Case Study on

**Increasing Artificial Intelligence Ability of Maya For Better Digital Healthcare**

By

Rijve Rahman

ID 15204059

An case study report submitted to the BRAC Business School in partial

fulfillment of the requirements for the degree of

Bachelor of Business Administration

BRAC Business School

BRAC University

January 2021

# Declaration

It is hereby declared that

1. The internship case study submitted is my own original work while completing degree at BRAC University.
2. The case study does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The case study does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I have acknowledged all main sources of help.

**Student's Full Name & Signature:**

_____Rijve Rahman_____
Rijve Rahman

15204059

**Supervisor's Full Name & Signature:**

_____
Riyashad Ahmed
Assistant Professor of Finance & Director of Research
BRAC Business School
BRAC University

# Letter of Transmittal

Riyashad Ahmed

Assistant Professor of Finance & Director of Research

BRAC Business School

BRAC University

66 Mohakhali, Dhaka-1212

**Subject:** Submission of Internship Case study on "Increasing Artificial Intelligence Ability of Maya for Better Digital healthcare"

Dear Sir,

It is a great pleasure for me to complete my internship case study on "Increasing Artificial Intelligence Ability of Maya for Better Digital healthcare". I have tried my level best to go at the bottom of the matter and tried to bring out as much as information and relevant issues and made full use of my capabilities while making this case study fruitful. I have tried to follow all the instruction which I was given though I believe there may be some mistakes and shortcoming.

I am really thankful to you for your valuable advice, direction, instruction and great cooperation at each and every time. It would be really grateful if you kindly check my case study and evaluate my performance on this case study. Thank you.

Sincerely,

___Rijve Rahman_____

Rijve Rahman

15204059

BRAC Business School

BRAC University

Date: January 10, 2021

# Non-Disclosure Agreement

This agreement is made and entered into by and between Mayalogy Ltd and Rijve Rahman the undersigned student of BRAC University to undertake the internship project described in this case study based on the assurance of avoiding the unapproved disclosure of any confidential data of the organization.

…………………………………..

Mayalogy Ltd

# Acknowledgement

Firstly, I would like to give my gratitude to Almighty Allah for Granting me patient and giving me strength, ability and opportunity to complete this Internship case study successfully within time. The achievement has come by many people who have helped me and guide me, provide me necessary information despite of having a lot of responsibilities.

Secondly, I would like to give special thanks to my Internship advisor Riyashad Ahmed, who is Assistant Professor of Finance & Director of Research at BRAC Business School in BRAC university. He helped me every time with valuable information as in this pandemic our semester is being in online, he has management his time to solve my queries about case study also advices me about this case study. His instructive advice and guidance have works as stepping stone while making this case study successful.

Thirdly, I like to thanks Mayalogy Ltd to giving this opportunity to work with them. I have learned how a digital health service work with their skilled employees. Moreover, I have come to know there is a lot of similarities between theories and real-life working concept.

Lastly, I would like to give thanks to my on-side supervisor Afrin Jahan Chowdhury, who is Data Manager at product and engineering team in Mayalogy ltd. She has helped me to learn about data labeling, dataset making for and how we redesign dataset with time and requirements. Then I like to give thanks to Asif Shahriar Sushmit, who is a research engineer at product and engineering team in Mayalogy ltd, I have learned machine learning from him. Lastly, I like to thanks all the member of Product and engineering team for this excellent journey in Mayalogy Ltd.

# Executive Summary

The main objective of this case study is to understand what are step a digital medical health provider take to resolve their AI issues. How they manage their data, how they deliver service to the users. Mayalogy ltd is a great technology-based company under health, wellbeing fitness industry of Bangladesh. I have a great opportunity to work under them and got to know how they manage and strategies regarding their digital service providing.

Firstly, in the case study I described about my internship I have given an internship overview like assessment of my internship my experience, learning also I have provided some recommendation where I have faced difficulties.

Secondly, in organization part I have gave an overall assessment of Mayalogy ltd. Their management issues, functional area and so on. Also, I have highlighted their strength and weakness and also their opportunity and threat. Moreover, I have made an analysis on health fitness and wellbeing industry's feasibility.

Finally, in the project part I have done the case study where I have talk about the background of AI issues. To collect information, I have used both primary and secondary data. Based on data I have finalized all the problem and the solution of the problem with theory I have learn during my BBA program in BRAC university. I have also tried to conclude the whole process and tried to provided recommendation for future need.

# List of Acronyms

AI  Artificial Intelligence

NLP Natural Learning Process

ML  Machine learning

# Table of Contents

# Chapter 1

## Overview Internship

### 1.1 Student Information

I am Rijve Rahman, ID 15204059. I am a student of Bachelor of Business and Administration of BRAC University. I have done my majors in Accounting and Computer Information Management (CIM). My contact information is below-

Mobile number is +8801947121764

E-mail Address: rijverahman0808@gmail.com

### 1.2 Internship Information

#### 1.2.1   Internship Objective

The main objective of internship is to give opportunity to the students to apply their knowledge which they have acquired from business concept and theories from the book in to real life.  It has also given me this opportunity to apply my knowledge into the real life.  Different business theories also different techniques which we learned during BBA helped me to cope with changing situation and it's need. Moreover, it has also provided me with professional experience in my major CIM. Furthermore, internship helps to increases business skills or interpersonal skills like communication, teamwork, critical thinking, analytical thinking, work under pressure. Lastly, it has help me to increase my professional network and contacts

#### 1.2.2   Duration of Internship, Company Name, Department/ Address

I am doing my internship at Mayalogy ltd. also known as Maya. My internship period is for four months starting from October 4, 2020 to February 3, 2020. Due to pandemic, I am doing work home but My office Mayalogy Ltd is located in Tower: Bay's Bella Vista, Level-9, Plot-96, Road-11, Block-C, Banani, Dhaka-1213. As Maya is mainly focus on online health services thus, we have a very well-maintained website where one can contact which is https://maya.com.bd/ . I am doing my internship under product and engineering team of Maya with engineering team.

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### 1.2.3 Internship Company Supervisor's' Information Name and Position

In Mayalogy Ltd I am doing my internship under the supervision of Asif Shahriyar Sushmit, Research Engineer at Maya, his main responsibility is to assist AI system, he finds ways to improve AI, he implements his research on system improvement. My on-site supervisor is Afrin Jahan Chowdhury, she is Data manager in the engineering team, main responsibility of her is to manage data create dataset, data labeling for Machine Learning, guide interns and assign task to internes.

### 1.2.4. Job Scope – Job Description/Duties/Responsibilities

In organizations and in my department's main concerns is to improve natural language processing capabilities, and manage software, create Models, manage AI system and design products so on. Also, my responsibility is to help the data science team to help improve their models that process natural language. As Maya is an online health care assistance work through app, which means Maya get huge amount of data or questions each day. Thus, one of the main duties which I am performing is to annotated the question and give them the appropriate tag and categorized them. As to help the model, first task was to group the data under more than 100 categories. It was my responsibility to put specific data identify their uniqueness and put it in their appropriate category. I had to resolve conflicts of different tags in one question, compile terminology and information to be used in translations, including technical terms such as legal or medical material also translate (English) medical questions and create medical questions dataset lastly, I have to edit the questions maintaining its original format.

