Chapter 1: Introduction

1.1. Introduction

Over the course of my Backend Python Developer Internship at Khalti Digital Wallet, the chance was given to fully embrace the software development culture and observe how it has been used effectively to deliver software to the masses. Khalti Digital Wallet is one of the well-known names in innovative financial solutions, offering a wide array of innovative and advanced solutions to commercial banks, development banks, financial institutions, and several other large enterprises. The company is committed to using advanced technology with the view of enhancing financial inclusion and making digital experience seamless.The primary responsibility, as a member of the backend team, has been to learn how to streamline and enhance the development and operational processes, so that the resulting systems could be robust, efficient, and reliable.

The main duty included understanding and implementation of software practices, simplify different parts of the software development process. This entailed creation as well as optimization of various software systems while increasing overall team's productivity.

Additionally, there was an opportunity given to observe how consumers utilize various features and services of a large digital wallet platform. The users were facing difficulty and also in the customer facing department there was lots of issue regarding the email address and verification, thus i worked on the email change/verification system feature.

Real-world experience with Software Development, complementing the theoretical knowledge I previously acquired, has been one of the best outcomes of this internship. A better understanding of the collaborative and iterative nature of software development was also achieved. Khalti has been able to produce quality software faster by focusing on continuous improvement, optimization, and ensuring effective communication between development and operations teams. These skills and ideas will help in handling future challenges in this area, thereby contributing to becoming an even better software engineer.

1.2. Problem Statement

In the development of a digital wallet application at a fintech company, a robust and secure email verification system was required to enhance user account security and ensure the validity of email addresses used for communication. The system needed to address two primary scenarios: the verification of a new user's email address upon signup and the updating of an already verified email address. In both scenarios, it was crucial to ensure that the email verification process was secure, reliable, and user-friendly, preventing unauthorized access and ensuring that only verified email addresses were used within the system.

To achieve this, a feature was developed using Django and Django REST framework for the backend, with Celery employed to send emails asynchronously. The feature involved storing the user's email in the database with an is_email_verified flag set to false upon signup and sending a one-time link to the user's email for verification. For users updating their verified email addresses, a two-step verification process was implemented, where a one-time link was first sent to the old email address and, upon clicking, another one-time link was sent to the new email address. The system ensured that both links were clicked for the email change to be completed and verified. Extensive testing, including unit and integration tests, was conducted to ensure the implementation's effectiveness and reliability.

Addressing these problems was crucial for maintaining Khalti's competitive edge, ensuring customer satisfaction, and supporting the company's growth objectives.

1.3. Objectives

The primary objectives of my internship at Khalti Digltal Wallet were:

i) **To work**:
Work in a real-world corporate environment to understand team dynamics, project management, and effective communication within a professional setting.

ii) **To tackle**:
Tackle real-world challenges and develop solutions, enhancing critical thinking and problem-solving abilities.

iii) **To implement**:
Implement various steps of software development life cycle, to gain hands-on experience developing scalable backend application.

iv) **Collaboration with Senior Developers**:
To collaborate with senior developers and learn best practices in coding and project management.

1.4. Scope and Limitation

1.4.1. Scope
The scope of my internship included the following key areas:

i) **Backend Development Contribution**:
Django and Django REST frameworks used to construct APIs for the digital wallet, including a payment scheduling feature with functionalities for scheduling, rescheduling, and automatic execution.

ii) **Agile Development Participation**:
Involvement in the software development lifecycle, potentially encompassing sprints, code reviews, and collaboration with mentors and teams to deliver the payment scheduling feature.

iii) **Mentorship and Knowledge Acquisition**:
Guidance from experienced developers, understanding of secure backend development for financial applications and best practices within the software development lifecycle.

iv) **Technical Skill Development**:
Enhancement of python programming skills and expertise in the Django framework. Expanding knowledge of financial regulations while addressing challenges and proposing codebase improvements.

1.4.2. Limitations
Despite the comprehensive scope, there were some limitations during my internship:

i) **Limited Project Scope**:
The internship focused primarily on the development of a single feature (email change/verify) within the digital wallet, potentially limiting exposure to the broader functionalities of the application.

ii) **Intern-Level Responsibilities**:
Tasks were assigned with an intern's experience level in mind, potentially offering less opportunity to work on complex backend functionalities or core system architecture.

iii) **Focus on Specific Technologies**:
The internship primarily used Django and Django REST framework, potentially limiting exposure to a wider range of technologies and frameworks used in the industry.

iv) **Time Constraints**:
The internship's timeframe may have restricted the ability to delve deeper into specific technical aspects or explore alternative approaches to the payment scheduling feature.

1.5. Report Organization

This report is structured into four main chapters, each detailing different aspects of my internship experience at Khalti Digital Wallet. Here is a brief overview of each chapter:

i) **Chapter 1: Introduction**
This chapter introduces the work completed during my internship. It outlines the problem statement, the objectives of the internship, the scope and limitations of the project, and provides an overview of the report's organization.

ii) **Chapter 2: Organization Details and Literature Review**
In this chapter, a comprehensive introduction to Khalti Digital Wallet has been provided. This includes an overview of the organization, its hierarchy, the various domains in which it operates, and a detailed description of the department where internship has been completed. Additionally, this chapter includes a literature review or related study, highlighting relevant theories and frameworks that underpin the works that have been performed during the internship.

iii) **Chapter 3: Internship Activities**
This chapter delves into the specifics of my internship activities. It outlines my roles and responsibilities, provides a weekly log of the technical activities, describes the involved projects, and details the technical tasks and activities have been completed successfully. This section offers an in-depth look at the hands-on experience obtained.

iv) **Chapter 4: Conclusion and Learning Outcomes**
A brief overview of the experience gained during the internship is also stated in this last part, as well as the main conclusions. It mentions my skills and knowledge, challenges I faced and how I dealt with them. Additionally, the section talks about what the future holds in terms of career development after such an opportunity.