



Shahjalal University of Science & Technology, Sylhet

Internship Report

Course Code: SWE 420

Performed At:



Pathao Limited

Submitted By:

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Department of SWE

IICT, SUST

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LETTER OF TRANSMITTAL

July 14, 2022

Director

Institute of Information & Communication Technology

Shahjalal University of Science & Technology, Sylhet

Sir,

I would like to submit this internship report as a part of my internship program (SWE420) of seventh semester. I have been working as an intern at Pathao Limited for six months time period, starting from September 01, 2021 to February 28, 2022.

This report covers my overall experience with the company, includes both my learning phase and the active participation with the current workforce. I hope that, this document will portrait my total experiences, gathered knowledge and accomplishments. I'm looking forward to your valuable feedback on my entire report.

Sincerely yours,

Fazle Rabbi Rakib

Registration No. 2017831030

Semester: 4/1 (Seventh semester)

Department of Software Engineering

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LETTER OF ENDORSEMENT

To Whom It May Concern

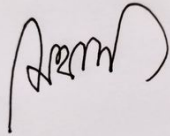
Subject: Approval of the Report

This letter is to certify that the report entitled with “**Internship Report**” has been submitted to me prior to the final submission.

It also certifies that, all the information mentioned in this document is true and not confidential to the company. The projects mentioned here have had successful involvement of Fazle Rabbi Rakib, (2017831030), Institute of Information & Communication Technology, and Shah-jalal University of Science & Technology.

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

Internship Supervisor,



Emran Ul Hadi
Staff Enginner
Pathao Ltd.

Acknowledgement

To begin, I'd want to express my appreciation towards the **IICT** faculties and officials for arranging this internship program for me. I am really thankful to the **Pathao Limited** for recruiting me as an intern and also to be part of a significant phase of my academic career.

I take this opportunity to express my profound gratitude and deep regards to my Team Leader **Emran Ul Hadi**, Staff Enginner, Pathao Ltd. for his outstanding advice, supervision, and consistent support during this internship.

I also make this chance to express a profound sense of gratitude to **Prof M. Jahirul Islam, PhD., PEng.**, Director of IICT, SUST and **Fazle Mohammed Tawsif**, Assistant Professor of IICT, SUST for conducting the industry personals and giving me the opportunity to participate in the internship at such a prestigious organization.

I am incredibly thankful towards **Nafiul Islam**, Staff Software Engineer of Pathao Ltd. & **Omar Faruque Tuhin**, Senior Software Engineer of Pathao Ltd. for their constant support and guidance.

I also take this opportunity to express a deep sense of gratitude to **Rezwan Kader Mishu**, Vice President Of Engineering of Pathao Ltd. & **Md. Touhidul Islam**, Senior Software Engineer of Pathao Ltd., for their cordial support and supervision.

I am also thankful to **Tanvir Rahman & Tasmia Alamgir**, Software Engineer of Pathao Ltd. for helping me to understand the technical terms, processes, guiding me through the problems I faces & problem-solving technique that were necessary for me to complete the assignments at various stages of the program.

I will always be indebted and immensely grateful to **Shifat Adnan**, CTO of Pathao Ltd. for inspiring me and for his constant support in intern.

I would also want to express my gratitude towards all my **team members**, people in **Technology** and **Human Resource** department for the valuable information provided by them in their respective fields and help me out with any issues. I appreciate their cooperation during my internship.

Executive Summary

This document serves the purpose of highlighting my experiences and contributions during the internship period in **Pathao Limited**. It also reflects the academic and non-academic acquired knowledge, accomplishments and challenges during the internship program. The scope of this document is to identify and describe the analysis performed, an overview of **Pathao Limited** as a company, technical and non-technical experience gained, and an emphasis on my accomplishments.

Students who are undertaking the B.Sc.(Eng.) in Software Engineering from **Institute of Information and Communication Technology(IICT)** of **Shahjalal University of Science and Technology(SUST)**, should undergo an industrial training of six months prior to graduation. According to the curriculum, The internship program carries out total of 18 credits. The objective of this program is to avail an opportunity for its students to experience and gain practical knowledge of the software engineering profession.

As a bachelor program student at IICT, SUST, my industrial training was conducted at **Pathao Limited**, an on-demand digital platform which provides a number of logistics services and technological solutions for different real life scenarios.

The industrial training period at **Pathao Limited** has given me exposure to the industrial working life, a deeper understanding how a top tech company operates. Besides, throughout the training program, I've received the appropriate work-related training, which has strengthened my technological expertise.

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Chapter 1

Introduction

1.1 Preface

Internship is a form of experiential learning that integrates knowledge and theory learned with real-world applications and skills development in a professional setting.

Institute of Information and Communication Technology (IICT) provides an glorious opportunity to it's students of having a six-month internship within their academic curriculum. One of the key goal of the institute is to provide more skillful people in our emerging software industry.

The internship program is possibly most effective, one of the finest ways to gain industry orientation. Student can connect their academic learning with real-world applications by the course of this program. I have tried my best to combine the both. I hope I'm successful. The fact of being successful or not will be determined by the implication of the experience where it is required.

The company I was sent for internship is **Pathao Limited**. It is one of the most successful and leading technological start-ups, on-demand digital platform company in Bangladesh.

1.2 Objective

This report has been prepared as a requirement of the internship program (**SWE420**) according to the curriculum of department of **Software Engineering, IICT, SUST**. The report is meant to emphasize my accomplishments, project involvements and professional development during the internship period.

1.3 Source Of Information

All the information presented here is authentic. The authenticity is based on by the review of **Pathao**. I have presented different kinds of information in this report which I gathered or experienced during internship period. All the information has been collected from different kinds of written document from Internet or shared via my own experience without violating the confidentiality of **Pathao**.

1.4 Scope

This report highlights my experiences and knowledge's that I have earned through the internship program. The key factors that decided my scopes are stated below -

- The company profile of **Pathao** and its culture.
- Collaboration manner and software engineering practices.
- My role and experiences working with a team.
- Growth of my technical and professional experience.

1.5 Limitations

There are some limitations that are impacted on this report. Limitations of the report are stated below in brief -

- Due to the **non disclosure agreement** or **NDA** between the author and the company, some information, such as, project details, business logic and motivations is restricted to be published.
- The experience I shared via this report will represent my point-of-view which may differ person-wise.
- Due to pandemic, this report won't be able to completely emphasize on physical work culture effectively.