Secondly, another important duty which I am performing in Maya which required a lot of attention which is to process data and make it usable for NLP/ML technology. Under every sub category there are plenty of datasets, and in data set there are many unnecessary data which pollutes the dataset which create problems in ML. It was my responsibility to clear all the unnecessary data from each sub categorizes dataset and make a clean effective dataset which will be applied for Machine learning.

Lastly, another task I am doing in Maya is to check Maya expert. In Maya experts they ensure that AI system is answering questions with 70% accuracy this the highest priority of AI team. If any answer provided by the AI system is below 70%, we send it to our doctor.

## 1.3   Internship Outcome

### 1.3.1   Student's Contribution to The Company

Maya is online health care provider so each day we have thousands of questions from our users. To give them the accurate suggestion which they are desired for it is mandatory to put their question into its's appropriate category and sub categories. Thus, my work is playing a very important role in Maya AI department. As my work is to put every question analyze it, resolve conflicts of tag in one question and mainly focus on the information they need and put that in their accurate category. Thus, it is a great responsibility for me. Thus, my work really contributes a lot in Maya Product and engineering department.

Secondly, I also process data for ML. a clean dataset is mandatory for ML. the cleaner is dataset the more effectivity and efficiently ML will learn and more effectively AI system will responses. Thus, this work also plays a very important role in AI system development.

### 1.3.2   Benefits to the Student

As a fresher I am getting experience of such technical based work which is giving me a brief idea about how does the corporate life feelings in digital Health, Wellness & Fitness service industry. It helps me to refined the skills which I already have and also helped me to identify which skill I need to newly learns and which skills I need upgrade for my better benefit in lives competitions. This internship has increased my adaptability. As I am switching my work every week it gives me a glimpse how corporate world work how people adopt with time and work to make the grow and developed.

This internship also helps to narrow down the topic than broader view. It helps me trains my mind to focus in every and important details which is most important in every analysis. It has also taught me how to get desired result or analysis, how a dataset should be processes and applied in ML. Moreover, it teaches me to look for the future to long term benefits rather than short term. It showed me that be long term successful one needs to be focused on each and every aspect pick all the important and rational data need have patients while dealing with data to get better analysis better result for better benefits for the organization and for the individual.

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### 1.3.3    Problems and Difficulties

Due to pandemic we have to work from home and also our governments are doing some necessary improvement in to our local area to improve our life style sometimes I faced load shading which hampers my work. Moreover, as I was working from home some time I get distracted as my office is my home family relative used to come and gossip some kill productive time.

### 1.3.4    Recommendation

I want to suggest Maya as we are working from home less chances to meet and know other employees of Maya. So, they can arrange e video meeting with others to know them better also can assign sob interns into other department for 1 or 2 weeks so that interns can learn more about the other department of Maya. This will also help to know more about other departments works, importance of those department into Maya.

# Chapter 2

## Company Overview

## 2.1 Introduction

Introduction part of the organization will cover the objective, methodology, scope limitation with importance of this chapter.

### 2.1.1 Objective

The main objective of this part is to introduce to the Mayalogy ltd and give overall assessment of Mayalogy ltd. One can know how this organization works though different department, its functional areas operational aspects. To the end one can get the strategic analysis of Mayalogy ltd.

### 2.1.2 Methodology

To do the analyzing of Mayalogy ltd. I mainly rely on primary data. Primary data was collected by interviewing more than eight people from different department to get more idea about their work Also I have get secondary data from authentic Mayalogy ltd website, different authentic article related. Moreover, I took necessary information from my supervisor as primary data as both qualitative and quantitative data is needed to do this analyzes. Based on this information their management practice, marketing practice operational management, information system practice, industry and competitive analyze are being made.

### 2.2.3 Scope

After analyzing different departments and aspects one can get a definite conclusion about the Mayalogy ltd. As this part will give a proper introduction about Mayalogy ltd. and how it works. It will also give an overall idea about the industry which Mayalogy ltd. belong and how they are different from the competitor. It will also summarize of their functions and proceeding of Mayalogy ltd. and also one can get an idea of how other company works in the same industry.

### 2.2.4 Limitation

One of the biggest limitations of this analyzes thought out my case study is to acquire data about Mayalogy ltd. For maintain confidentiality and security of the organization those data need to be confidential to survive and beat competition of the market and also those are the which make them unique and secure their place in the market.  It can be assumed that this case study will be more effective specially in financials part if more information were available.

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### 2.2.5 Significance

Significance of this part is that, one will able to know about their strength and weaknesses of Mayalogy ltd. Also, after analyzing I can give recommendation to the company which they can implement to get their opportunity and reduce threat as much as possible. From the strategic analysis which have been made in this part will also help them to take necessary and effective decision about improvement in internal and external environment of Mayalogy ltd.

### 2.2 Overview of the Company

Maya is a technology-based company in Bangladesh trading as Mayalogy Ltd. They work through app which is known as Maya. They provide Experts like doctors, therapist, lawyer's advice in physical, mental, relationship, legal to their users. It in an anonymous platform so that people can freely express their problem without any hesitation.

Maya started its journey in 2009 with blog called 'Maya' which was maintain by Maya CEO and

founder Ivy Huq Russell. Maya believes in women empowerment, in February 2015, Maya made partnership with BRAC and introduces first ever One-touch help services app for women In Bangladesh. Moreover, all female engineers, doctors and entrepreneurs are behind of this "Maya Apa" app's design, application and development. Moreover, the director of BRAC' gender, Justice and diversity Sheepa Hafiza said this app will create a great access to the information and services for women all over the country and also a nationwide consensus for a supportive society. Moreover, in a country like Bangladesh it is really hard to find trustable advice particularly for women thus this app is really helpful for them. Both man and women can cask question in Bangla, English, Bagnlish and also in voice then this question being routed to a vetted network of experts who answer their question trough a real time.

### 2.2.1 Philosophies of Maya (Vision, Mission)

**Vision:** To help everyone feel awesome, every day.

**Mission:** Easy access to expert advice, when you need it.

**Slogan:** It's okay to ask for help

## 2.2.2 Maya App & Features

Maya is a knowledge sharing and anonymous platform, this app can be found in google play store. It is also available for Android, web, IOS in free basis. After installing this app in the smart phone one can start using Maya's services.




