SUMMER INTERNSHIP REPORT

By: **Kiran Patil 211070904**

BTECH in Computer engineering

Under the supervision of:

**Mrs. Seema Shrawne**



Company: **Wells Fargo**

Duration: 5th June, 2023 – 4th August, 2023



DEPARTMENT OF COMPUTER ENGINEERING AND INFORMATION TECHNOLOGY

***VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE***

(An Autonomous Institute Affiliated to Mumbai University)

(Central Technological Institute, Maharashtra State) Matunga, MUMBAI – 400019

## CERTIFICATE

This is to certify that Pranav Kute (20107020) is a student of B. Tech. Computer Engineering has successfully completed his internship at Wells Fargo for a duration of two months to our satisfaction.

|  |  |  |
| --- | --- | --- |
| **Internal Supervisor** | **Industrial Supervisor** | **Head of Department** |
| **Mrs. Seema Shrawne** | **Mr. Rajesh Kannan Ramasamy** | **Dr. Mahesh Shirole** |
| Department of CE and IT | VP at Wells Fargo | Department of CE and IT |
| VJTI, Mumbai | Wells Fargo, Bengaluru | VJTI, Mumbai |

Place: Embassy Tech Village, Bengaluru Date: 4th August, 2023

## APPROVAL SHEET

The Final Internship Report by Pranav Kute is satisfactory and approved for Degree of Bachelor of Technology.

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| --- | --- | --- |
| **Internal Supervisor** | **Industrial Supervisor** | **Head of Department** |
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Place: Embassy Tech Village, Bengaluru Date: 4th August, 2023

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**INTERNSHIP CERTIFICATE:**



### STATEMENT OF CANDIDATE

I, Pranav Kute (201070020) state that the work embodied in this Internship Report forms my own contribution to work at Wells Fargo as an intern. The report reflects the work done during the period of internship from 5th June 2023 to 4th August 2023. No part of this work has been used by me for the requirement of another degree except where explicitly stated in the body of the text and the attached statement. I assert that statements made, and conclusions drawn are an outcome of my internship work and are true to my knowledge.

I further certify that:

1. The work contained in the report is original and has been done by me under the supervision of my supervisor.
2. I have followed the guidelines provided by the college in writing the report.
3. Wherever I have used materials (text, data, theoretical analysis equations, codes, figures, etc.) from other sources, I have given due credit to them in thereport by giving their details in the references.

Name: Pranav Kute Roll No: 201070020

Date: 4th August, 2023Place: Bengaluru

## ACKNOWLEDGMENT

I would like to express my heartfelt gratitude and appreciation to Wells Fargo for providing me with the invaluable opportunity to embark on an enriching internship experience. This summer internship has been an incredible journey of growth, learning, and professional development, and I am truly honored to have been a part of the Wells Fargo team.

Firstly, I want to express my appreciation to VJTI TPO head Dr N P Gulhane and the HR department at Wells Fargo and all the support staff who have played a pivotal role in ensuring asmooth and productive internship experience.

Secondly, I would like to thank my internship mentor, Mrs. Seema Schrawne for her support and guidance throughout the internship period.

I am deeply thankful to all the individuals who have guided and supported me throughout this internship. My sincere gratitude goes to my supervisor and mentors, Mr. Rajesh Kannan Ramasamy and Mrs. Sweta Srivastava for their unwavering guidance, mentorship, and encouragement. Their insights and expertise have been instrumental in shaping my understanding of the industry and enhancing my skills. I am also grateful for having the chance to meet so many wonderful people who led me through my internship period.

I would also like to extend my thanks to the entire team at Wells Fargo for their warm welcomeand collaborative spirit. The camaraderie and teamwork I experienced during my time here have left a lasting impact on me.

I am grateful for the opportunities I had to work on challenging projects and tasks, which not only expanded my skill set but also deepened my understanding of the financial sector. The exposure to real-world scenarios and the chance to contribute to meaningful projects have been truly enriching.

My time at Wells Fargo has been an invaluable chapter in my professional journey, and I am excited to carry the lessons, experiences, and relationships I have gained forward with me. Thank you once again for this incredible opportunity.