Chapter 2

Company profile

2.1 Overview

Founded in **2015**, **Pathao Limited** has initially started its journey as an on-demand digital platform with **parcel delivery service** across the Dhaka city. It is among the fastest growing tech startups in Asia which has dedicated itself to solve some of the country's most challenging problems in logistics and transportation.[1]

With a hope to accelerate the establishment of digital Bangladesh, **Pathao** provides services in one single platform, by harnessing the power of data-driven technology. Pathao currently provides on-demand ride-sharing, parcel, courier, food delivery, e-commerce, pharma, health, media-consumption services.

Pathao follows a **SuperApp** model[2], providing all of its services through one app. App is updated frequently to make the overall app navigation more straightforward and more accessible for all users.

At **2018**, Pathao has expanded its business by availing similar logistics services beyond the nation's boundary, in **Nepal**[3]. This is the first time that a Bangladeshi ride sharing platform has been launched operations beyond its borders.

Being a fast paced company, it gives it employees an immense amount of space to develop professionally as well as take ownership of the initiatives undertaken in the organization. Pathao has built a platform that enables employment for thousands of people and a product that millions of consumers use in Bangladesh. From top to bottom, Pathao has now employs over **1200** people.

This organization stands for four basic principals which is strictly maintained by each employee from the very beginning[4]. They are,

1. **Customer First:** Pathao exists to serve. Everything we do impact thousands of people.

2. **One Pathao:** Nothing at Pathao is someone else's problem. We all work together on a shared mission!!
3. **Everyone Matters:** Anyone who is a part of the Pathao family is valuable. No one is of any less important than someone else.
4. **Empathy and Kindness:** We want our people to be smart and driven but also be kind and have empathy for others.

2.2 Services

Based on the its customer roles, Pathao provides several internal and external services for its business partners and target customers. The main product, The **Pathao App** provides the following services[5]:

2.2.1 Ride Sharing Services

Pathao is majorly well-known for its ride sharing platform. Customers can select their destination on the app and based on the service type a registered car captain or rider will arrive at the user's destination and drop him/her at his/her destination. Based on the types of vehicle, it has two types of services,

1. **Pathao Bike:** Pathao has over 50,000 bikes registered in it's platform. It is one of the safest and cost saving transportation available. Also, it is convenient for the metropolitan cities to avoid traffic jam. .Pathao is providing bike services in Dhaka , Narayanganj, Tongi, Gazipur, Sylhet and Chittagong metropolitan city area.
2. **Pathao Car:** Car is also availed based on customer's choice and comfort. The car ride sharing service is only available **Pathao Car Plus** format.

Pathao is providing ride sharing services in Dhaka, Narayanganj, Tongi, Gazipur, Sylhet and Chittagong metropolitan city area in Bangladesh. The ride sharing service is also available in Kathmandu, Nepal from 13th September, 2018.

2.2.2 Pathao Food

It is an online food delivery service of Pathao. Pathao Food connects three user classes at one place: Customer, Restaurant, Rider. Users can Select the food they want from thousands of restaurants. This is one of the most trusted and widely used online food delivery platforms in the country.

2.2.3 Pathao Parcel

Pathao parcel is an on demand intra-city delivery service. Users can send gifts, documents, packages, accessories, electronics, perishable, homemade foods to any destination in the same city in the shortest time. Users can also track the status and location of the delivery man on the app. User can avail this service within Dhaka & Chattogram Metropolitan cities.

The services it provides to its users are:

- On demand delivery
- Emergency parcel delivery

2.2.4 Pathao Courier

Pathao parcel is an on-demand delivery service for B2B. Merchants can send products to any destination within Metropolitan cities of Dhaka, Chittagong, Sylhet, Khulna, Rajshahi in the shortest time. It has two delivery options:

- Standard delivery within 24-72 hours
- On-demand/Express Delivery within 4-6 hours from point of pick-up to the customer (Dhaka city only)

The services it provides to its merchants are:

- Nationwide Delivery : Offering home delivery to 50+ Districts Nationwide where packages will be delivered to customers' doorstep within 48-72 hours
- Fulfillment solution
- Corporate Service/Contract Logistics
- Cash on Delivery
- Reverse logistics is provided that allows customers to return their products

Receivers can also track the status and location of the delivery man on the app. It has now more than 3000+ business partners.

2.2.5 Pathao Shop

Pathao Shop is an e-commerce platform for online shopping with a wide collection of products and fastest delivery. It offers authentic lifestyle, beauty, electronics products and more to its consumer. The products are delivered directly at customer's doorstep. Pathao Shop aims to provide users a pleasant experience by providing a variety of products to select from the app and deliver it within a shortest possible time. **The services it provides to its users are:**

- Authentic product from trusted sellers
- Return & Refund for eligible products
- A great collection of curated products personalized for user

2.2.6 Pathao Pharma

Pathao pharma is the online medicine delivery service of the platform. Users may use the Pathao app to order medicine from authentic pharmacies and have it delivered to their doorstep. It has been a very crucial service during this pandemic.

2.2.7 Pathao Tong

Pathao tong is the ultimate online grocery shop for users. Users can select the shop and order the groceries they want and products are delivered at their doorstep.

2.2.8 Pathao Health

Pathao Health is launched with the promo of 'Connecting People With Health Resources'. This service on Pathao platform is powered by **Maya**, a digital platform that is re-inventing the way people in developing countries access vetted expert advice. Pathao Health provide services with the of Maya are:

- Getting accurate information, checking symptoms and seeking medical advice online is now easy
- Instant doctor answers feature
- Generating e-prescription based on doctor's consultation

2.2.9 Video Streaming & Gaming Services

Pathao has partnered with **Bongo BD**, an on demand video streaming company to show their contents from the Pathao app. Pathao also teamed up with **Goama** games to add exciting mobile games in the app.

2.2.10 Digital Payment Services

Customers can link their online banking systems or other payment providers to make the payment process go more smoothly. It provides Instant payments, cashless ride ensuring full safety and security. Pathao accept digital payment through mobile financial service(Bkash, Nagad) & multinational car services(Visa, Mastercard). Due to the pandemic outbreak, this service has grown in popularity.

2.2.11 Driver and Merchant Apps/ Dashboards

To make the services smoother and faster Pathao also provides mobile application and Dashboards in driver and merchant end. Together, the whole system is called "Marketplace".

2.2.12 Buy Now Pay Later (BNPL)

'Buy Now, Pay Later' (BNPL) feature has been rolled out on November 16th, 2021. The feature allows shoppers to split the cost of goods into instalments with no interest but a late fee if payments are missed. In so doing, it offers consumers more purchasing power without pressuring their finances.