- **Features of Maya App:** The basic service that maya provides is health advices, they have many categories like dermatology, skin, pregnancy, men's health, fitness like nutrition expert who can provide diet chart for weight gain or loss. Along with that Maya has several more feature that has been given below-
    1. Period Tracker: girls can easy track their period's time
    2. Blog: Can read different kind of article in the app
    3. BMI: BMI calculation helps to see whether they are overweight or underweight.
    4. Order medicine: One can order medicine from the app
    5. Maya shop: Here one can order personal product like women hygiene products like sanitary napkins, etc. Mans's products like condoms, razors etc. personal hygiene products like floor cleaning, mask, lotions, shampoo etc.
    6. Maya video: one can also watch video
    7. E-prescription: One can get E-prescription by consulting with doctor through video call.

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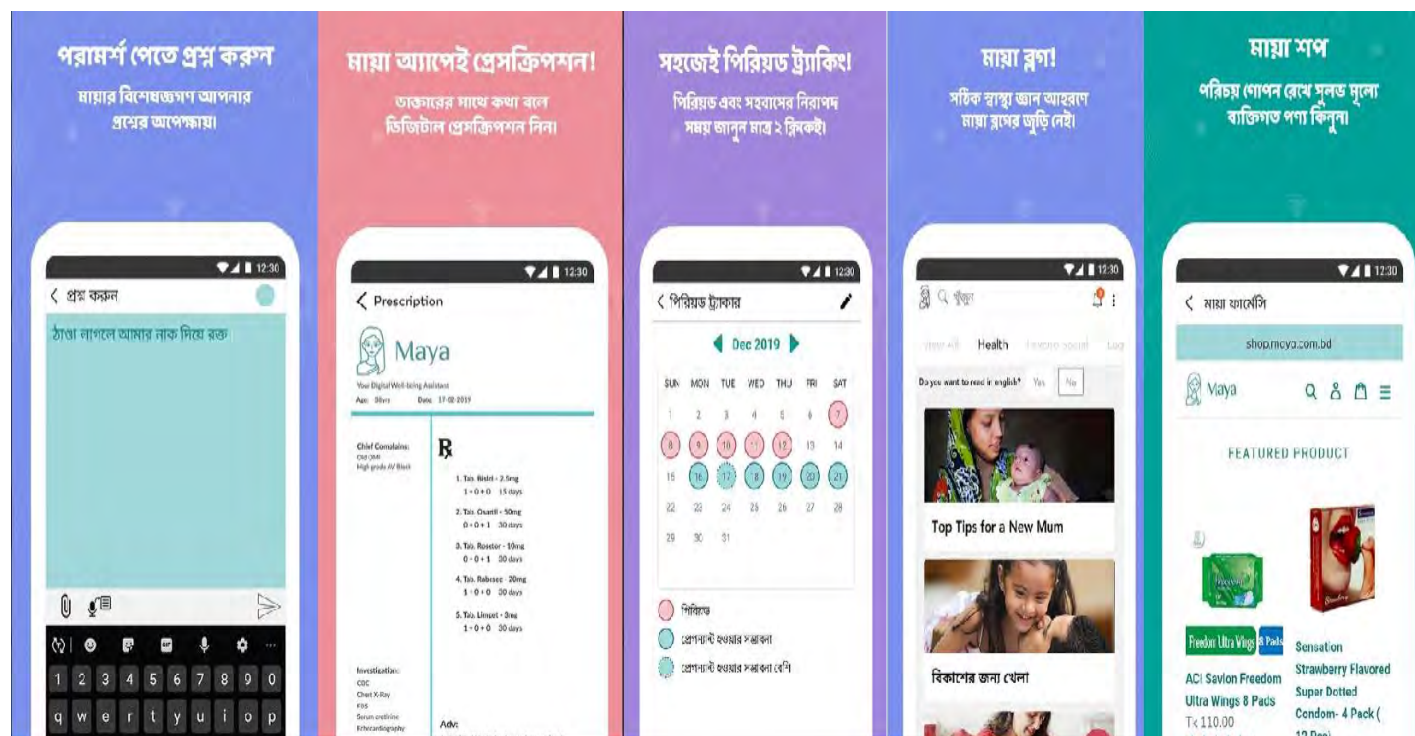
**Picture:** Features of Maya

## 2.3 Management Issues

To describe Maya's management issues their organogram, human resources practice, Training and development, promotion and incentives, customer care will be described briefly.

### 2.3.1 Organogram

Maya follows a simple chain of command follow a common hierarchy. First comes Maya's founder and CEO Ivy Huq Russell. She is in the top of hierarchy with primary responsibility of the organization like taking all major decision regarding operations and recourses are taken by her. She supervises all the department like Product and Engineering, Market Expand, bizz dev (Business Development), Human Resources Management. She is the main communicator between

funder, investors, and corporate operation. All these department has their own chief who come next after the hierarchy. Department chiefs handle their respective department set goals to achieve mission. Then comes most senior officer ranked in hierarchy with primary responsibility is to build the tactical goal to reach the mission. A research engineer who helps the senior officer to set tactical goal. Then comes manager who divided the task supervise the task of the junior executive or intern.



**Figure 1:** Chain of Command in Maya

- **Chain of Command in Product & Engineering Department:** In product & engineering department there are many teams under it and they all follow their general chain of command hierarchy. Where first comes head of the teams who report to the CTO (Chief Technology Officer) and other officer repot to their immediate senior post officer. The chain of command of this Department is given below-
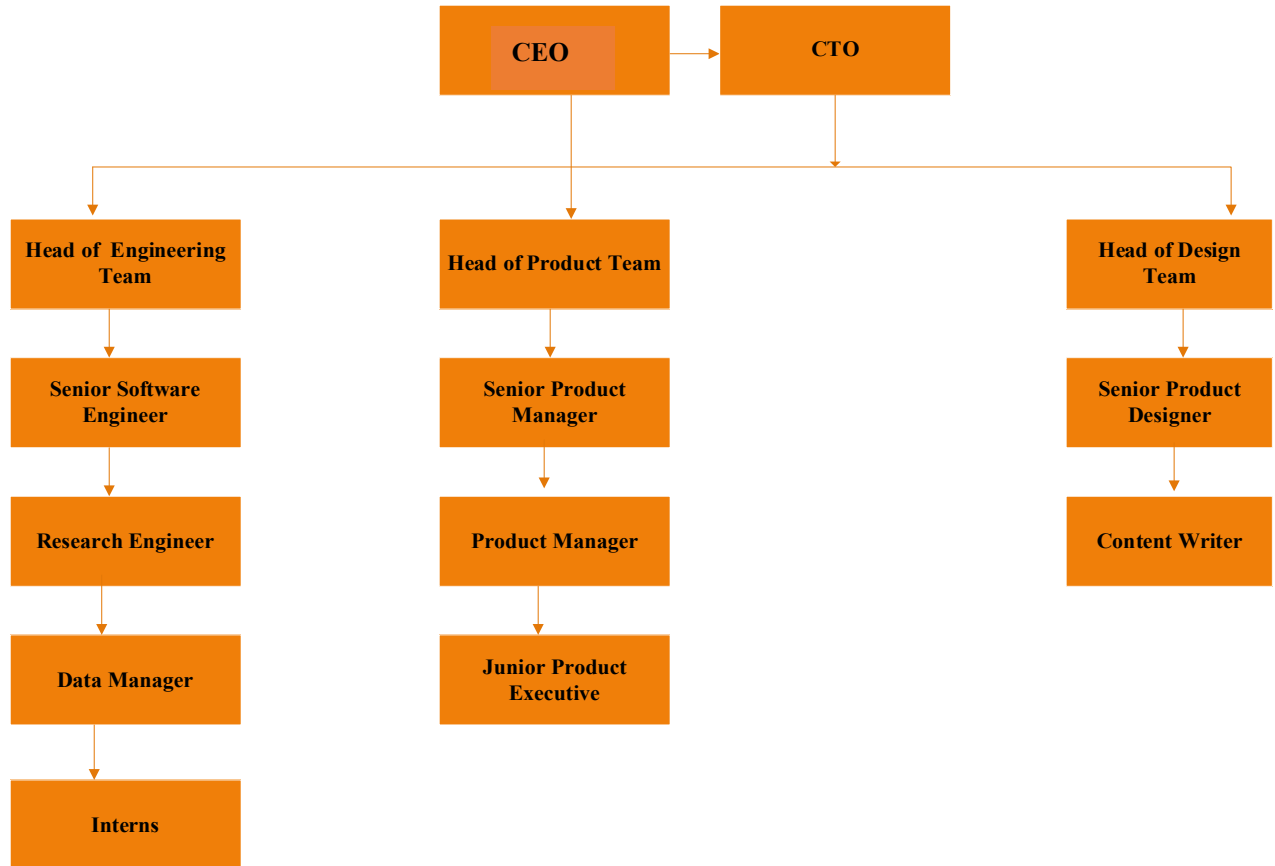
**Figure 2:** Chain of Command in Product & Engineering Department