Sincerely, Pranav Kute

# ABOUT WELLS FARGO

Wells Fargo stands as a venerable pillar of the American financial landscape, boasting a legacy dating back to its establishment in 1852 during the California Gold Rush. With a steadfast commitment to delivering excellence, the bank has evolved into a stalwart institution, providing a wide spectrum of financial services that cater to the needs of individuals, businesses, and institutions alike.

The institution's offerings encompass an impressive range, including retail and commercial banking, mortgage lending, investment banking, and wealth management. By embracing technological advancement, Wells Fargo ensures that its services remain easily accessible through an extensive network of branches and ATMs, supplemented by intuitive digital banking solutions. This dedication to innovation underscores the bank's responsiveness to the ever-evolving needs of its customers.

Wells Fargo's core values of integrity, customer focus, and community engagement drive its operations. Through its responsible banking practices, the institution has fostered a culture of accountability, ensuring that its customers' financial well-being takes precedence. This commitment to ethical conduct and customer satisfaction distinguishes Wells Fargo as an institution that prioritizes long-term relationships and mutual growth.

Recognizing the importance of community, Wells Fargo actively engages in philanthropic endeavors, striving to make positive contributions to society. These efforts underscore the bank's commitment to social responsibility and its role in promoting economic vitality and inclusivity in the communities it serves.

In conclusion, Wells Fargo's enduring legacy, commitment to innovation, ethical foundation, and community engagement position it as a cornerstone of the American financial sector.

Through its unwavering dedication to positive values, the bank continues to empower individuals and businesses, fostering financial well-being and contributing to the overall prosperity of the nation.

# ABSTRACT

During my internship at Wells Fargo, I was engaged in a multifaceted role that encompassed data analysis, frontend development using React.js, and backend development using Flask. Throughout this experience, I honed my skills in the following areas:

In-depth Data Analysis: A significant portion of my internship involved conducting thorough data analysis on diverse financial datasets. I applied advanced analytical techniques to extract valuable insights and trends, contributing to well-informed decision- making processes. By synthesizing and visualizing this data, I played a role in enhancing the organization's understanding of market dynamics and risk assessment.

React.js Frontend Development: Another crucial aspect of my internship was leveraging React.js to design a web-based portal. Collaborating closely with the design team, I translated conceptual designs into interactive and visually appealing components. This involved creating intuitive user interfaces, optimizing user experiences, and ensuring seamless navigation. Through React.js, I contributed to the development of a dynamic and engaging portal that catered to user needs.

Flask Backend Development and API Creation: Additionally, I had the opportunity to work on backend development using Flask, a versatile Python web framework. I was responsible for creating robust routing mechanisms that facilitated smooth communication between the frontend and backend components of the portal. Furthermore, I designed and implemented RESTful APIs using Flask, enabling the exchange of data and interactions between different parts of the application.

In summary, my internship at Wells Fargo provided me with a comprehensive experience spanning data analysis, frontend development using React.js, and backend development using Flask. This multidimensional exposure allowed me to develop analytical skills, gain insights into the financial industry, and enhance my proficiency in modern frontend and backend technologies.

### CHAPTER 1: INTRODUCTION

As a cornerstone of the financial landscape, Wells Fargo has a storied history of adaptability and progress. My internship at Wells Fargo delved into the fusion of data analytics, React.js frontend expertise, and Flask backend mastery to create a cutting-edge portal. Over the course of my internship, I had the privilege of working on a project that combined cutting- edge technologies such as React.js for frontend development and Flask for backend implementation. The primary objective of this project was to design and develop an intuitive portal that would streamline various processes and enhance user experiences within the organization.

My role in this internship was multifaceted, involving web development aspects. I was entrusted with the responsibility of harnessing the power of data to derive meaningful insights that could guide the design and functionality of the portal. For the front-end development, I employed React.js, a cutting-edge JavaScript library known for its flexibility and scalability. This allowed me to create a visually engaging and user-friendly interface that catered to the diverse needs of the portal's users. I collaborated closely with the design team to translate conceptual designs into functional front-end components, ensuring a seamless and aesthetically pleasing user experience. On the backend side, I leveraged Flask, a powerful Python web framework, to build the foundation of the portal's functionality. This involved implementing data handling, user authentication, and various interactive features. The Flask backend served as the backbone of the portal, facilitating efficient communication between the front end and the underlying data sources.

