As with any time series forecasting project, I encountered various challenges. Some of the key challenges included:

- **Data Preprocessing:** Cleaning and preprocessing the raw stock market data to handle missing values, outliers, and other data inconsistencies.
- **Feature Engineering:** Selecting and engineering relevant features that have a significant impact on stock market trends and price movements.
- **Model Selection:** Identifying the most suitable machine learning model for the specific time series data and exploring ensemble methods to improve forecasting accuracy.
- **Hyperparameter Tuning:** Optimizing model hyperparameters to achieve the best possible performance and generalization.

To address these challenges and improve forecasting accuracy, ongoing research and experimentation are being conducted. The project involves staying up-to-date with the latest advancements in machine learning and time series forecasting techniques.

Notepad

In the stock market forecasting project, due to the sensitivity of the data and company policies, I cannot share all the notebooks and detailed information. However, I am providing a link to an initial Google Colab notebook that demonstrates the basic analysis and forecasting using LSTM for the closing feature of the selected stock. You can access the notebook through the following link:

`https://colab.research.google.com/drive/1hAhzQIcF8QAiney8nUr1AflfLquA50dZ`

Please note that this notebook represents an initial phase of the project and focuses solely on forecasting the closing prices. It serves as a starting point for further research and model exploration.

and the result is:

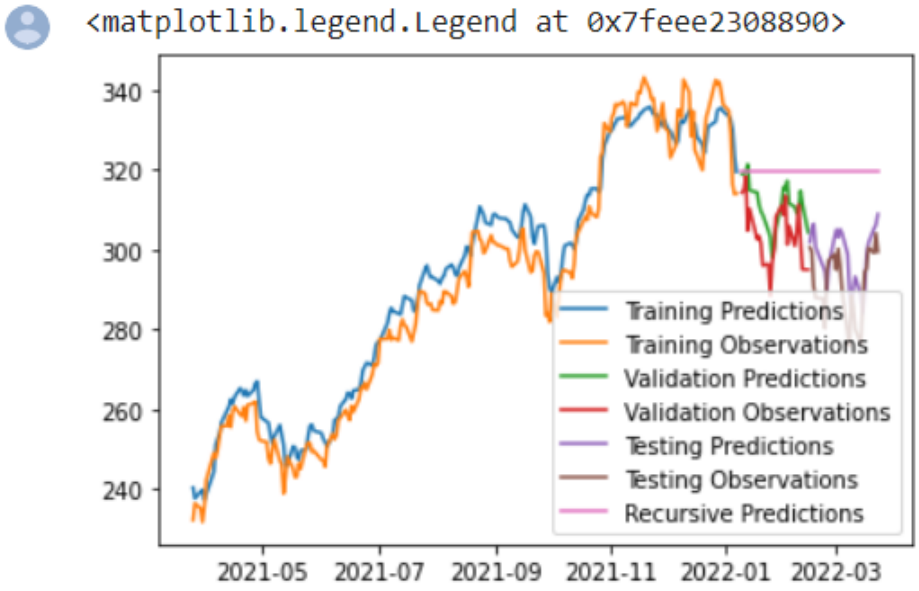

Figure 3.14: Initial notebook's output

another notebook's result with 30-days forecast:

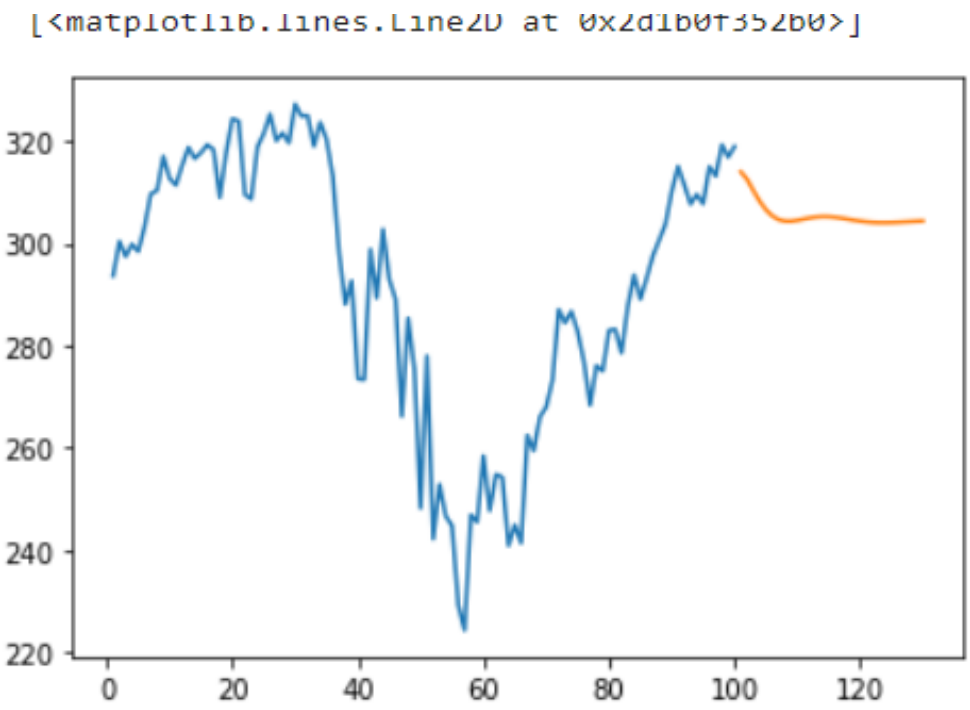

Figure 3.15: Initial notebook's output

Chapter 4

Professional Growth

During my 6-month internship at LogiQbits Limited, I had the opportunity to experience significant growth in both technical and non-technical aspects. This valuable experience allowed me to develop various skills and attributes that are essential for a successful career in the software development industry.

4.1 Technical Aspect

4.1.1 ReactJS

Working extensively with ReactJS during my internship enabled me to gain a deep understanding of this powerful JavaScript library. I became proficient in building dynamic and interactive user interfaces, leveraging React's component-based architecture and virtual DOM. This skill has proven valuable in developing modern and responsive web applications.

4.1.2 Typescript

Typescript became an integral part of my development workflow during the internship. The strong typing and enhanced tooling provided by Typescript significantly improved the robustness and maintainability of my code. I now feel confident in writing scalable and error-free applications with Typescript.

4.1.3 Redux

Understanding and implementing Redux for state management was a crucial aspect of my internship. With Redux, I learned how to manage complex application states efficiently and ensure a seamless user experience across different components.

4.1.4 Git

Version control with Git was an essential part of my daily workflow. I acquired proficiency in using Git for code collaboration, branching, merging, and managing project repositories effectively.

4.1.5 Next.js

Exploring and working with Next.js exposed me to server-side rendering and various optimizations for React applications. I gained expertise in building fast and SEO-friendly web applications with Next.js.

4.1.6 FastAPI

FastAPI played a central role in the development of various backend APIs. Its high performance and easy-to-use features made it the preferred framework for creating RESTful APIs. I learned how to design routes, handle requests, and integrate data models with FastAPI.

4.1.7 PostgreSQL

As part of the Salesense Analysis API project, I extensively worked with PostgreSQL for efficient and reliable data storage. I gained experience in designing database schemas, creating tables, and performing complex queries to retrieve and manipulate data. PostgreSQL's robustness and scalability were essential in handling large datasets and supporting data-driven analysis.

4.1.8 Data Science Libraries and TensorFlow

During the Salesense Analysis API project, I utilized various data science libraries such as NumPy, Pandas, and Matplotlib for data analysis and visualization. Additionally, I delved into machine learning using TensorFlow, an open-source ML library. I developed ML models for time series data forecasting and other data-driven tasks. TensorFlow's capabilities allowed me to build and train complex neural networks and deep learning models for advanced analytics.

4.1.9 MongoDB

I also had the opportunity to work with MongoDB, a popular NoSQL database, during my internship. MongoDB's flexibility and scalability made it ideal for

handling unstructured or semi-structured data. I gained experience in designing database schemas and performing CRUD operations using MongoDB.