### 2.3.2 HR Policies

In case of Human Resources policy in Maya they have a small team, who do the recruitment of employees. Also, Maya has a hiring agency called kalke.co while any department or any team need any new employee, they set their requirement sent it to the HR team. As thousands of CV a come and it is very help full while first screening done by the hiring agency. Then capable candidate's CV is being forward to the HR team and candidate selection done by the specific team or department who needs the employee. Then the selected candidate get call from the HR team for interview. Selected candidates go through several step interviews, written exam, technical testing and so on. After completing all the process, if it a junior post like intern department head is permission is enough for requitement but for senior requirement CEO permission is mandatory. After completing all the step final step is complete by making several agreements with both the parties so that is any unwanted negative situation occur, they can take action against it. They

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maintain a good working condition in the organization moreover, they are very punctual regarding salary imbursement and termination notice.

### 2.3.3 Training and Development

In Maya after new recruitment a training session has been made so that every employee can come to same page. Seven to ten days training period happens almost all recruitment. After new recruitment in Maya, they have Buddy program. Which means after recruitment a supervisor or buddy has been assignment to particular member or new group of recruitment like interns for next two week or for one month. Buddy will guide one about the organization, assign task, get new tips from the new employee to improves onboarding. An employee can expect general advice, he/she's permeance feedback any other information about the organization, they can also know about company culture from their buddy. This is how Maya train their new recruitment and make a part of Maya's family.

### 2.3.4 Promotion & Incentive

In Maya promotion are in yearly basis but if anyone work extra ordinary can get promotion very soon. To get promoted three kinds of feedback has been made on particular employee. first feedback will own feedback done by the him Herself then second one is the peer feedback with whom he or she worked with and lastly supervisor feedback. To the end all three feedback are being evaluated and verified by the supervisor and then they get promoted.

Moreover, to talk about incentives Maya's employee get two Eid bonus and also, they get free snack like tea coffee all day and also lunch. However, they did noy get any transportation facilities.

### 2.4 Marketing Issues (4P's of Maya)

To understand marketing issues of Maya and to analyze it, the best thing is to describe their 4P's.

A complete Marketing 4P's of Maya are given Below

- **Product:** Maya's product is the service that they provide to a user which is any e-digital medical service. They offer health service physical service, mental health service, legal advices through expert advisors any physical problems such as cardiology, Dermatology, relationship advice, and many more. Maya's another product is Maya shop they have different kind of products that as personal health products and men's product which includes everything and women's products such as sanitary napkins, razors, man's products like

condoms, shaving cream, personal hygiene like mask, and many more these two are the main product of maya.

- **Price:** Maya sells their service in a very reasonable price so that everyone can get the treatment. They have one prescription package which includes on time, mini, weekly, monthly package and also pregnancy package.
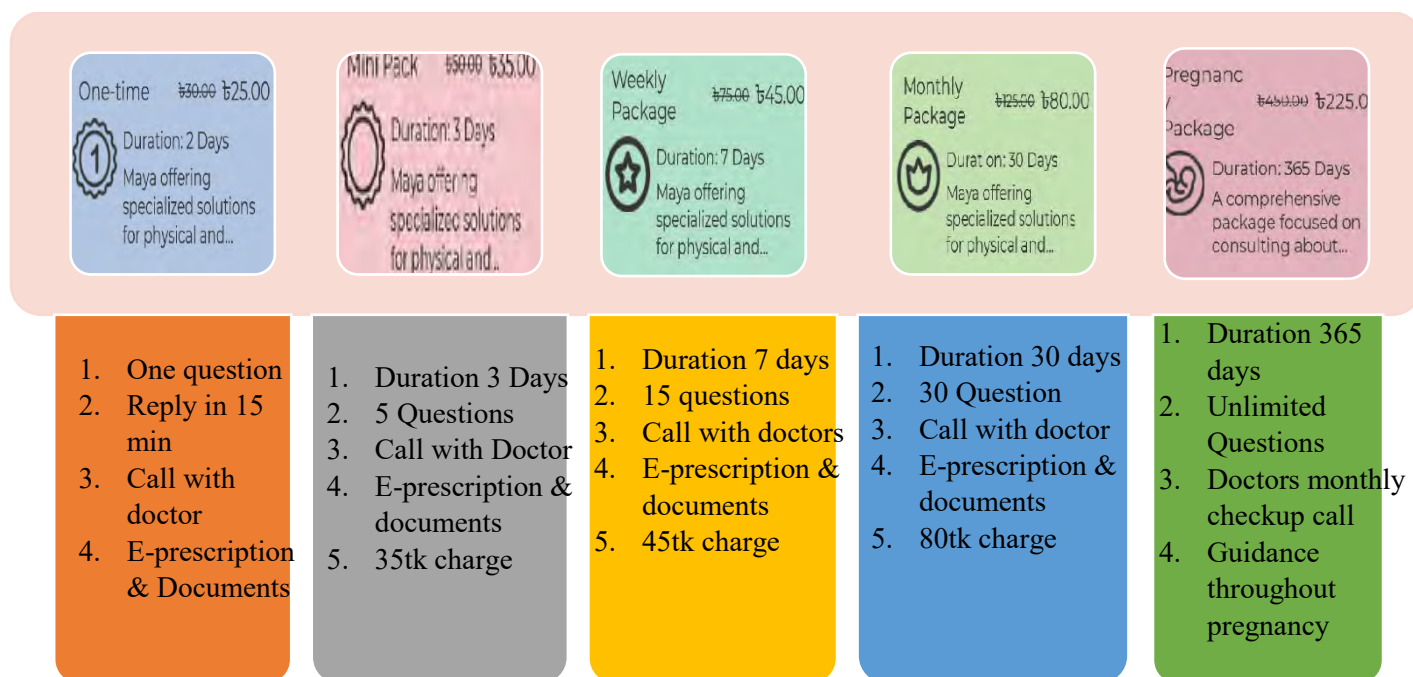


**Figure 3:** Maya Prescription Packages

- **Place:** As Maya provide digital health assistant, they work through app. Whoever download the app can use free service so our place is all over our country from rural to urban area also around the world.