2.3 Departments in Pathao:

Pathao has a very large workforce to complete their day to day goals and provide its user of all kinds, a good experience. The daily operations of Pathao takes place by following strategic methodologies combined by the participation different departments as follows:

- Technology
- Operations
- Marketing
- Sales
- Finance
- Accounting
- Human Resources
- Customer Support

As I have been recruited as an intern under the technology department, in the next sub-section I'll try to give an overview of **Technology Department** of Pathao.

2.3.1 Technology Department:

Pathao's Technology department consists with nation's top tech minds. The amazing skill set and vision of each individuals here keeps Pathao moving towards its goal, and motto, '**Moving Bangladesh**'.

This department is divided into few individual teams. These are:

- Android Team
- Data Engineering Team
- Design Team
- iOS Team
- Product Team
- Platform Team
- Software Quality Assurance Team
- Web Engineering Team

Every team works together to meet the requirements and provide the best software solutions for each project and product courtesy to the pleasant yet professional environment at work. Though each team has different type of works and methodologies, their works are correlated with one another.

2.3.2 Android Team:

Android team manages the Pathao app and the Driver app for Android mobile devices. As most of Pathao's services are mobile application based and most people use Android devices, the role of this team is very crucial. The Android team creates new features, upgrades apps with the newest technology, and always looks for ways to enhance user experience.

2.3.3 Data Engineering Team:

Pathao always emphasizes the importance of utilizing technology. With the advancement of data science and artificial intelligence, services can be more efficient and produce more accurate and profitable results. Pathao has a highly experienced and skillful data science team that aspires to create models to handle various complex problems and make the products more efficient. Additionally, they provide the presentable data needed by product teams.

2.3.4 Design Team:

Design team makes the UX/UI designs for the Pathao App and other services of Pathao. This team works with the development teams and product team to establish how the UI design should be based on customer's behavior which is later implemented by the iOS, Android and web engineering team on the products.

2.3.5 iOS Team:

iOS team manages the Pathao app and the Driver app for iOS mobile devices. iOS team works very closely with the Design, Product, Platform and Quality Assurance Team. Similar to Android team, iOS team upgrades apps with the newest technology, and always looks for ways to enhance user experience.

2.3.6 Product Team:

Product team build, deploy, monitor, and are on call for the platform components and underlying platform infrastructure. The responsibility of the team is to define the strategy to solve problems, building the roadmap, and defining product structure. This team sets up and provides underlying services required by the other teams. Product team works as a bridge between business and engineering ends.

2.3.7 Platform Team:

Platform team develop services that are consumed by other services. Devops team is also a part of platform team. Services which are developed in this team may not directly used by the app but other services. Platform is the largest team in Pathao tech department.

2.3.8 Software Quality Assurance Team:

SQA or Software Quality Assurance team is responsible for testing and ensuring the quality of the software developed by the development teams. SQA team scrutinizes the user app, driver app and other internal and external services and dashboards.

2.3.9 Web Engineering Team:

Web Engineering team is responsible for developing various web based projects, used for both internal and external services. The team mainly manages all the dashboards and administrative panels used by the clients or stakeholders Pathao has partnered its business with. Web Engineering team conducts with versatile jobs including development of the internal libraries and tools, product integration and alignment with other teams. This team closely works with product, design, platform, sqa, android and ios teams. I have been assigned to this team after recruitment.

2.4 Office Environment & Employee Facilities:

Frederick Herzberg theorized that employee satisfaction has two factors: “**hygiene**” and “**motivation**”.[6] Hygiene issues, such as salary and supervision, decrease employees’ dissatisfaction with the work environment. Motivators, such as recognition and achievement, make workers more productive, creative and committed.

Pathao has successfully fulfilled the two dimension of employee satisfaction. In the later part, I’ll go into more detail about how Pathao achieved these two dimensions in brief in the following section.

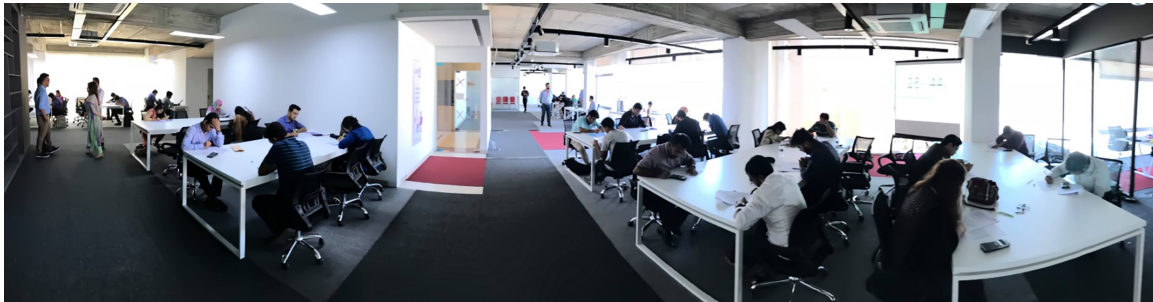


Figure 2.1: Work Environment

2.4.1 Domestic Environment:

Pathao provides an excellent working environment with all necessary facilities. People of Pathao works in a collaborative manner and everyone wants to give there best. The shared mission of solving different problems and challenges each day boosts the employee productivity and help to deliver a better product to the customer, as well as building their own skills.

In addition, the office premises is consistently organized and clean. It contains multiple distinct conference rooms as well as a specialized cafeteria to ensure that the workplace atmosphere is free of noise.

Moreover, to persist a good grip on market and for continuous growth Pathao team is always focused on cutting edge technologies and have a flexibility to adapt better methodologies. This characteristics made Pathao a good place to learn new things.

2.4.2 Office Schedule

Employees have to work for **45 hours** per week as per company policy. Office hour starts at 10:00am and ends at 7:00pm, from **Sunday to Thursday**. There is an

one hour break from 1:30 pm for lunch and prayer. Even in a pandemic crisis, the company offers its staff flexible working hours.

2.4.3 Sync Meetings & Communication Channel

1. **Daily Stand-ups:**

Daily stand-up meeting is conducted at the very beginning of the day by each team, where each team member briefs about the tasks he has been assigned with and his plan for the following day. This helps all team members to be informed on the daily status and progress of the team. It assists managing **daily scrum**; more on daily scrums will be explored later.

2. **Employee All hands:**

A monthly employee all-hands meeting is held at Pathao headquarters, Banani. The meeting's goal is to keep all employees informed about the company's current challenges, progress of on-going-projects and status of live projects. After pandemic situation, this meeting is conducted virtually through Workplace or Google Meet.

