SCTR's Pune Institute of Computer Technology
Dhankawadi, Pune

AN INTERNSHIP REPORT ON

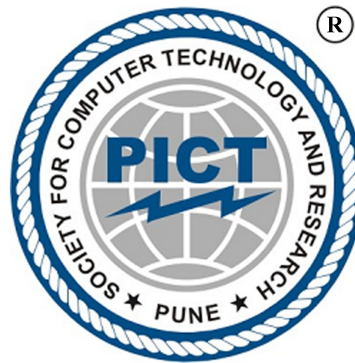Software Engineering Intern at Bajaj Finserv

SUBMITTED BY
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Class: TE03
Roll no: 31376

Under the guidance of
Prof. Jayshree Mahajan

DEPARTMENT OF COMPUTER ENGINEERING
ACADEMIC YEAR 2023-24

DEPARTMENT OF COMPUTER ENGINEERING

SCTR's Pune Institute of Computer Technology
Dhankawadi, Pune
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CERTIFICATE

This is to certify that the SPPU Curriculum-based internship report entitled
"Software Engineering Intern at Bajaj Finserv"

Submitted by
Mustafa Trunkwala
Roll No. : 31376

has satisfactorily completed the curriculum-based internship under the guidance of *Prof. Jayshree Mahajan* towards the partial fulfillment of third year Computer Engineering Semester VI, Academic Year 2022-23 of Savitribai Phule Pune University.

Prof Jayshree Mahajan   Dr. G. V. Kale
Internship Guide   Head
PICT, Pune   Department of Computer Engineering
                                                                         PICT, Pune

Place: PICT
Date:

Acknowledgement

It gives me great pleasure in presenting the internship report on "Software Engineering Intern at Bajaj Finserv".

First of all I would like to take this opportunity to thank my internship guide Prof. Jayshree Mahajan for giving me all the help and guidance needed. I am really grateful for her kind support and valuable suggestions that proved to be beneficial in the overall completion of this internship.

I am thankful to our Head of Computer Engineering Department, Dr. G.V.Kale, for her indispensable support and suggestions throughout the internship work.

I would also genuinely like to express my gratitude to the Department Internship Coordinator, Prof.P.P.Joshi, for her constant guidance and support and for the timely resolution of the doubts related to the internship process.

Finally, I would like to thank my mentor, Mr. Ajay Prabhu for his constant help and support during the overall internship process.

Contents

1 Title

Software Engineering Intern at Bajaj Finserv

2 Introduction

At Bajaj Finserv, a leading Indian financial services company, I had the opportunity to intern as a software engineer within their dynamic IT department. This role was comprehensive and multifaceted, immersing me in both the development and implementation of software solutions that enhance the efficiency and effectiveness of financial services.

Bajaj Finserv is renowned for its innovative approach to providing integrated financial solutions, and as an intern, my responsibilities were pivotal in supporting the company's digital transformation initiatives. My primary role involved contributing to a variety of projects across the software development life cycle, from initial design through to deployment and maintenance.

As a software engineer intern, I actively participated in the coding and testing of new software applications, working closely with senior engineers and project managers. This role not only required a strong technical ability but also an understanding of financial models and customer needs, ensuring that all software solutions were robust, scalable, and user-friendly.

The experience at Bajaj Finserv was enriched by the company's commitment to technology and innovation. I was encouraged to engage in problem-solving and critical thinking, which enabled me to contribute effectively to the development of software that could handle complex financial operations and improve customer engagement.

Overall, my internship at Bajaj Finserv was an invaluable step in my career, offering a rigorous environment to hone my software engineering skills while learning about the financial sector's unique challenges and opportunities.

3   Problem Statement

The problem statement for the projects I worked on at Bajaj Finserv focused on enhancing user engagement and accessibility across diverse customer segments. Specifically, the first project addressed the inconsistency between the app and web versions of a progressive web application (PWA). This discrepancy could lead to a fragmented user experience, potentially diminishing user satisfaction and engagement. The objective was to develop a software tool that could identify and visually represent these differences, thereby aiding in their resolution to ensure a seamless cross-platform user experience.