- **Promotion:**  For promotion activities Maya mainly use digital marketing like short videos, image etc. though various platforms like Facebook, YouTube, advertisement in paper and so on. However, they mainly focus on Facebook. As today's generation mainly and also spent their maximum time on Facebook thus, it is a very good platform for their promotion. Moreover, Ayman Sadiq the CEO and owner of '10-minitues School' also appreciate Maya

Picture: Ayman Sadiq promoting Maya.

## 2.4.1 Busines And Development and Expand

As in Maya they provide online health service. Thus, their main supplier is our doctors. Maya has more than 200 doctors at their service. Among them 6 doctors are full time in Maya for mental health service they have 14 doctored working 24/7. Moreover, Maya has in contract with Maria hospital for medical treatment. Maya always appreciates their doctors also stands with them if any help is needed this how they maintain their relationship with suppliers.

- **Customer Service:** Maya also believes in caring their customer they have 24/7 customer care service user can call or message in customer help line or in website regarding any problem about prescription package activation, or payment issue or any service issue regarding Maya shop product delivery and so on. Everything their user can ask and their problem will be solved immediately. Maya value their customer and this how Maya takes care of their users as well
- **Going Abroad:** As Maya has already international users. They are making plan to go abroad like they are planning to go India, Pakistan for their services though app. Maya get a lot of questions from Kolkata, Afghanistan, Pakistan after analyzing it they have planning to take to the next level and they will start their journey in India, Pakistan.

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## 2.5 Finance and Accounting Practice

Maya is very sensitive about sharing their financial information because of their confidentiality thus, financial analysis of Maya could not be possible. However, they their accounting period from 1<sup>st</sup> July – 31<sup>st</sup> June. Maya is very serious about maintaining their accounts correctly. They support integrity, professionalism, and believes in transparency in their accounting department. No unethical behaviors will be tolerated in Maya. Thus, they maintain a strict Audit committee.

- **Audit Committee:** In Maya they have an **internal audit team**. They continuously check every transection of Maya. Every month they check their monthly basis accounts. They ensure that company is maintain relevant laws. They also evaluate the internal control of Maya and also provides recommendation to improves it. They also have **external audit team.** They inspect Maya financial Statements. They make a visit every year. They ensure that no errors have been made while making financial statements. They ensure Maya's transparency about their accounts. They also inspect internal managements.
- **Funding**: In Crunchbase some financial information about Maya has been given. Such as- Maya has raised around of $1.6 million (135,576,352 TK) in funding over 11 rounds, last funding was raised on February 12, 2020 from a grant round. Moreover, Maya has been funded by more than 10 investors among them ACI and Humanity United are the most recent Investors.

## 2.6  Operational Strategies and Information System Management

### 2.6.1   Operational Management

Operation management means all other functional department of Maya like product and engineering team, analytics team, market expand, servicer delivery team, human resource management, financial, marketing customer service, business development every department work together. To get to the goal all these team need to works along these team work great as their work as project-based team. To get the best result they continue make case study of the current status and discuss it with supervisors regularly and also in Maya they always have a weekly meeting where all share their opinion regarding improvement of the app and improvement of the business. They make list of activities they need to like for market exaptation what are thing have been completed what things need to done. What IT support or marketing support they need they will be discussing it with the marketing team in the meeting.  This how all the department work and this how they management their operation.

### 2.6.2   Information System Management

As we all know Information management mainly have four component such as hardware, software, people and data.

1. **Hardware:** As Maya mainly, technology-based company also provide digital services thus they must have hardware like laptops, desktop for the employees UPS, router for internet connection and so on which they have.
2. **Software:** As Maya app is online services thus it has a its own software. Maya software design is user friendly, convenient. In behind Maya's software really dynamic as question goes though AI to the doctors and doctors also answer though same software. They have Maya app for android, IOS, and webpage. Also, they have label studio for labeling the data also they have own database for storing data.
3. **People:** In analytic and product engineering team they have more than 50 people working just to maintain the data and software. they ensure data security; they ensure software higher performance also they redesign and modify model to get more effective result.
4. **Data:** Maya work though data, everyday people ask more than 1000+ question per day. This question is the base or heart of Maya. Thus, for analyzing or create any dataset gold dataset they have enough data. By analyzing these data, they can bring new service. Thus, Maya takes good care of data security.

### 2.7 Industry Competitive Analysis

Industry and competitive analysis are very important for any company. Swot analysis is the first basic part to start with. As financial and operation goal are set for the upcoming year to reach the goal, thus SWOT analysis is done based on the overall corporate planning process. SWOT analysis will help Maya to use its resources wisely effectively which will improve their business, bring new opportunities and solve the risk and so on.

### 2.7.1   SWOT Analysis

- **Strength:** One of greatest strength of Maya is they have very strong product and engineering team because this team as Maya is totally online work though app and website so if any negative occurrence happens, they take necessary step and solve it in very short time. Secondly, they have excellent research and development sector which always works on how

to improve Maya services what new product they can bring which help them to stay competitive in the market.

- **Weakness:** One of the greatest weakness of Maya is in analytics part. Everyday Maya have thousands of data users are also increasing but some users are dropping off. They are not becoming a regular user, now it is really hard to find out reasons behind it.  As there is million of data and it is really hard to find out our users' feedback like in which issue their users are dropping of. Thus, it is really hard to solve this problem.

- **Opportunity:** Biggest opportunity of Maya is increasing life style of rural people like they are getting digitalizes but not getting enough health care centers. Though it is very sad for all over the world to have this pandemic. But this has also become greatest opportunity for Maya as they provide online health service to the people. Moreover, if maya can make offline service as well it will be great opportunity for them to boost their revenue. Furthermore, in some rural area there is less clinic or medical service is available for people here Maya can help a lot to the people.

- **Threat:** Maya's one of greatest threat is increasing competitor. As a lot of startup of digital health provider has already arrived. Secondly, there is the internet connection or internet infrastructure is a great issue, as their service is totally based on online thus internet connections is must. Thus, internet connection can is a great issue to Maya.

