Report On

Implementing A.I Based Solutions To

Understand & Predict Consumer Sentiment

Submitted By:

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BRAC Business School

An internship report submitted to BRAC Business in partial fulfillment of the

requirements for the degree of

Bachelor of Business Administration

BRAC Business School

BRAC University

September, 2022

Declaration

It is hereby declared that

1. The internship report submitted is my/our own original work while completing degree at Brac University.
2. The report 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 report 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:

Omar Bin Ahmed

17104126

Supervisor's Full Name & Signature:

Ms. Afsana Akhtar

Assistant Professor, BRAC Business School

BRAC University

Letter of Transmittal

Ms. Afsana Akhtar

Assistant Professor

BRAC Business School

BRAC University

66 Mohakhali, Dhaka-1212

Subject: Submission of internship report on implementing A.I based solutions to understand & predict consumer sentiment.

Dear Madam,

With due respect, I would like to inform you that I have successfully completed my internship report on report on implementing A.I based solutions to understand & predict consumer sentiment.

I have attempted my best to finish the report with the essential data and recommended proposition in a significant compact and comprehensive manner as possible.

I trust that the report will meet the desired goal.

Sincerely yours,

_____

Omar Bin Ahmed

17104126

BRAC Business School

BRAC University

Date: September 13, 2022

Non-Disclosure Agreement

This agreement is established and entered into by and between Omar Bin Ahmed (ID: 17104126), a student at BRAC University, and Tech Garlic Limited. with the intention of preventing the unlawful disclosure of the company's confidential information.

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Tech Garlic Limited

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Omar Bin Ahmed

Executive Summary

This report reflects my 12 weeks of work experience at Tech Garlic LTD. And also, my observation and workflow of analyzing customers' sentiments of different brands using an Artificial Intelligence-based solution called DotKom. This report shows the importance and ease of implementing artificial intelligence-based solutions to understand & predict consumer sentiment. Understanding customer sentiment can be a difficult process and in the modern age of social media marketing without a big and accurate data set it is almost impossible to determine customer sentiment in real time. Artificial Intelligence-based solutions like DotKom makes the process fast and responsive. It helps campaign planners like myself to create successful marketing campaigns and also enables brands to build better connections with their customers. Adding to this fact this report also showcases my responsibilities as a campaign planner and also my experience working in the organization. Along with these this report will also provide business strategies, operational practices, and the financial performance of the organization. This report will also reflect on the challenges and limitations of Artificial Intelligence-based -based solutions. Lastly, some recommendations have been provided for future improvement of the tech solution.

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List of Acronyms

A. I	Artificial Intelligence
IT	Information Technology
API	Application Programming Interface
OVC	Online Video Commercial
MFS	Mobile Financial Services

Chapter 1

Internship Overview

1.1 Student Information

Name: Omar Bin Ahmed

ID: 17104126

Program: Bachelor of Business Administration

1.2 Internship Information

1.2.1

Company Name: Tech Garlic Limited

Department: Planning and Client Service

Address: House No: 126, Road No: 05, Mohakhali DOHS, Dhaka-1206

1.2.2

Internship Company Supervisor's Name: Fahim Uddin

Designation: Chief Operation Manager

1.2.3 Job Description

At Tech Garlic I joined as a senior executive in the Planning and Client Service department. I worked as a content planner and design team lead. I also worked as a client service executive to provide important data to our clients regarding social media campaigns which are essential for the brands to design efficient successful campaigns in the future.

1.3 Internship Outcomes

It was an exciting experience to work at Tech Garlic. As Tech Garlic is a newly founded company, I had the opportunity to learn many aspects of brand building as well as team leading within a very short period of time. This experience has helped me to understand how to run and grow an organization from the very beginning. I have advanced to a new level in both my professional and leadership abilities thanks to Tech Garlic.

Chapter 2

Organization Part

Company Introduction

2.1 History

Tech Garlic was established in 2019 by its founder Obaidur Rahman and Nazmul Haque. Tech Garlic is a software and strategic marketing company located in Mohakhali DOHS which focuses on Artificial Intelligence and machine learning-based solutions to make social media marketing campaigns more successful and data-driven. Tech Garlic believes that the future of marketing will be data-driven and the goal of the organization is to make a data-driven approach as friendly as possible. Tech garlic started its journey in 2019 with 8 employees, currently, it has 30+ employees working in different departments of the organization such as the tech department, marketing department, business solution department, human resource, and administration department. Tech Garlic aims to create an all-in-one online solution for social media monitoring. Tech Garlic is dedicated to assisting successful businesses in expanding their technological capabilities.