Throughout my internship, I had the privilege of working in a collaborative and innovative environment at Wells Fargo. The experience provided me with valuable insights into the financial industry's technological landscape, as well as the chance to contribute to a project that directly impacted the organization's operational efficiency and user satisfaction.

In the following sections, I will delve deeper into the specifics of my role, the technologies I employed, the challenges I encountered, and the successful outcomes achieved during my time as an intern at Wells Fargo.

# CHAPTER 2: OBJECTIVE OF WORK

As an intern, the main objectives centered around gaining practical experience and a thorough knowledge of the various technologies used. The key goals were:

**Exploring Pathways and Bridging Theory with Practice**: Internships offer a unique avenue for individuals to navigate potential career routes ahead of graduation. They serve as a bridge between academic theories and real-world applications, aiding in self- assessment and skill alignment within one's chosen field.

**Unveiling the Power of Training Internships**: Within the realm of training internships, lies an opportunity to grasp firsthand experience and refine skills within a specific domain. These experiences mold participants into adept professionals, equipped with practical insights crucial for their future journey.

**Showcasing Skills and Embracing the Learning Journey**: A key aspect of internship goals involves not only highlighting existing proficiencies in the chosen domain but also displaying an earnest enthusiasm for continuous learning. This tandem of skills and curiosity creates an enriching internship venture.

**Crafting Resumes with Experience and Expertise**: Internships serve as a goldmine for enriching resumes and honing skills that can be paraded in future job pursuits. Experiential learning during internships speaks volumes to potential employers about an individual's capabilities.

**Unearthing Insights through Data Analysis**: Delving into the depths of financial trade data, the objective is to unearth valuable insights, detect trends, and decipher patterns. This analytical endeavor empowers decision-makers with a comprehensive understanding, aiding strategic choices in a dynamic market landscape.

**Navigating User Interface Evolution**:Tasked with orchestrating a seamless transition from an antiquated user interface to a modern iteration, the goal encompasses not just retaining functionality but also enhancing user delight through aesthetics, intuitive navigation, and interactive elements. This transformation aims to elevate client engagement within a platform.

**Professional Development**: Actively seek opportunities to enhance personal and professional growth, such as attending training sessions, networking events, and workshops, to gain a broader perspective on the banking and finance industry.

## CHAPTER 3: WORK DETAILS

|  |  |  |
| --- | --- | --- |
| **WEEK** | **PERIOD** | **TASKS** |
| 1 | 5-6-2023 to  11-6-2023 | 1. Onboarding process 2. Connecting with the team 3. Workspace and tools. 4. Setting up VDI and raising tickets for software 5. Company Policies and Practices to be followed 6. Introduction about the entire project and walkthrough 7. Mandatory compliance and behavior Training |
|  | | |
| 2 | 12-6-2023 to | 1. Introduction to the problem statement. 2. Detailed overview of the project and outcome expected. 3. Brainstorming about different ways to approach the problem statement. |
|  | 18-6-2023 |
|  | | |
| 3 | 19-6-2023 to | 1. Deciding the tech stack that will be required for building the solution. 2. Dividing the tech stack between the team members on the basis of proficiency and interests. 3. Drawing the initial workflow diagram of the solution decided by the team members.   Making changes based on the review by the managers and  mentors. |
|  | 25-6-2023 |
|  | | |
| 4 | 26-6-2023 to | 1. Installation of Python and miniconda environments. 2. Getting access to the MongoDB database. 3. Learning React.js and web development fundamentals. 4. Setting up all the required libraries. 5. Getting access to the confidential data on which the problem statement is given. |
|  | 2-7-2023 |
|  | | |
| 5 | 3-6-2023 to  9-7-2023 | 1. Started with data analysis on the given confidential dataset. 2. Visualizing different trends and important facts from the data. 3. Simultaneously started with building a web portal for displaying the trends with react.js. 4. Explored different data analysis methods each having its advantages, and narrowed them down with guidance from managers. 5. Mid-term review with senior managers, getting their   feedback on the progress and inputs for the next steps of the project. |