**Figure 4:** SWOT Analysis

## 2.7.2 Porter Five Forces

Porter five forces usually help to understand industry construction aims its strength and weakness. It also helps to know about industry structure based on which business makes their corporate strategy. It will also help to Maya's five competitive forces it is also help to understand how competitive the industry is. To understand companies' competitive level within the digital wellbeing, health fitness industry. Porter five forces of Maya are applied below

1. **Bargaining Power of Suppliers**: As Maya's main suppliers are the doctors and they can choose whether they want to sit for hospital their clinic for higher benefits. Whenever they want, they can switch to other places. So, the bargaining power of suppliers will be high. Also, for the products the main suppliers are the retailers they can also switch to other shop or put their products other online business. In both the cases bargaining power of suppliers will be higher.

2. **Bargaining Power of Buyers:** Maya's bargaining power of buyer or the users are moderate to high. As people can choose whether they want to go the hospital or near clinic for their treatment. Thus, in urban area it is high, but in the rural area it moderate as in rural area clinic are far away and some places there is no clinic at all.

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So, for the rural area bargaining power of the buyers will moderate. Also, for the products users can switch to other online deliveries and so on thus it will be high as well.

3. **Threat of Substitute:** As Maya is digital health assistance it provided health solutions thus, Mayas substitutes will be is the hospital, Clinic, retails shops. For better treatment users can select hospitals clinics, for product they can buy it by themselves from the retails shop near pharmacy and so on. Thus, the threat of substitute is also moderate to higher. In rural area clinic are far away thus it will be moderate for Maya.

4. **Threats of New Entrance**: As for digital medical health service one need doctors at first so if to start this business. Private hospital can modify their doctor's admission and make a new department for this process for a better online service as well which will create a lot of new entrance. Thus, the Threat of new entrance is also high for Maya.

Threats of New Entrance High

Bargaining Power of Suppliers High

Competition Among the Rivals High

Threat of Substitute High-Moderate

Bargaining Power of Buyers High-Moderate

**Figure 5:** Porters Five Forces

*Increasing Artificial Intelligence Ability of Maya For Better Digital Healthcare*
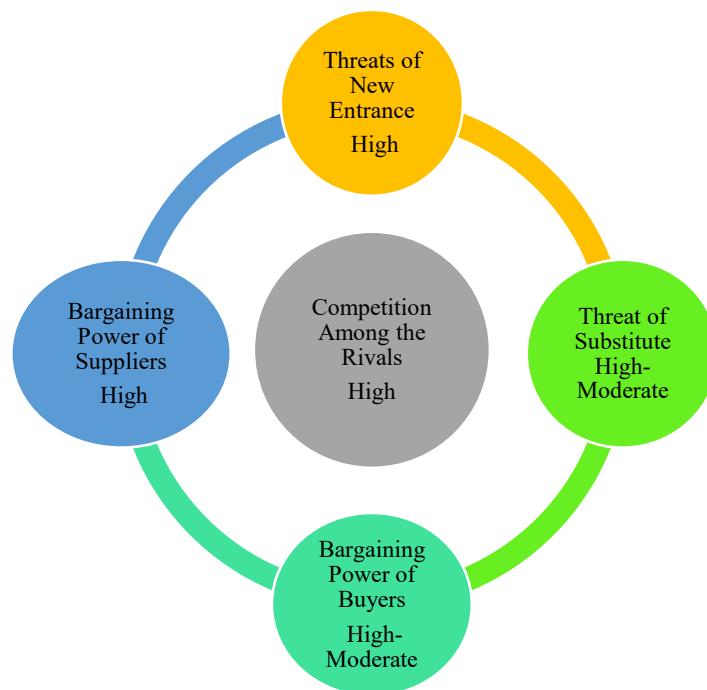
5. **Competition Among the Rivals:** As there is some new startup start the same business-like Maya Digital health services like Doctorola, Doctor Bari, Patient Aid app, My health and so on. Though Maya work though app but they give a very strong competition. Thus, the competitions among the rivalry are also high.

## 2.8 Summary and Conclusion

To the end it is visible that Maya is going very well in the market. After analyzing the SWOT analysis except of weakness and threat Maya has a lot strength which make them unique in the market and opportunities will give them a boost in their business. They have great potential to be in the market and give a great competition to the competitors as they are more focused on their strength and try to capture their opportunities also, they continuously training to solve their weakness. Partnering with BRAC helped them a lot in this journey.

It is very appreciative that they are in right business track and expanding the business facing their challenges and growing up, but as we have seen from the porters five forces that maximum forces are in high and with time challenging are being increasing with time so it is really hard to come to conclusion about Maya in this challenging industry.

## 2.9.1 Recommendation

- First recommendation I like to give Is, Maya does not have financial and operation information about their business in the public. I would like to suggest them to give more information to public
- There is no annual case study of Maya, thus it is really tough to evaluate them.

*Increasing Artificial Intelligence Ability of Maya For Better Digital Healthcare*

Case Study

3.1 Introduction

Topic selected for the case study is the "Increasing Artificial Intelligence Ability of Maya for Better Digital healthcare'

In this part will cover the background of case study with the objective and significance of this project. This case study and analysis of this part is also related with my major CIM and also goes with my internship work at Maya.

### 3.1.1 Background

We live in an era where technology took a place. Each and every individual use internet for entertainment, shopping, food and also medical services. As technology has been increased, everyone from urban and rural area people ureses smartphone. In this digital life AI plays a very important role. Special in ecommerce and digital health care industry es. In AI we teach a machine to take decision, solve problems, prediction and so on like Alexa where machine has been though with thousands of audio data. In Maya they also use artificial intelligence to serve their customers.

To know about how Maya's artificial intelligence works one need to know about Machine learning. Machine learning is the most general practice of using algorithm to parse data, learn it and make determination or prediction about the specific things in the world. In other words, the machine is trained with large amount of data with algorithm which gives it the ability to learn how perfume task, do decision making or predict something. In Maya they train their machine to take make decision.

Now, in Maya they work with real life data, the question that users ask we. As they give digital assistance in physical health, mental health, law stuffs but the physical health services in Maya will be first priority in here as it is related to case study and I was in physical health related queries. However, in engineering team they make datasets to tech machine and to do decision making. their AI system work with 70-80% accuracy in all the category of physical health accept of view categories. This problem will be solved thought this chapter.

### 3.1.2 Objective (Broad & Specific)

- **Broad Objective:** Main objective of this part is to see how they solve this problem. how a digital health care industry solves their AI issues. For Maya how they will increase the AI ability to get 80-85% accuracy in view categories.

- **Specific Objectives:** Specific objective will help us to get to our broad objective those are
    1. Find out the problem issue in AI system
    2. Analyzes all the alternative plans like creating a model to solve this AI issue which
    3. Gathering data like data mining, processing, for making the model implement it
    4. Evaluation of the model implantation

### 3.1.3 Significance

The main purpose of this case study is to identify how online or digital health care behind and how the works with AI system. First of all, as with time people are getting more digitalized, they are moving towards automaton. Everything is started to work through AI, thus whoever wants to know about how to AI works it will be really beneficial for them.