2.2 Vision, Mission & Values

2.2.1 Vision

A vision statement is a short declaration that defines the goals and ambitions of an organization. Below is the vision statement of Tech Garlic LTD.:

"Developing Cutting-Edge Software by Utilizing Cutting-Edge Technology to Deliver Superior Solutions to Meet the Needs of Consumers."

2.2.2 Mission

A mission statement provides a brief description of an organization's purpose. It outlines the organization's goals and overarching objectives. Missions of Tech Garlic LTD. Are given below:

- Be the leading artificial intelligence-based software solutions provider in Bangladesh
- Creating the best all-in-one software solution for social media marketing.
- Creating the friendliest work environment that focuses on the mental well-being of the employees.
- Establishing itself as the world leading tech solution provider.

2.2.3 Values

To collaboratively achieve the organization's mission and vision, the workforce is expected to act in accordance with the organization's values. The values of Tech Garlic LTD are:

- Result Driven
- Transparent
- Respectful
- Focused on Customer Satisfaction

2.3 Services

Tech Garlic promises to meet the IT requirements of businesses of all sizes. Services provided by Tech Garlic are:

- **Software Development**

  The process of conceptualizing, defining, designing, programming, documenting, testing, and addressing bugs in order to create and maintain applications, frameworks, or other software components is known as software development. Program development comprises all activities from the idea of the intended software through to the ultimate manifestation of the software, often in a planned and organized process. It also involves authoring and maintaining the source code. Research, new development, prototyping, modification, reuse, re-engineering, maintenance, and any other activities that lead to software products are also considered to be a part of software development.

- **Mobile Application**

A mobile application or app is a computer program or piece of software designed particularly to run on a mobile device, such as a phone, tablet, or watch. Mobile apps are typically made with the intention of running on mobile devices, in contrast to desktop apps, which are designed to run on desktop computers, and web applications, which run via mobile web browsers rather than directly on the mobile device.

- **E-Commerce Solution**

The goods and services that assist a firm in doing business online are known as e-commerce solutions. There are a wide variety of e-commerce options available, including those that let conventional firms plan, develop, and manage websites.

- **Website Design**

The term "web design" describes the layout of websites that are seen online. Instead of software development, it often refers to the user experience components of website development.

- **Web Application**

Web applications are computer programs that are hosted on a distant server and accessed by users through a web browser. By definition, all online services are also web applications, and most if not, all modern websites have at least some Web applications.

- **API**

The abbreviation "API" means "Application Programming Interface." With regards to application programming interfaces, "Application" may mean any piece of software that serves a certain purpose. An interface is like a service agreement between two programs. In this agreement, the parties have laid down the parameters for making and receiving requests.

- **Cloud Solution**

Applications, data storage, on-demand services, computer networks, and any other resources that can be accessed through an internet connection and run in a shared cloud computing framework provided by a third party are all examples of cloud-based solutions.

- **IT Consulting**

The purpose of IT consulting is to advise businesses on how to best integrate their technological goals with their overall business and operational objectives.

2.4   Products

As of now, Tech Garlic has been able to successfully produce multiple solutions for social media platforms. These solutions help users to monitor their business growth, control their social media pages and groups, and also helps to scrap information, and segment target market according to their demographic. Adding to this the solutions also provide state-of-the-art reports on consumer sentiment on social media platforms by which brands can plan and create successful campaigns in the future. Some of the products are:

- **Zerocium**

    Zerocium is a social media query management tool. It is a user-friendly query management tool that WhatsApp, Viber, Email, Telegram, Ticketing Systems, WebChat, and Facebook into your customer service platform.

- **DotKom**

    Dotkom, an AI-centric social listening tool, is our flagship product. Launched in October 2021, this tool is able to scale the digital lifestyle of a customer by profiling their interactions with a brand's social media page. Unlike other language-processing AI, Dotkom is programmed to specifically pinpoint sentiments in the Bangla language, which can range from positive, negative, or neutral comments left by customers in a brand's Facebook post. Based on what words have been used, the AI can understand if the customer has liked the specific service and if they might be interested in future offers.

- **Chumbok**

    Chumbok is a hub where users may collaborate on projects that improve the public's perception of a company or its products.