3. **Communication Channel:**

Pathao uses **Workchat** and **Workplace** as its primary communication tool, developed by Facebook. Following the recruitment process, Pathao administration creates an account for each employee. This communication channel allows one to contact anyone in the firm at any time. Furthermore, following the covid outbreak, **Google Meet** is largely utilized for meetings and one-on-one conversations.

2.4.4 Lunch & Snacks

We were provided lunch and evening snacks which is offered by the team-lead of my team. Also, there is tea, coffee available all the time provided from the office.

2.4.5 Festival Celebration & Team Dinner

Pathao celebrates every occasional day in a colorful way. It celebrates the **New Year** by offering wonderful gifts to the employee. **Pahela Falgun, International Women's day** were celebrated with great enthusiasm. After the joining ceremony in Pathao, we were warmly welcomed with lovely gifts By Pathao.

Pathao grants a monthly allowance to each team for the purpose of organizing a **team lunch/dinner**. This allows team members to get to know one another and form strong bonds.



(a) Joining Ceremony & New Year Celebration



(b) Gift packs & Signature Team Dinner

Figure 2.2: Recreational Activity in Pathao

2.4.6 Recreation

Pathao organizes several events for recreation. It takes part in different inter-software sporting events & organizes indoor sporting event in Pathao. Pathao has indoor gaming facilities like: table-tennis. It also arranges new year party & our celebrates traditional events like: Pohela Falgun. At the end of each three months, it organizes a signature dinner party. In a calendar year, it organizes a annual tour on various location.

2.5 Hybrid Office Hours during pandemic:

The coronavirus (COVID-19) epidemic has created considerable anxiety and economic distress for consumers, businesses, and communities worldwide. All Pathao employees have been instructed to continue working from home due to public health concerns in the hype time of covid.

Due to the ups and downs of the covid scenario, Pathao department teams began experimenting with **Hybrid Office** concepts. This involves **one or two days** of work each week at the office and the **rest of the week** from home. This made it easier for the team to communicate and sync while dealing with the covid epidemic.

On the contrary, to ensure employees productivity, office hour has been kept **flexible**. Also, several of virtual tools were introduced to keep each team synchronized in their respective work.

Chapter 3

Software Methodologies & Cultures

This chapter briefly emphasize on the software development methodologies that is generally followed in software **development processes** in Pathao. Also at the end of the section, we will find out some of the **development tools** that has made the life of an developer simpler and smoother.

3.1 Development Process Management

Pathao Engineering Department follows the **Agile** software development process. Agile software development refers to software development methodologies that has the the ability to create and respond to change. The ultimate value in Agile development is that it enables teams to deliver value faster, with greater quality and predictability, and greater aptitude to respond to change.

Solutions evolve through collaboration between self-organizing cross-functional teams utilizing the appropriate practices for their context. In Pathao, Agile is the most suitable process for its cross functional teams working together. **Kanban** and **Scrum** are two most widely used Agile framework in Pathao.

3.1.1 Kanban

Kanban is a visual method of project management used to track tasks and reduce inefficiencies in a project. The heart of the Kanban method is the Kanban board—physical or digital—in which phases of the project are divided into columns. Tasks are written on cards that progress from one column to the next, until the task is completed.[7] Example of columns in Kanban board are:

- To-Do: tasks that should be done.
- Work-In-Progress: tasks that are currently on development process.
- Issues: reported issues by team lead.
- Done: tasks that are finished.

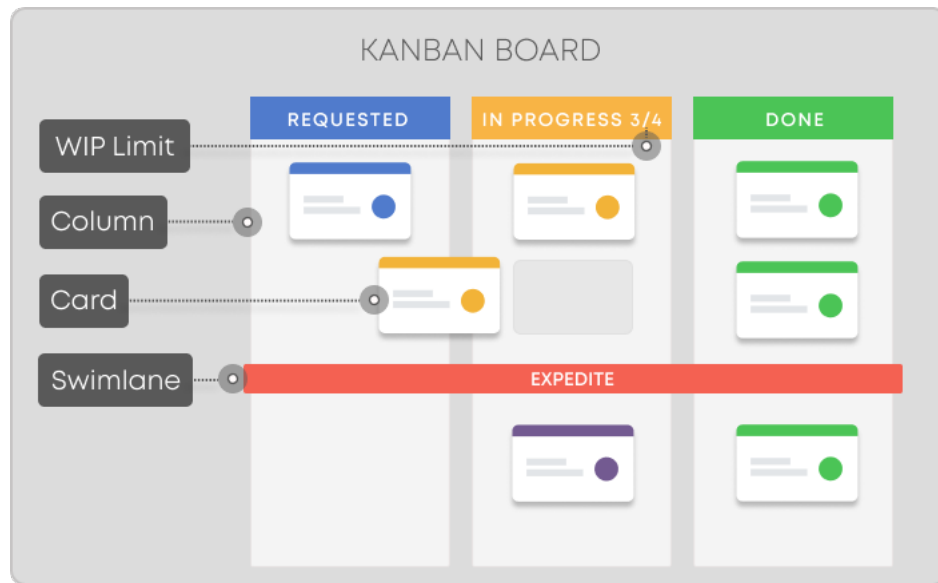


Figure 3.1: Kanban Board

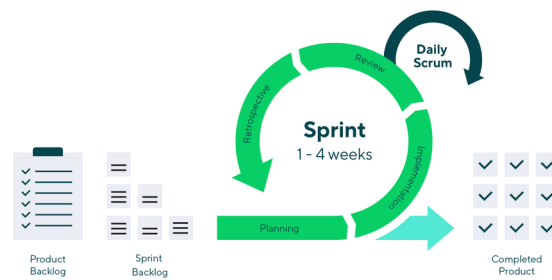


Figure 3.2: Scrum Process flow

3.1.2 Scrum

Scrum focused on continuous improvement, which is a core foundation of agile. Scrum framework focuses on ongoing work getting done. It is a lightweight process framework for agile development that used to manage complex software and product development, using iterative and incremental practices.[8]

Another term we want to mention here is **Sprint**. Sprint is one time boxed iteration of a continuous development cycle. Within a Sprint, planned amount of work has to be completed by the team and made ready for review.