Secondly, it is really important for any digitalized or online services to make their AI system work effectively, as it will boosts their service and bring profit to the organization. This case study will show to make an AI system work effectively though machine learning.

### 3.1.4 Methodology

In this part of the case study, primary data was only reliable source. I have interview 3-4 people in my department also took necessary information from my supervisor to complete this case study. As this a problem-solving case study I needed more qualitative data than quantitative data trough primary and secondary research processes.

**Primary Data Collection Process:** In this project as, primary data was main focused thus a separate focused primary data collection was first choice. Moreover, there is fewer secondary data is available for the specific objective of the case study. Primary data has been gathered though following source

- **FGD:** A focus group discussion was made with the full AI team to gather data for this case as most of the data was qualitative thus focus group discussion was really help full gather the information.

- **Personal Interview:** To get more information go deep in the case more than 2-3 interview was conducted with the doctors and also with AI team.


- **Practical Data Collection:** To understand the situation it was necessary to do certain task practically and also inspect the AI performance to gather more information to solve the case.

**Secondary Data Collection Process:** Secondary data really helped me to decide my specifies objective in to solve this case. Also, I got a lot of supporting information regarding this business and AI system, machine learning its pattern way of performing task or decision making of AI and so on. Moreover, Maya blogs, newspaper article about Maya AI helped me a lot to complete this process.

## 3.2 Evaluation of The Case

This section will be focused on finding the main possible reasons which might create problem in Maya AI ability to perform poor. Findings and analysis are given below-

### 3.2.1 Finding and Analysis

1. In physical category they have more than 100 subcategories like dermatology. Cardiology, pregnancy, Man's health, women's health and so on. Though Maya experts checking or though AI performance analysis, they have found that in some categories Al performance meaning answering the question in those categories is below 50-60%
2. From the feedback or review analysis they have found that about it takes a bit more time to replay to the user's question. When they went deeper regarding this matter it has been brought out that due to AI less accuracy performance doctors are answer this question one by one that is why it consuming a bit more time.
3. As Maya's users are increasing day by day and their users are all around the country. Moreover, our country is complete mixture of different kind of local language. One word with same meaning has more than 10 types of variation in terms of pronunciation spelling. Due to this variation sometime AI could not detect the word and it cannot answer.
4. As they continuously check Maya expert for AI answer performance verification, they have found out AI got confused with some specific word. Which was creating a huge problem.
5. Some dataset in those categories need to be refine as those datasets was creating confusion. As wrong annotation was given
6. Low variance in dataset which creates a huge problem

These issues have been come in front after analyzing the information and also while collecting information regarding the case.

## 3.3 Critical Question Central to The Case

In this section will cover critical questions, these are coming from the theories which have been learned from major courses and also related with the case study such as-

1. What kind of data mining techniques they are using?
2. How effective is the data mining process?
3. Competitive advantage of the using agile model
4. What kind of problems are being solved by the data mining
5. What is the scope of data mining?
6. What methodology they have used to create Model

## 3.4 Solution to The Case

To increase AI system effectiveness or to increase AI ability to serve more accurately MAYA's AI team has made a lot of research they have some with a solution to create a model with perfects datasets, then tech it to machines with new algorithm. To make New model Maya has to gone through several step.

- First to make well refine dataset by standard data annotation,
- Scaling annotation by clustering,
- To make then tech to machine and
- Then implantation and evaluation

## 3.4.1 Making Dataset (Components of Dataset)

To make the dataset for their model first step we need to is to crate dataset. A well refine dataset. To do that first need to know dataset components, data mining, data processing and cleaning

- **Components of Dataset:** There are some basic components while making dataset such as-
  1. **Training Data:** Some proportion of data that will be used to train machine

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2. **Validate Data:** Small portion of data that will be used to evaluate the model with intervals. To see if the model performance is good.
3. **Test Data:** I set of totally unique data set which have been never exposed to the machine. This test data is applied for the final Evaluation of model.

### 3.4.1.1 Data Mining

**Data Mining:** It means a process that used to extract usable data from a larger set of any raw data. Maya has all text data in as they work with real life data, they data is the question that people ask. All data goes under their main database or data warehouse. While processing the data they tried to annotated the question properly. In Maya data mining process has been classified into two sections such as-

1. **Spam Checking:** In spam checking here they took a chunk of data from their main data base and they try to remove noise or unnecessary data. In Maya they have a CX annotation team who always filters data remove form spam data such as slang any personal attacks and other things for our user's security and for respectful platform. Also, it has been in Maya AI system do not allow any spam in to platform. But still some questions are not harmful but still irrelevant for their dataset.

2. **Tagging:** After removing all the spam and unnecessary data then they moved to second step which is data tagging. Which also called clustering mining, as it means to categories data into a specific group with label. In Maya they have more than 100 categories in physical health layer Such as cardiology, dermatology, men health, women's health and much more. We have a team of 10 to 12 people who continuously given a set of data and they are analyzing the question and putting to the accurate category. This tagging is verifying by those 10-12 people to get more accurately. It is necessary because in real life dataset, it need to be clear what that specific question means and people perception is different so if one question is being tagging by 50% of the data labelers in one specific category that question will go under that specific category.

This is how first step of standard data annotation has been applied.

### 3.4.1.2 Data Cleaning and Processing

In data cleaning processes they clean the dataset remove more noise to get more accurate result. Moreover, in Data cleaning and processing and to get more accurate dataset they do it in 2 steps

- **Consulting with Doctors:** every week they consult with doctors regarding how they can improve their services. what thing need to be included in in the dataset so that they can

come with very well going answer of the questions. As they answer the quires of user also, they have a medical knowledge thus they help them to create dataset to specifically.

- **Creating Sub- Categories Clustering:** As there is more than 100 categories under physical health. The broad categories are pregnancy, women's health, dermatology, cardiology and much more. They have more sub categories under broad category like in vaccine we have TT vaccine, Rota vaccine, BCG vaccine and many more. Creating more sub categories of dataset so that datasets become more accurate. This how they refine their dataset.

Creating more subcategories through consulting with doctors help them to get that refine dataset which they have looking for. This is how they have completed manual scaled clustering process. Moreover, they had set a benchmarks data while creating the dataset so that they can make the best and gold standard dataset.

## 3.4.2 Creating Model

Maya is already serving to their users it would be really difficult for them if they follow tradition waterfall system to make their new model. Thus, they have applied agile model for continues development, as Maya need continuously improvement as they are service is providing health assistance through an app.  Now to create the model they desire first we need to know about agile model agile model is briefly describe below-

### 3.4.2.1 Agile model

This model focuses on improving the existing model for the best suit s for the project. In agile model they divided task in to several small task or time frame to releasee specific feature.  In Maya as we are already maintaining and providing services to our user thus agile methodology is perfect for them to increase AI performance by creating new model.