The second project tackled the challenge of language barrier, which can significantly hinder customer interaction and service accessibility. The goal was to develop a sophisticated translation model capable of converting English content into various regional languages with high accuracy and contextual relevance. This would enhance the inclusiveness of Bajaj Finserv's digital content, making financial services more accessible to non-English speaking customers, and thereby expanding the company's reach within India's diverse linguistic landscape.

4   Objectives and Scope

4.1   Objectives of the Projects

Project 1: PWA Consistency Tool

1. **Develop a Diagnostic Tool:** Create a software tool that can identify and clearly display the differences in functionality and user interface between the app and web versions of a progressive web application (PWA).

2. **Enhance User Experience:** Use the insights gained from the diagnostic tool to harmonize the user experience across platforms, ensuring that users receive the same functionality and visual experience whether they access the service via mobile app or web browser.

3. **Optimize Development Efforts:** Streamline the development process by providing developers with precise, actionable data on discrepancies that need resolution, thus reducing the time and resources spent on troubleshooting and adjustments.

Project 2: Language Translation Model

1. **Develop a Translation Model:** Build a machine learning-based model capable of translating English content into multiple regional languages with high accuracy and contextual integrity.

2. **Improve Accessibility:** Enhance the accessibility of financial services by providing multilingual support, thereby catering to a wider audience across different linguistic demographics.

3. **Increase Customer Engagement:** By offering content in regional languages, improve customer interaction and satisfaction, fostering greater engagement and loyalty among non-English speaking users.

4.2   Scope of the Projects

Project 1: PWA Consistency Tool

- Scope: The tool will be developed to analyze and compare UI/UX elements and functional behaviors across multiple versions of the company's PWA. The scope includes gathering requirements, designing the software architecture, implementing the tool, and integrating it into the existing development pipeline for continuous usage and feedback.

Project 2: Language Translation Model

- Scope: This project will encompass the development of a language translation model using advanced NLP techniques and existing machine learning frameworks. The model will initially focus on key regional languages identified based on customer base demographics. The scope covers data collection, model training, testing for accuracy and context, and deployment for real-time translation on the company's customer-facing platforms.

Both projects are aimed at not only addressing immediate business needs but also setting a foundation for continuous improvement and adaptation to evolving customer expectations and technological advancements.

5   Methodological Details

1. Project Initialization:

- **Stakeholder Meetings:** I outline project goals with stakeholders.

- **Resource Allocation:** I assign resources including team members, tools, and budgets.

2. Requirement Analysis and Planning:

- **Define Requirements:** I identify specific needs for the PWA tool and translation model.

- **Technical Specifications:** I detail the architectures and technologies to be used.

- **Project Roadmap:** I schedule phases, milestones, and deadlines.

3. Design and Development:

- **Unified Design:** I design the user interface for the PWA consistency tool and the architecture for the translation model.

- **Implementation:** I develop both projects using agile methodologies, allowing for iterative testing and improvements.

- **Integration:** I ensure both projects integrate seamlessly with existing systems.

4. Testing and Refinement:

- **Parallel Testing:** I conduct unit and integrated tests for both projects.

- **Feedback Loop:** I refine both projects based on feedback from end-users and stakeholders.

5. Deployment and Evaluation:

- **Phased Rollout:** I implement a phased rollout strategy, beginning with pilot phases to monitor performance.

- **Performance Monitoring:** I continuously monitor the performance of both projects using pre-established metrics.

- **Ongoing Optimization:** I regularly update and optimize both projects based on real-world usage data and evolving business needs.

This approach enables me to manage both projects efficiently, leveraging shared resources and ensuring they complement each other while delivering enhanced organizational value.

6   Modern engineering tools used

Automated Screenshot and Comparison Tool

- **Python:** A high-level programming language used for automation scripting and data manipulation.

- **Selenium WebDriver:** An automation tool for web applications testing, used to automate browser actions and capture screenshots.

- **OpenCV:** An open source computer vision and machine learning software library, used for processing images and performing operations like difference checking and highlighting discrepancies.

Custom Language Translation Model

- **Pre-trained Models:** Leveraging state-of-the-art models in NLP for translation tasks, including:
    - mBART
    - MarianMT
    - XLM-R
    - T5
    - mT5
    - OpenNMT

- **Custom Dataset:** Development of specialized datasets tailored to specific language pairs, integrating various sources and potentially involving data scraping techniques.