1. Sprint Planning

Sprint plan is an action in Scrum that kicks off the sprint. After all the **documentations** and **designs** are finalized, the product owner, scrum master

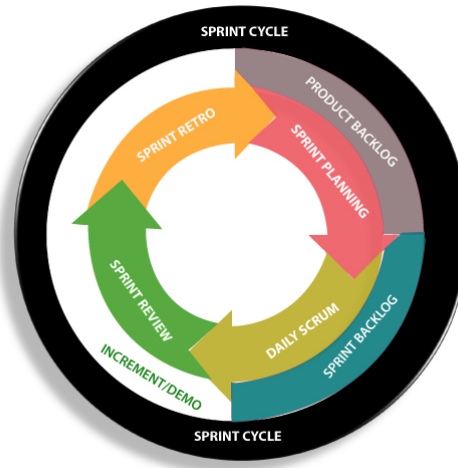


Figure 3.3: Sprint Cycle

and the developers from different team, along with the designers comes along. The tasks are broken down into multiple linear tasks. Generally each sprints are **2-4** weeks long based on the product complexity, size and requirements. There are three major fragments in each sprint,

- **Product Backlog:** Product backlog is a list of sub-tasks that is generated from breaking the end product. Product owner or product manager set priorities to the tasks that need to be done and maintain a master list of work. It is, essentially, the developer team's "To Do" list. The Product Owner constantly monitor, re-prioritize and maintain the product backlog.
- **Sprint Backlog:** Sprint Backlog is the list of tasks, user stories, or bug fixes, selected by the development team with assigned team members for implementation in the current sprint cycle. A sprint backlog is flexible for adhoc based tasks and can evolve during a sprint. However, the fundamental sprint goal – what the team should achieve from the current sprint – cannot be compromised.
- **Sprint Goal:** The fundamental goal of a sprint is to fulfill the tasks that has been moved from Sprint Backlog to Board for current sprint. At the end of the sprint, a demo is demonstrated where the team shows what was completed in the sprint. After end of a sprint retro planning is arranged to create a new sprint backlog.

3.2 Software Development Life Cycle

After completing the learning phase in Pathao, I was assigned to the Pathao Web Team. I observed and learned how the features of web application's are developed

6 Phases of the Software Development Life Cycle

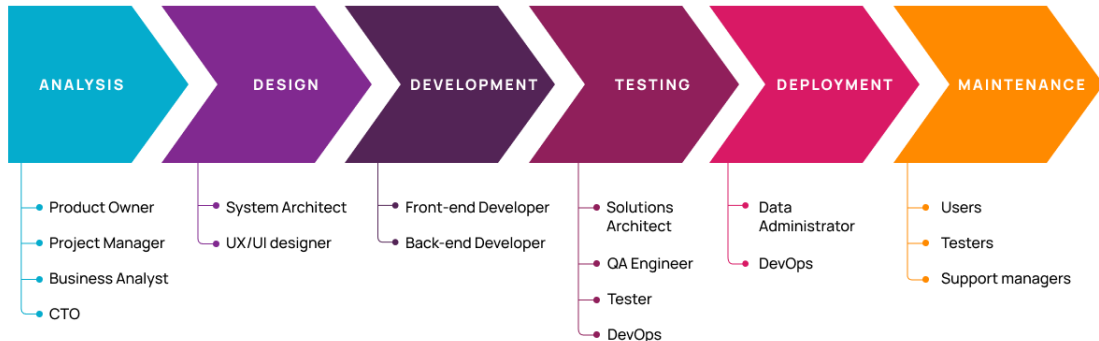


Figure 3.4: Software Development Life Cycle

and launched. The whole development cycle can be broken down into several discrete parts:

3.2.1 Requirement Specification

During the initial phase, product team gathers the requirements of the features or an entire new product that should be implemented. Meetings are scheduled with the product team, scrum masters, developers (both front-end and back-end), design, and quality assurance teams to analyze and finalize the requirements. Software Requirement Specification(SRS) document is made after a thorough analysis and study of the requirements. User Story is prepared and the requirements become locked and ready to be implemented.

3.2.2 UI/UX Design

As the requirements are locked, Design team starts to make the UI/UX design of the features or the entire new product. The designs are then shared with the other teams. Some design tweaking may occur based on feedback from other teams. The product is now ready for the developers to implement after the design has been finalized.

3.2.3 Development Cycle

Normally, all of the features and requirements from the back-end development team are met first. Then, the front-end development team then begins their sprint cycle.

1. **Back-end Development:**

Back-end development team starts their work as soon as Sprint begins. The team lead assign one or more team members to any specific task based on task complexity, size & requirement. They develops required services based on the project requirement.

2. **Front-end Development:**

Generally, The Front-end development team starts the sprint a few days prior to the Back-end development team. Front developers implements the interface according to the design approved by product team.

Codebase Review is also a part of the development process. The team lead or the senior team members of a certain team review the codes of the team members. They give their feedback on code optimization, efficiency. Then, the code is merged and set up for testing.

3.2.4 Testing

After the completion of product development, **EOD** (End of the Day) is declared by scrum master or product owner of the development teams. The portion of the code is frezzed and SQA team starts debugging & testing the developed features on deployed staged product. The issues and bugs are reported in sprint backlog or "To-do" list. Based on the backlogs, next sprint plans are set up with the reported issues & bugs.

3.2.5 Bug Fix & Re-staging

Development team starts fixing reported issues & bugs found by SQA team. After bug fixing is completed, the application is then re-launched on stage for more inspection. On stage, the application is run on use cases from real life scenarios. If there are any issues found at stage, the SQA team reports the issues & bugs and the whole process is repeated again.

3.2.6 Production Deployment

After several sprint cycle, the SQA team announces the product is good to go when the application is at a stable state, the product owner comes to a decision about application release. The **DevOps** team deploys the application for production.

3.2.7 Sprint Retrospective

This is the final stage of the development process.

- All the team members reflect on the entire work flow to review about the process.
- Finding out if the work could have been done more efficiently in any different way and to create methods to solve the problems aroused in this sprint.
- Based on these reviews, a document is created so that the work flow can be improved for future tasks which will increase productivity on a large scale.

3.2.8 User Acceptance testing

Pathao conducts user acceptability testing on all applications before they are made public. This is referred to as a UAT release, in which the application is utilized as a beta tester by Pathao personnel from the top down. This method not only identifies technical flaws, but also operational facts and loop-holes that must be fixed.

3.2.9 Final Release & Maintenance

All bugs mentioned by beta users are resolved after a longer or shorter UAT period, and the program is ready for final release. As the market demands, technologies are always improving, and numerous edge cases emerged from time to time. Following that, another scrum or kanban procedure is used.