### 3.4.2.2 Core of Agile Model

Agile model has four core values such as

1. **Interaction and Communication:** There should continue communication among the teams like in Maya there is always a communication between data labeler if new tag they need to annotated properly, with software developer how they can make it more friendly and so on.
2. **Working Software:** Agile methodology requires a working software like Maya's software was still working while new model was implemented
3. **Customer Collaboration:** Customer feedback is needed to improve the model so that developers can create a model which satisfy the customer
4. **Responding to Change:** As in agile task keep changing to get better performance. In every phase there is something new in agile model. Thus, responding to the

customer demand to make model more effective with their requirement for more customer satisfaction.

### 3.4.2.3 How an Agile Model Works

There are five steps to make agile model. These steps are given below-

1. **Define:** In this step agile we define what work they will be doing in this current interaction. Like Maya AI team will be improving AI performance by creating new model, teaching machine new refine datasets.
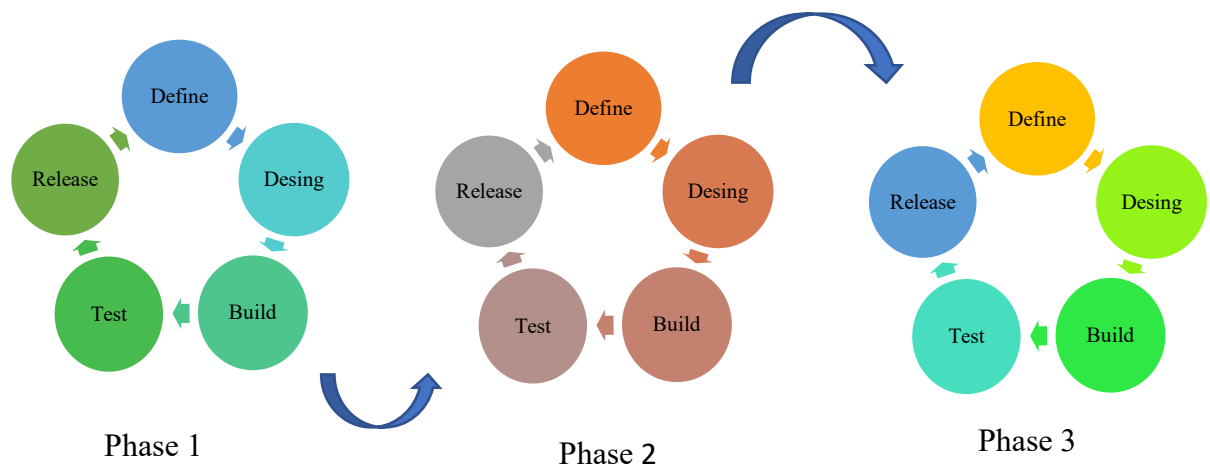


Figure 6: Agile Model

2. **Design:** After defining design phase come where all the requirement product has been gathering to build the model. Such as in this case their clustering well define dataset will be their requirement for the model.
3. **Build:** In this step model has been made by teaching the machine with the refine dataset with new algorithm. In this step software engineers do coding to tech the machine and build the model. In Maya they trained the machine with 80% of their data while building this model. While building the model they have used decision tree. As Decision tree help to predict the group or value of the target variable by learning simple decision rules inferred from prior data.
4. **Test**: In this step the model has been tested to see if it works good or not or does it need any more editing in the building part to work more effectively.

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In Maya they tested the model with rest 20% of the data to see whether the model can detect the question and answer it correctly. To the last they have applied their test data which is totally unique, never been exposed to the machine for model's final evaluation test.

5. **Release:** After testing means after implementation the model has been released to the customer after new model implantation and people start to use it. and the team star to take feedback if it is good.

This is how agile model work. No need to stop old model to build new model can be built with old one and release to the customer. In Maya we have also done the same process.

### 3.4.2.4 Scrum Methodology Used to Create agile Model

There are many methodologies while creating agile Model. In Maya they have used Scrum Methodology: the scrum methodology has been briefly described below-

**Scrum Methodology:** In scrum it focuses on the team who might not know about the task about get to know while projects start. In team there will be small group of people based on their task such as in Maya they have a data labeler team who divide or label the data. A small team of data cleaning one research engineer who guide the whole team. Group of doctors along with 1-3 software developers who will do the coding and machine learning with new algorithms and one team they will continuously evaluation and sending review to everyone.

### 3.4.2.5 Steps in Scrum Methodology

There are four steps in scrum methodology. These steps are given below

1. **Product Backlog:** In this step They list down all the primary works they have to like doing define annotation, clustering, making dataset for model and so on. Every group has been assigned with their primary task. Like data labeler task is do the correct annotation, data cleaning team will do the clustering, software team will do the machine learning wilt dataset.
2. **Sprint Backlog:** which Means what kinds of bugs we need to fix for the sprint cycle like in Maya AI was being biased with some word they will fix it in this sprint.
3. **Increment:** It means sprint goal In Maya its increment is to create unbiased model so that AI will not get confused with another word, create gold stand dataset by correct annotation and clustering
4. **Start New Spring after Finishing**: After finishing the sprint a meeting will held by the team about what product they have made through this. Like in Maya they have a in this step a new sprint has been taken to improve model.

### 3.4.3 Implementation & Evaluation

After creating the model though these processes finally they implemented the model the design has been come in real. Now to analyses if the model is working correctly Maya product and engineering team use Maya expert to analyze AI performance. After implementation it has been found out that AI performance has been increase to 50% accuracy in those specific categories which is a very big achievement for them. To improve more another phase will be taken. To solve more issues.

### 3.5    Summary and Conclusion

As Maya provides digital Health service to their users. Have various categories like skin women's health, man's health and so on. Some categories AI accuracy performance was below 50% to solve these issues they have created a model though correct annotation, clustering applying new algorithm to the machine to remove biasness and confusing among the words. They have used agile model as it can modify while old model is still working and serving to the customers. To make agile model they have used scrum methodology which is creating small group with respective task. After implantation the model and evaluation it has been found out that AI accuracy performance has been increased to 50%. Though it is below 70% it is also a great achievement for Maya.

### 3.6    Recommendation

Firstly, I like to recommend Maya team that they should explain to their team what kind of output they want through this project, so that other team get a clear idea and work in that way. And they should make sure that everyone is in the same page. Also, all the team member should come forward if they do not understand anything.

Secondly, I like to recommend is Maya team that they should continue have meeting with the team show them the progress how far they have gone so that other team get motivation and do the work more effectively and energetically.

Thirdly, Maya team should analyze or make e meeting with some of user or customer to get their feedback how they can increase App effectiveness, how more friendly they can make so that user get more satisfaction and so on.

Moreover, they should have a or documented about every sprint they have made so that in future they can analyze how far they have come.

Lastly, team leaders should give praise to the team member also should be helpful if one person need more instruction than other. Have patience with the team, as working with data is a huge task and need more concentration. Some teammates might need a bit more time to sort.

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