|  |  |  |
| --- | --- | --- |
| 6 | 10-7-2023 to | 1. Working on the points mentioned in the mid-review. |
|  | 16 -7-2023 | 2. Continuing building the web portal. |
|  |  | 3. Adding charts and visualizations to the portal. |
|  |  | 4. Working on the backend and creating the API routes. |
|  | | |
| 7 | 17-7-2023 to  23-7-2023 | 1. Adding final touches to the web portal. 2. Preparing the final presentation. |
|  |  | 3. Final Demo with senior managers. |
|  |  | 4. Writing the documentation. |
|  |  | 5. Code refactoring. |
|  | | |
| 8 | 24-7-2023 to  29-7-2023 | 1. Extending the project with 2 more data analysis methods. 2. Extending the web portal. 3. Document the changes made once approved by supervisor. 4. Code refactoring. 5. Once all changes are approved, push the final code on Git Hub. |
|  | | |
| 9 | 30-7-2023 to  4-8-2023 | 1. Code refactoring. 2. Updating documentation. |
|  |  | 3. Knowledge transfer to a wider team. |
|  |  | 4. Demo to reporting and hiring manager. |
|  |  | 5. One-on-one meeting with the managers. |
|  |  | 6. Device handover and exit process formalities. |
|  |  | 7. Farewell. |

**CHAPTER 4: TECHNOLOGY LEARNED**

##### React.js:

React.js is a widely-used JavaScript library for building dynamic and interactive user interfaces. Developed and maintained by Facebook, it simplifies the creation of reusable UI components, streamlining web development. React employs a virtual DOM (Document Object Model) to efficiently update only the necessary parts of a webpage, enhancing performance. Its component-based architecture fosters modular, maintainable code, making it a top choice for single-page applications, progressive web apps, and mobile app development. With a robust ecosystem of libraries and a supportive community, React.js empowers developers to craft responsive, user-friendly web applications with ease.

##### Flask:

Flask is a lightweight and flexible Python web framework used for building web applications. Known for its simplicity and minimalism, Flask provides the core tools and libraries needed for web development while allowing developers to choose additional components based on their specific project requirements. It follows the WSGI standard and includes features like URL routing, template rendering, and support for extensions, making it a popular choice for creating web applications, APIs, and microservices. Flask's simplicity and scalability have made it a favored option for both beginners and experienced developers looking to build web applications quickly and efficiently.

##### JavaScript:

JavaScript is a versatile and widely used programming language primarily employed for front-end web development. It enables the creation of interactive and dynamic elements within web pages, enhancing the user experience. JavaScript is supported by all modern web browsers, making it a crucial tool for building responsive and engaging web applications. Its capabilities include DOM manipulation for altering web page content, event handling to respond to user actions and asynchronous programming for handling tasks like data retrieval. Additionally, JavaScript can be used on the server side through platforms like Node.js, extending its utility to full- stack web development and a wide range of application domains.

##### MongoDB

MongoDB is a widely used NoSQL (non-relational) database management system that stores data in a flexible, schema-less format. Developed to handle large volumes of unstructured or semi-structured data, MongoDB is designed to be highly scalable and efficient. It uses a document-oriented model, where data is stored in BSON (Binary JSON) format, making it easy to work with complex data structures.

MongoDB's features include horizontal scaling, support for geospatial data, text search capabilities, and a powerful query language. It's often used in web applications, big data, real-time analytics, and content management systems, providing developers with a versatile and scalable database solution.

##### Git/Github:

Git is a distributed version control system (VCS) that enables developers to track code changes efficiently. It maintains a detailed history of modifications, facilitating collaboration and the ability to switch between different code versions. GitHub, a web-based platform built around Git, serves as a collaborative hub for code hosting, project management, and issue tracking. It simplifies teamwork by offering features like pull requests and integrations with various development tools. Git and GitHub together empower developers to work seamlessly on projects, manage code repositories, and contribute to open-source initiatives, enhancing the transparency and efficiency of software development processes.