3.3 Development Tools

Pathao uses many tools for maintaining and managing its projects. These technologies provide a smoother experience for its developers, making the development process transparent, trackable, cross-team collaboration simpler, and overall work-friendly. Based on working experience some are mentioned below:

3.3.1 Project Repository

Pathao uses its own custom repository served by GitLab's organizational tool named as **Magic**. This is an end-to-end software development platform with built-in version control, issue tracking, code review, continuous integration/continuous deployment pipeline features, using an open-source license, developed by GitLab Inc.

3.3.2 Google Meet

Google Meet is an enterprise-grade video conferencing tool, developed by Google. It serves Pathao's online meeting and communication needs for cooperation and synchronizing.

3.3.3 Jira

Jira is a proprietary issue tracking product, widely used by agile development teams to track bugs, stories, epics, and other tasks, developed by Atlassian that allows bug tracking and agile project management. Pathao uses Jira as a project management tool, for breaking down the tasks, assign them to the developers and maintain the sprint with timeline.

3.3.4 Trello

Trello is a web-based project management tool, developed by Trello Enterprise, a subsidiary of Atlassian. Pathao uses Trello as a tool for listing down issues that found out in the phase of quality assurance, tracking the progress of discovered issues.

3.3.5 Google Docs & Sheets

Pathao uses Google Docs as a tool to create and update documents, primarily product requirements documents (PRDs) that are shared among teams. It also uses Google Sheets as a tool to construct the planning of various products and essential documents for development.

3.3.6 Figma

Figma is a web-based UI and UX design application, connects team members in the design process so teams can deliver faster, better products. Pathao uses Figma for creating interface designs, shares projects, files, pages and frames with team member who has access. Design team, product team, front-end developers and back-end developers collaboratively uses this application.

3.3.7 Workplace

Workplace is an enterprise collaboration platform, a mobile and web app that aims to provide connection and collaboration among coworkers of an enterprise. Pathao connects its employees through Workplace. It facilitates inter- and intra-departmental communication and connection in Pathao.

3.3.8 Tunneling Software

For security purposes, Pathao uses tunneling software of its own. This tool ensures that only authorized personnel and devices are permitted to use the hosted services rather than allowing direct access to them.

3.3.9 Sentry

Sentry is a platform for crash reporting that provides real-time visibility into production deployments with information to replicate and fix crashes. Pathao uses Sentry tool as an application monitoring platform that helps to identify and report issues in real-time.

Chapter 4

Internship Activities

4.1 Overview

Software Engineer Intern is responsible for contributing to software design & development. An internship program gives a student the opportunity to explore & learn along with a glimpse of professional life. I am lucky enough to get my internship opportunity in Pathao. Skills & knowledge that I have gathered in this internship period will guide me to have a better career.

As I have been assigned to **Web Engineering Team** in **Pathao**, I collaborate with my other team members in creating secure & reliable software solutions. The basic responsibility of this team are:

- Its primary responsibility is to manage and build **web-based** projects, which include various internal and external dashboards operated by Pathao employees and business associates.
- The team is also in charge of developing numerous **tools & libraries** for serving its development needs.

4.2 Training Period

As internship is a short-term job training, anyone should have in-depth knowledge prior about the technologies to work on that field. In university program or course I had hands-on experience on building projects. But the industry requires in-depth knowledge about the technology it uses on daily basis.

Based on team suggestion, I have been advised & guided to acquire concrete skill specifically for **front-end development**. The total timeline of the training period was **two months**. In this two months, I've learned basic technologies that is used in this team.

The learning period can be sectioned into two different phases. Each phase a total timeline of **one month**. The technology that I learnt in my leaning phase are briefed below emphasizing on the process:

4.2.1 JavaScript Basics

JavaScript is a lightweight, interpreted, cross-platform, object-oriented scripting language used to make webpages interactive (e.g., having complex animations, clickable buttons, popup menus, etc.). There are also more powerful server side versions of JavaScript such as Node.js, which allow to add more functionality to a website than simply downloading files (such as realtime collaboration between multiple computers). JavaScript can be attached to the objects of its environment inside a host environment (for example, a web browser) to allow programmatic control over them.

JavaScript ES6 (also known as ECMAScript 2015 or ECMAScript 6) is the newer version of JavaScript that was introduced in 2015. ECMAScript is the standard that JavaScript programming language uses. ECMAScript provides the specification on how JavaScript programming language should work. As most of the browsers and tools supports ES6, I was advised to learn the latest features it offers.

The JavaScript learning period can be divided into three sections:

1. Learn through Documentation & Tutorial:

At the beginning, I was guided with how to learn something new from scratch. "What should I follow" and "What should I not follow" was clearly defined to me. For example, I need to have clear idea about how the JavaScript works behind the seen. There are some blogs and documentation that has been followed are:

- <https://javascript.info/js>
- <https://developer.mozilla.org/en-US/docs/Web/JavaScript>
- <https://www.w3schools.com/js/default.asp>
- <https://js.zonayed.me/>

I also followed a tutorial named **JavaScript - The Complete Guide 2021 (Beginner + Advanced)** by **Maximilian Schwarzmüller**. This helped me learn JavaScript from scratch and in great detail. The course is also designed as project driven learning as a result I have hands-on experience of code in JavaScript.[9]

2. Solve Problems:

This is elaborated in section 4.2.3

3. Build Demo Projects:

This is elaborated in section 4.2.4

4.2.2 VueJS Basics

Vue is a JavaScript framework for building user interfaces. It builds on top of standard HTML, CSS and JavaScript, and provides a declarative and component-based programming model that helps to efficiently develop user interfaces, be it simple or complex.

Similar to the JavaScript learning process, VueJS learning process can be divided into two sections:

1. Learn through Documentation & Tutorial:

As I have already trained with JavaScript learning process, VueJs learning process path was smoother for me. I have searched the internet for blogs & documentation. The official documentation helped me than anything else. Link of official documentation:

- <https://v2.vuejs.org/>

I also followed a tutorial named **Vue JS Crash Course** by **Traversy Media**. This helped me learn JavaScript from scratch and in great detail. The course is also designed as project driven learning as a result I have hands-on experience of code in VueJs.

In addition, I followed another tutorial named **Vue - The Complete Guide (incl. Router & Composition API)** by **Maximilian Schwarzmüller**. This one helped me to acquire knowledge some of the topics that were not elaborated in the previous tutorial.[10]

2. Build Demo Projects:

This is elaborated in section 4.2.4

4.2.3 Solve Problems

The best way to learn is to build something with it or to have hands on practice.