4.1.10 GraphQL

GraphQL was another technology I explored during my internship. Its efficient data query and retrieval capabilities provided a more flexible and efficient alternative to traditional REST APIs. I learned how to design GraphQL schemas, create queries, and interact with data on the client side.

4.1.11 Monorepo

The concept of a monorepo architecture was integral to the Shopap project. Working with a monorepo allowed me to manage multiple projects within a single repository, facilitating code sharing and centralized dependency management. I gained insights into code organization, versioning, and continuous integration using a monorepo setup.

4.2 Non-Technical Aspects

4.2.1 Code Quality

Throughout my internship, I prioritized code quality by following best practices, writing clean and well-documented code, and conducting code reviews. This emphasis on code quality has improved the overall reliability and maintainability of the projects I worked on.

4.2.2 Professionalism

I maintained a high level of professionalism by adhering to project timelines, meeting deadlines, and engaging in effective communication with team members and mentors. This professionalism ensured a productive and collaborative work environment.

4.2.3 Teamwork

Working as part of a team taught me the importance of effective collaboration and communication. I actively contributed to team discussions, shared ideas, and provided support to team members, fostering a positive and cohesive work atmosphere.

4.2.4 Punctuality

Punctuality was a core value during my internship. I ensured the timely completion of tasks and meetings, demonstrating reliability and commitment to project schedules.

4.2.5 Communication

Effective communication played a vital role in project success. I improved my communication skills by articulating ideas, expressing concerns, and actively participating in team meetings and discussions.

4.2.6 Planning

During my internship, I learned the significance of effective planning and organization. Prioritizing tasks, setting realistic goals, and creating project timelines were essential for achieving project objectives efficiently.

4.2.7 Knowledge Sharing

I actively engaged in knowledge sharing with team members by participating in technical discussions, sharing relevant resources, and providing assistance when required. This collaborative approach contributed to a culture of continuous learning within the team.

The Professional Growth phase of my internship provided me with a holistic learning experience, combining technical excellence with soft skills development. These learnings have empowered me to tackle complex challenges in the software industry and continue to grow as a skilled and versatile software engineer.

Chapter 5

Conclusion

My six-month internship has been an invaluable experience that has significantly shaped my professional growth during my undergraduate education. Through this internship program, I gained profound insights into the software industry, workplace culture, and the intricacies of software development. It has been a period of immense learning, networking, and self-discovery.

The objective of my internship was to acquire practical knowledge and skills in various technical aspects. I successfully achieved this objective by actively engaging in real-world projects and tasks. Working on the Shopap project within a monorepo using Next.js and Redux provided me with hands-on experience in front-end development and state management.

Additionally, I had the opportunity to contribute to the Salesense project, where I delved into data science tasks, including analyzing sales data and creating APIs. This exposed me to the challenges of handling time series data and applying machine learning techniques for stock market forecasting.

Throughout the internship, I honed my technical expertise in ReactJS, Typescript, Redux, and Next.js, which are widely used technologies in the industry. I also gained proficiency in version control using Git, a crucial skill for collaborative software development.

Apart from technical skills, the internship enhanced my non-technical aspects, including code quality, professionalism, teamwork, punctuality, communication, and planning. Collaborating with the team at LogiQbits Limited taught me the importance of effective communication, mutual respect, and teamwork in achieving project success.

The conceptual phases, in the beginning, allowed me to grasp the fundamentals of HTTPS, RESTful API, and data science, which served as a solid

foundation for my subsequent work. The internship also provided me with opportunities for knowledge sharing, where I actively participated in discussions, presentations, and question-answer sessions.

I am immensely grateful to our honorable director Prof M. Jahirul Islam sir, Mohammed Raihan Ullah sir to give me this internship opportunity, and to the entire LogiQbits team for their guidance, support, and encouragement throughout my internship journey. Their mentorship has been instrumental in shaping my understanding of real-world projects and industry practices.

Overall, my internship at LogiQbits Limited has been an enriching and fulfilling experience. It has equipped me with practical skills, industry knowledge, and a deeper understanding of software development processes. I am confident that the lessons learned during this internship will serve as a strong foundation for my future endeavors in the software industry.

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