##### Core Python:

Core Python stands as the quintessential programming language known for its elegance and versatility. With its rich standard library and intuitive syntax, Core Python is the foundation upon which countless applications are built. From scriptingto web development, data analysis to artificial intelligence, Core Python's adaptability empowers developers to bring ideas to life with code that is both readable and efficient. Python was used extensively in automating manual touchpoints.

##### Miniconda:

Miniconda emerges as a nimble marvel, offering a lightweight and efficient Python distribution. Its essence lies in simplicity and agility. Within Miniconda's embrace, developers find the Conda package manager—a tool that simplifies package management and environment creation. This combination empowers developers tocurate custom Python environments tailored to each project's needs, elevating the precision and reproducibility of Python-based endeavors.

##### Microsoft Excel:

Microsoft Excel, the venerable spreadsheet juggernaut, is the canvas on which data-driven stories unfold. From intricate calculations to intuitive data visualization, Excelempowers users to transform raw data into insights. It's the embodiment of cells, formulas, charts, and macros—a platform that both novices and experts wield to extract meaning from numbers.

##### Data analysis Libraries :

Data analysis libraries refer to specialized tools and packages used by data analysts and data scientists to manipulate, process, and visualize data effectively. These libraries provide a wide range of functions and methods for tasks such as data cleaning, transformation, statistical analysis, and machine learning. Some popular data analysis libraries in Python, for instance, include:

* + 1. Pandas: A versatile library for data manipulation and analysis, offering data structures like DataFrames and Series, as well as functions for data cleaning, grouping, and merging.
    2. NumPy: Essential for numerical computing, NumPy provides arrays and mathematical functions for operations like linear algebra and statistical analysis.
    3. Matplotlib: A powerful library for creating static, animated, or interactive visualizations in Python.
    4. Seaborn: Built on top of Matplotlib, Seaborn offers an easier interface for creating informative and attractive statistical graphics.
    5. Scikit-Learn: Widely used for machine learning tasks, Scikit-Learn provides tools for classification, regression, clustering, and more.

These libraries, among others, empower data analysts and scientists to efficiently work with data, gain insights, and build predictive models.

**IDE used: VS code**

## CHAPTER 5: LEARNING AND EXPERIENCES

My internship journey provided me a valuable experiences and knowledge in various aspects of software development and quality assurance. Throughout the weeks, I acquired essential skills and insights, including:

**Learnings:**

1. **Data Analysis Proficiency:** The extensive data analysis of daily financial trade data enhanced your skills in data manipulation, statistical analysis, and deriving actionable insights. You learned to navigate complex datasets and extract valuable information for strategic decision-making.
2. **Financial Insights:** Engaging with financial trade data provided deep insights into market trends, risk assessment, and volatility. This experience expanded your financial acumen and showcased how data-driven insights influence financial strategies.
3. **Software Development Skills:** Participating in UI migration exposed you to software development practices, including coding, version control, and collaborating within cross-functional teams. You honed skills in front-end development and gained practical experience in a software development environment.
4. **Technical Proficiency**: Through hands-on experience, I acquired technical proficiency in data analysis, React.js for frontend development, and Flask for backend development. These skills are valuable assets for my future career.
5. **Web Development Expertise:** Building an entire user-friendly frontend using React.js and crafting a robust backend with API routes using Flask honed my web development skills. I gained insights into creating interactive and efficient web applications.
6. **Professional Collaboration:** Working closely with the team at Wells Fargo taught me the importance of effective collaboration in a corporate setting. I learned how to communicate and coordinate with professionals from diverse backgrounds.
7. **Mentorship and Learning:** The mentorship and guidance I received were invaluable. Interacting with experienced professionals inspired me to continue my learning journey and seek excellence in my work.
8. **Corporate Environment Exposure:** Immersing yourself in the corporate environment of Wells Fargo granted you insights into industry norms, compliance standards, and professional conduct. This exposure cultivated your ability to navigate a corporate setting effectively.
9. **Documentation Proficiency:** Engaging in projects necessitated meticulous documentation of procedures, methodologies, and outcomes. This experience honedyour documentation skills, essential for preserving project knowledge and aiding future endeavors.
10. **Project Management Insights:** Collaborating on projects exposed you to project management fundamentals. You gained insights into planning, resource allocation,and timeline management, crucial skills in driving successful project outcomes.
11. **Agile Modelling Understanding:** Engaging in agile modeling practices acquainted you with agile methodologies, emphasizing iterative development and adaptability. This experience prepared you for dynamic work environments that require flexibility and continuous improvement.