1. Edabit : A Problem solving site using JS:

Edabit is a website with **JS coding challenges**. This is designed for beginner to solve problems in JS. I have solved like 15 basic problems on this site.

Major Learning Focus:

- JS Basics
- Strings, Booleans, Arrays use in JS
- Arithmetic operations, Conditions, Loops in JS

- Functional Programming in JS
- Fixing buggy code

Site Link: <https://edabit.com/>

Profile Link: <https://edabit.com/user/obDKxs9ph5r22fL8K>

4.2.4 Demo Projects

I have also developed some simple projects during my training period that are mentioned below:

1. JavaScript 30 projects:

Javascript30 is a website with **30 Day Vanilla JS coding challenges**. This is designed for beginner to intermediate developers and designers who want to become comfortable with both JavaScript fundamentals and working in the DOM without a library. **Wes Bos** is the course creator.

Major Learning Focus:

- Basic HTML, CSS, JS
- ES6, Advanced JavaScript Concepts
- JS DOM Manipulation

Site Link: <https://javascript30.com/>

Solution Link: <https://github.com/Fazle-Rakib/Learning-JS/blob/main/Challenges/challenges.md>

2. To-do List

A list with everything that one have to do, with the most important tasks at the top of the list, and the least important tasks at the bottom. By keeping such a list, making sure that tasks are written down all in one place so one doesn't forget anything important. I have done a simple to-do list using **VueJS** with the help of an built-in api from **Herokuapp**.

Major learning of this project are:

- Creating a simple UI with HTML, CSS, JS using VueJS
- Vuex, a State Management pattern
- API consumption
- Setting up Vue Router

Project Link: <https://github.com/Fazle-Rakib/Learning-Vue/commits/main/Tasks/todo-list>

3. B64 converter

This web-based project is for B64 conversion, Base64 is a group of similar binary-to-text encoding schemes that represent binary data in an ASCII string format by translating it into a radix-64 representation. User can easily convert a simply encode or decode in Base64.

Major learning of this project are:

- Creating a more complex UI
- Implementing conversion logic in JS
- Used built-in package like **bcrypt**, **crptico**, **hash-wasm**
- Routing with Vue Router
- Tabular Data Representation
- Deploying static project in **Netify**

Project Link: <https://github.com/Fazle-Rakib/Learning-Vue/commits/main/Tasks/b64-converter>

Deployed Website: <https://onlinekeygenerator.netlify.app/>

4.3 Live Project Engagement

After completing the training period with the mentioned technology for two months, the most exiting phase of internship has been started. As I already mentioned that I have been assigned to **Web Engineering Team**, I have experienced to work with my team in some live projects for the next **four months**. But before that I have to fulfill some prerequisite to do so.

N.B.: The real name of the live projects can't be revealed as per Non Disclosure Agreement or NDA between the participant & the company.

4.3.1 Prerequisite For Live Project Involvement

After acquiring some fundamental knowledge about HTML, CSS, JS, & VueJS framework, I have been advised to look through some projects that were under development process. I have strictly followed the **companies confidentiality policy** to give an brief overview of each projects below.

1. Reading Code Base:

Reading codes developed by others is a key skill. I had to go through all the documentations and list out the features. Then I have drafted the flow of the project and learned about the conventions of writing readable codes, following the design pattern and file structuring.

2. Usage of Chrome Developer Tools:

Chrome Developer Tools is a complete developer toolkit that is embedded directly into the Chrome browser. These tools enable you to edit web pages in real time, diagnose problems faster, and construct better websites more rapidly. It also helps in inspecting currently-loaded HTML, CSS and JavaScript to showing which assets the page has requested and how long they took to load. Key learning's of Chrome Developer Tools are:

- Edit Web-page in real-time
- Diagnose the occurred issues by debugging JS
- Change in style on-the-fly
- Identify network activity on a timeline, showing payload and response in return.

3. Learning Tailwind CSS:

Tailwind CSS generates tiny utilities with a predefined set of settings that allow for the simple integration of existing classes right into HTML code. Custom CSS can be applied to the components with the help of this framework.

4. Usage of Postman:

Postman is an API client software that makes it easy for developers to create, share, test and document APIs. This is accomplished by allowing users to create, save, and read basic and sophisticated HTTP/s requests. Typically, information is returned, which Postman presents to the user by some styled or data re-presentable UI. Key learning's of Chrome Developer Tools are:

- Maintaining payload convention.
- Mapping the APIs response with data re-presentation in the dashboard.

4.3.2 Live Project Development

After successfully completing the training phase & acquiring fundamental knowledge about the technologies & tools, I have been assigned with some live project development. This section will cover-up a brief description about that:

1. Access Control Dashboard:

Access Control Dashboard maintains a list of rules that specifies which users are granted or denied access to a particular dashboard or system resource. It can be defined as Role-based access control (RBAC), a method of restricting access to other internal dashboard based on the roles of individual users within an enterprise.

Tools & Technologies:

- ExpressJS, a NodeJS framework for API implementation and routing.

- VueJS framework for UI
- Google Login Service
- Redis for user data
- MySQL
- Docker as application container
- Postman
- Gitlab
- Figma
- Trello Board

My Responsibilities:

- Add a new interface in the existing project.
- API integration.
- Input & Form data validation with disabling form submission based on validation.

Major Learning Focus:

- VueJS, Vuex, Vue Router, Vuelidate
- Basic HTML, CSS, JS
- ES6, Advanced JavaScript Concepts
- Usage of GitLab
- Code Restructuring
- Refactoring code smells
- Usage of trello board for issue resolving

2. Merchant Management Dashboard:

This is an internal application for Pathao. This application is used for creating, updating merchants, listing different types of transactions. This is a Pathao's ongoing project.

Note that, this project was still under development and the details is restricted to be published on any public document.

Tools & Technologies:

- ExpressJS, a NodeJS framework for API implementation and routing.
- VueJS framework for UI

- Google Login Service
- MongoDB
- Docker as application container
- Postman
- Gitlab
- Figma
- Trello Board

My Responsibilities:

- Form validation using Vuelidate
- Error handling with proper message showing

Major Learning Focus:

- VueJS, Vuelidate
- Basic HTML, CSS, JS
- ES6, Advanced JavaScript Concepts
- Usage of GitLab
- Code Restructuring
- Refactoring code smells

3. Pathao Foods Operational Dashboard:

This project serves by managing Pathao Foodman. The basic features of this project are: managing & allocating time-slots to specific food-man based on zones, sub-zones by Pathao CX operators. I have been working at front-end portion of this project.