These tools were pivotal in not only enhancing productivity but also in ensuring the delivery of high-quality software solutions during my internship.

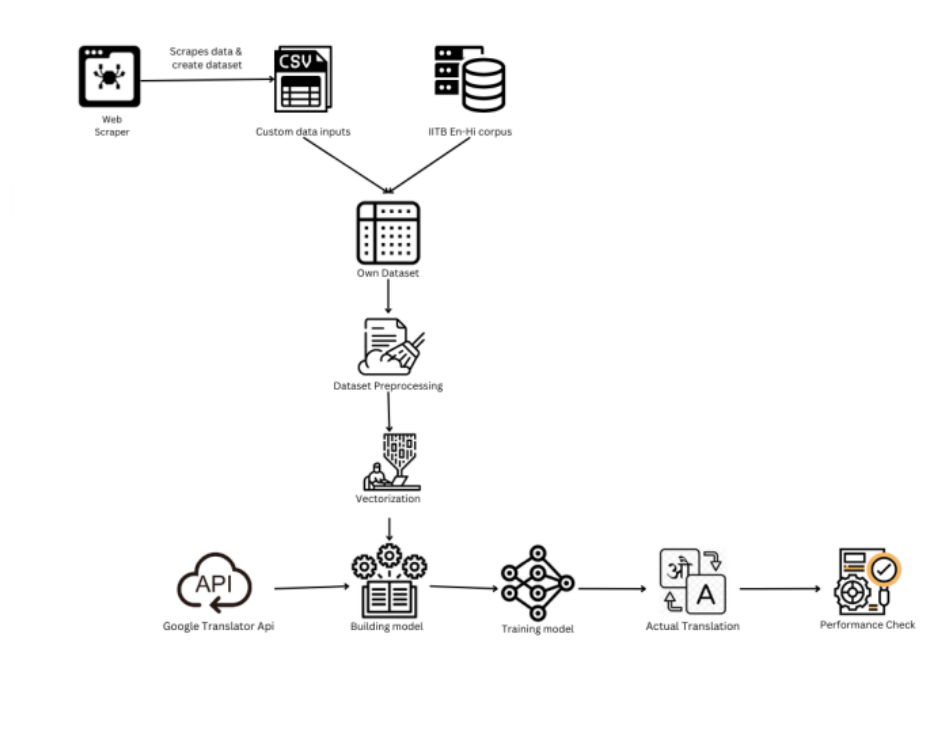# 7 Outcome/ Results of Internship Work (Screenshots of Work Done)