**Experiences:**

1. **Hands-on Financial Data Analysis:** Immersing yourself in real-world financial data strengthened your ability to work with complex datasets. You gained hands-on experience in data preprocessing, statistical analysis, and generating actionable insights.
2. **Real-World Application**: My internship provided me with the opportunity to apply theoretical knowledge gained from coursework to real-world scenarios, bridging the gap between academia and practicality. These learnings have not only enriched my technical skill set but have also equipped me with a holistic understanding of the corporate world and the financial sector. They will undoubtedly shape my future career and professional development positively.
3. **Corporate Work Etiquette:** Working in a corporate environment introduced you to professional conduct, workplace etiquette, and the significance of adhering to industry standards. This exposure prepared you for future roles in similar settings.
4. **Documentation Practices:** Engaging in documentation demonstrated the value of well-structured documentation in preserving project knowledge and aiding collaboration. You learned how to create comprehensive documentation for reference and knowledge sharing.
5. **Presentation Mastery:** Crafting and delivering presentations refined your ability to communicate complex technical concepts effectively. This experience prepared you to convey insights and findings to diverse audiences with clarity and impact.
6. **Project Management Exposure:** Collaborating on projects allowed you to witness project management in action. You gained insights into project planning, resource allocation, and timeline management, valuable skills for future project-oriented roles.
7. **Agile Modelling Dynamics:** Engaging with agile modeling practices familiarized you with agile methodologies, adapting to changing requirements, and delivering incremental improvements. This experience equipped you with agility in managing dynamic project landscapes.

My internship at Wells Fargo has been a transformative experience, equipping me with technical expertise in data analysis, web development, and automation. Beyond skills, I've imbibed the values of ethical conduct, collaboration, and a commitment to excellence, setting a strong foundation for my future career in the financial industry.

## CONCLUSION

My nine-week internship at Wells Fargo has been an invaluable journey of learning and growth. Throughout this experience, I've had the privilege to work on a diverse range of projects, from data analytics to front-end and back-end development.

One of the most significant takeaways has been the exposure to the dynamic and innovative world of banking and finance. I've gained firsthand insights into how a leading financial institution like Wells Fargo operates, its commitment to customer satisfaction, and its focus on ethical conduct.

During the initial weeks of onboarding and team integration, I gained valuable insights into the corporate world's practices and norms. This foundational knowledge prepared me to tackle the challenges that lay ahead. The exposure to a dynamic team environment, coupled with setting up essential tools such as VDI and software tickets, allowed me to seamlessly transition into project-focused work.

Additionally, the technical skills I've acquired, particularly in data analysis, React.js, and Flask, have enriched my toolkit as a future software professional. Building an entire user- friendly front end and crafting a robust backend with API routes has given me hands-on experience in web development. The automation of data analysis tasks using Python libraries has highlighted the importance of efficiency in handling large datasets.

Above all, the support and mentorship I received from the team at Wells Fargo have been instrumental in my learning journey. Collaborating with professionals who are passionate about what they do has inspired me to continue pushing boundaries and seeking excellence in my work.

In conclusion, my internship at Wells Fargo has been an enriching experience that has not only deepened my technical skills but has also provided me with valuable insights into the financial industry. It has prepared me to tackle real-world challenges and has strengthened my determination to contribute meaningfully to the field of software development. I'm grateful for this opportunity and excited about the prospects that lie ahead in my career.

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