Tools & Technologies::

- ExpressJS, a NodeJS framework for API implementation and routing.
- VueJS for frontend development.
- Google Login Service
- Redis for caching user login data, service data caching.
- MongoDB for saving logging data.
- Docker as application container
- Postman
- Gitlab

- Figma
- Jira Board

My Responsibilities:

- UI based on design
- Usage of Pathao component library
- Building custom component

Major Learning Focus:

- VueJS, Vuex, Vue Router, Vuelidate
- Basic HTML, CSS, JS
- ES6, Advanced JavaScript Concepts
- Usage of GitLab
- Code Restructuring
- Refactoring code smells
- Usage of trello board for issue resolving

Chapter 5

Thinks I Learned At Pathao

I have learned a lot of technical and abstract terms during this phase. This internship program enriched myself in both technical and non-technical aspects which I should apply to my professional carrier. The key points are mentioned below:

5.1 Technical Skills

5.1.1 Library, Tools and Frameworks

- VueJS
- Tailwind CSS
- Visual Studio Code
- GitLab
- Postman
- Figma
- Chrome Developer Tools
- Jira & Trello Board

5.1.2 Version Control Management

I have learnt basics of version control system mainly **GitLab** and also maintaining feature and fix tasks for project development. After each task and issue solving, a merge request is performed and code is reviewed by team lead. Naming convention for branching & commit message also have been learnt on this process. Resolving conflict in merge request is another leaning what I acquired during my internship period.

5.1.3 Focus on Documentation

For any kind of development, to maintain the development process, documentation is the ultimate key. So, reading and understanding the documentation is a key skill to fulfill the required task with perfection. I have read & wrote several documents in the process of learning & development phase.

5.1.4 Designing Based on Figma

Working with Figma is something I've never done before. At first, I faced some certain challenges which I overcome thanks to the generosity of my team mates. Fixel-perfect-design is a concept that I have been introduced with in this procedure. As a developer, it help me to understand how user experience/user interface can be more user friendly and appealing. It also helped me understand & some more style related up-gradation that can be done for better UI.

5.1.5 Code Review & Refactoring

Code review is the process of finding logical bugs, code smells, complex logical operations in place of more simpler one. My team lead & other team members reviewed my code thoroughly. This process help me understand my flaws of code which is creating logical issues, code smells. Then, I have started to review my own code for finding similar issues that occurred earlier. Refactoring is the procedure of restructuring code, while not changing its core functionality. After reviewing the code, I begin refactoring, which is the process of improving internal code by making many small changes, removing code smells, without altering the code's external behavior.

5.1.6 Usage of Kanban Board

A kanban board is an agile project management tool designed to help visualize to-do's, limit work-in-progress, and maximize the flow of work. I have used **Trello Board** with my team members to visualize the flow of my work. This empowers my team to manage any type of project, workflow, or task tracking. Collaboration was much easier by the use of this board.

5.1.7 Keep Updated of Technological Knowledge

I've always attempted to stay on top of any modifications to the project. Reading and comprehending the anticipated changes aided me in determining and quickly overcoming the barriers.

5.2 Non-Technical Skills

Technical learning is essential in an internship program but the professional learning is the sole purpose of it. Pathao has been an excellent place to work and learn simultaneously. I have grown as a more professional, punctual, organized person through this process. This will assist me to have a better professional carrier.

5.2.1 Professionalism

Professionalism is the conduct, behavior and attitude of someone in a work or business environment. Universities and software farms have quite diverse environments. In Pathao, people are quite smart, friendly and professional. These kinds of attitudes usually make me conscious of what I'm doing and motivate me to learn more about it. This also teaches me to adapt my perspective and that there is always more to learn and know.

5.2.2 Knowledge Sharing

In Pathao, I could approach & seek about anything at anytime to my team members. They are always keen to our interests and help us providing proper guidance. They always encourage us to discuss about the things we want to know and also to share our view so that we can learn more. Also, several sessions are conducted both in office premises and online where team people shares something new they've learned about. All in all, there is a group in workplace named '**Tech Knowledge Base**' for sharing knowledge among co-workers.

5.2.3 Communication

Communication skill is very important to perform effectively in a professional environment. Internships provide the students' a great way to improve their communication skills. In Pathao, I have worked with people of different teams. I have learned how to approach and seek for a help to anyone. Moreover, recreational sessions, employee welcome parties, team lunch, team dinner, chit-chat, farewells helped me to know and communicate with a large number of individuals.

5.2.4 Punctuality

Punctuality is an important factor in professional life. In Pathao, I attend office premises and gave our attendance within a certain time in regular time. In the pandemic outbreak, we had to attend a status meeting daily in a certain timestamp. Every single task in the workplace was completed in a timely manner.

5.2.5 Planning Before Doing

Before starting a task, I have always shared to my plan of doing the task with my team-lead or the supervisor. The art of planning, figuring out what you're going to create helps me understand the task deep-down. I have stated some of the planning technique below:

- Analyzing the task properly
- Identifying the aim of my plan
- Create a roadmap to do that
- Sharing my thoughts with the person in supervision
- Evaluate the plan & its impact
- Documenting the final plan
- Implement the strategic plan

5.2.6 Organizing Capability

The six months period in Pathao has been one of the finest ways to learn how to organize myself. In the Pathao internship interview, I stated **time-management** as one of my weakness. Now, I can state that only by applying the approach I followed in Pathao, I have become a much more organized person.

Chapter 6

Conclusion

The six months of internship was a time of experimentation, acquiring knowledge, boosting confidence. Completing my internship journey in Pathao is a matter of joy for me. Also I may have passed the best academic period of my life by experiencing real world technology.

The working environment of Pathao is truly wonderful. Everyone is really friendly and cooperative. I was provide with all the privileges of a regular employee. The co-operation among the employees was really amazing. Also, everyone was really professional about their work here.

The time in Pathao helped me to shape my thoughts and perspective in various way. I have been able to learn a lot not only about the huge operation behind company itself, but also some people with great mindset. This pleasant experience will help me to be confident enough about myself and take a healthy mindset in the future carrier.

I will remember Pathao as a place to learn, grow, push oneself to one's limit. Its practices & culture will always hold a particular place in my heart. It aided my development as a better human being capable of making wiser decisions and thinking more clearly.

Finally , I want to express my gratitude to everyone affiliated with this internship program and I wish this experience will be extremely beneficial to me in the future.

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