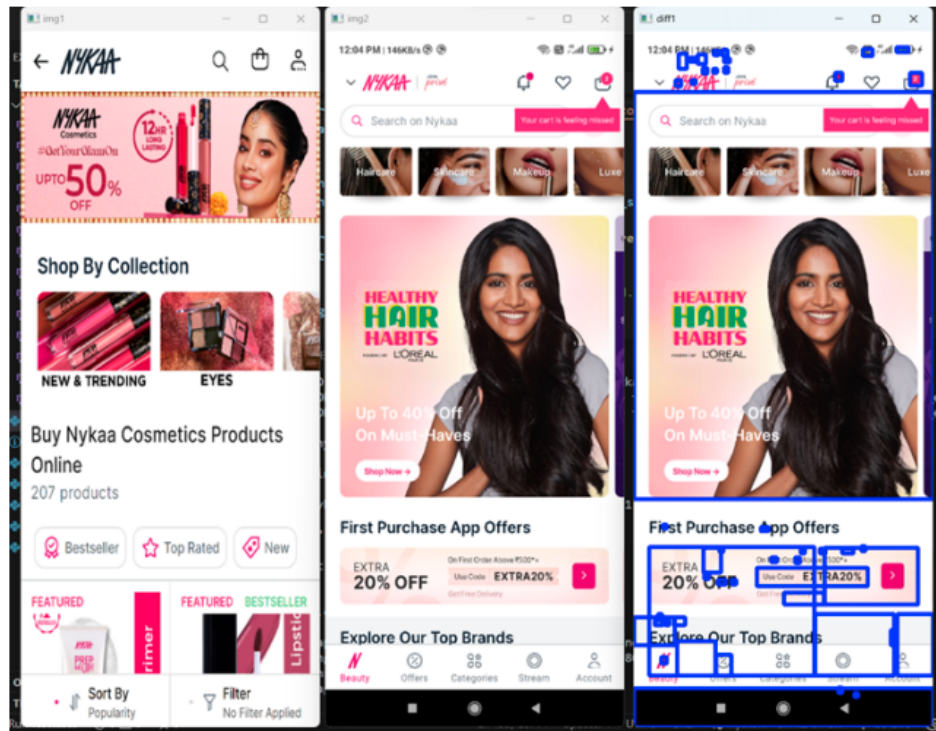Figure 1: Flow for the Translation Model
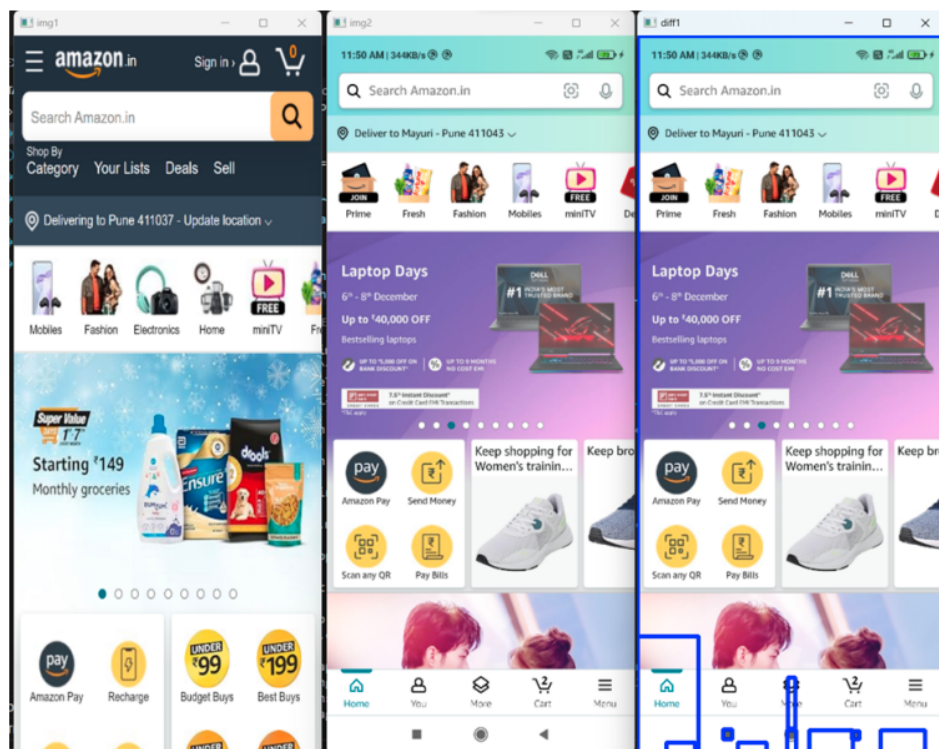
Figure 2: Screenshot for the Comparison Tool

Figure 3: Screenshot for the Comparison Tool

8 Any achievement (Job opportunity, project sponsorship, patent, commercial product, research publications, pre-placement offers, a strong professional network etc.)

While the internship projects have achieved significant milestones, there are avenues for future exploration and enhancement. Possible future work includes:

- **Enhanced Visual Comparison Tool:** Further refinement of the Automated Screenshot and Comparison Tool by incorporating advanced visual comparison algorithms and supporting a broader range of web application technologies.

- **Multimodal Language Translation:** Expanding the capabilities of the Custom Language Translation Model to handle multimodal inputs, such as translating text embedded in images or audio, to make the translator more versatile.

- **User Interface (UI) Integration:** Integrating user-friendly interfaces for both projects to make them more accessible to users with varying technical expertise.

- **Scalability and Deployment:** Investigating strategies for scaling the tools to handle large-scale applications and exploring deployment options to make them readily available for industry applications.

The Byte Spark internship provided valuable insights and hands-on experience in cutting-edge technologies, laying the foundation for continuous learning and innovation in the dynamic fields of software testing and natural language processing.