2.5   Organogram of Tech Garlic LTD
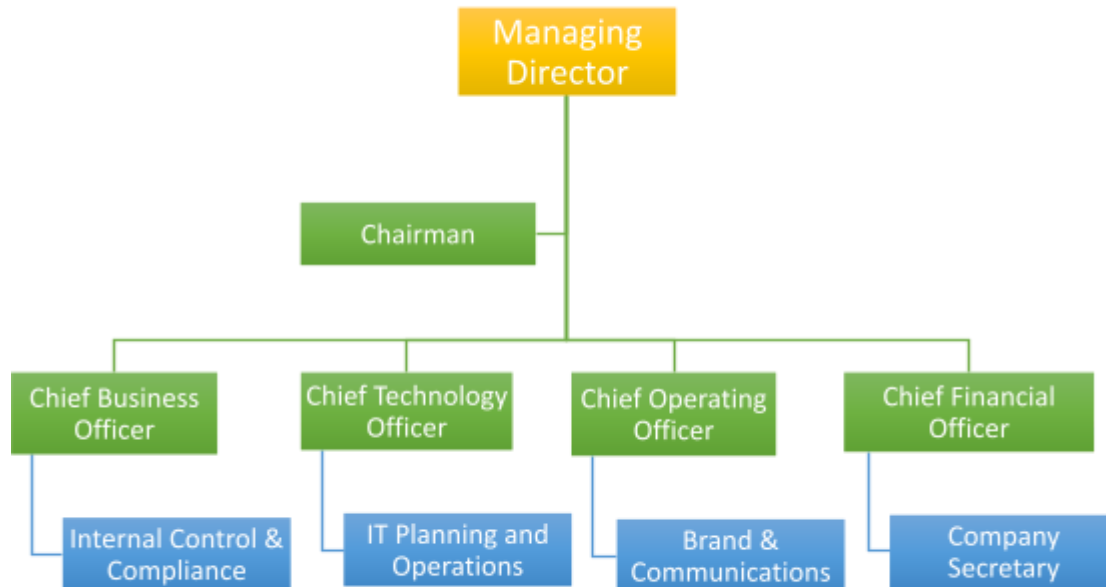
Figure 01: Organogram of Tech Garlic Limited

2.6   Marketing Strategy of Tech Garlic LTD.

By anticipating and meeting consumer demands and differentiating the firm in the marketplace, a marketing strategy helps businesses succeed over time. It includes everything from identifying your target demographic to selecting the most effective communication methods to get your message through. As a software company Tech Garlic focuses on B2B marketing. The marketing strategies of Tech Garlic are:

❖ **Referral Marketing:**
Referral marketing is a marketing strategy that uses referrals and word-of-mouth to expand a company's client base via the networks of its current consumers. Tech Garlic uses its current network of consumers to promote the products and services of the

company. It is the most efficient and easiest way Tech Garlic promotes its service. It has the highest customer-gaining rate among all of the marketing strategies.

❖ **A High-Performance Website:**

A well-designed and functional website is considered to have good performance. A company's website is a window into the company's mission, capabilities, goods, services, and, ultimately the brand. So, make sure you look nice, polished, and professional. Tech Garlic makes sure that all of the service-based websites look and perform in an optimal manner so that it reflects a positive experience from the target customers.

❖ **Search Engine Optimization (SEO):**

SEO, or search engine optimization, refers to the methods used to increase the number of visitors to a website or a certain page within a website. Search engine optimization aims for organic rather than bought traffic. Tech Garlic focuses on gaining organic traffic on its service websites by doing SEO.

❖ **Social Media Marketing:**

The purpose of social media marketing is to accomplish marketing and branding objectives by leveraging the power of popular social media networks. Social media marketing is a subset of digital marketing. Tech Garlic promotes its product and services through its social media pages and ads to promote the brand and its services to the target market.

2.7   Financial Performance of Tech Garlic LTD.

The financial performance of an organization must be monitored in order to predict its future and sustainability. Calculating financial ratios is one approach to assessing an organization's financial performance. The previous two years' worth of data on Tech Garlic Limited's cost-to-income ratio, return on investment, current ratio, and debt-to-equity ratio have all been examined to ascertain the company's viability and future.

2.7.1 Cost-to-Income Ratio:

The cost-to-income ratio gives a clear indication of how well an organization runs; the lower the ratio, the more profitable the bank is. Changes in the ratio might also suggest potential problems; for instance, if it rises from one period to the next, it means that costs are increasing more quickly than income.
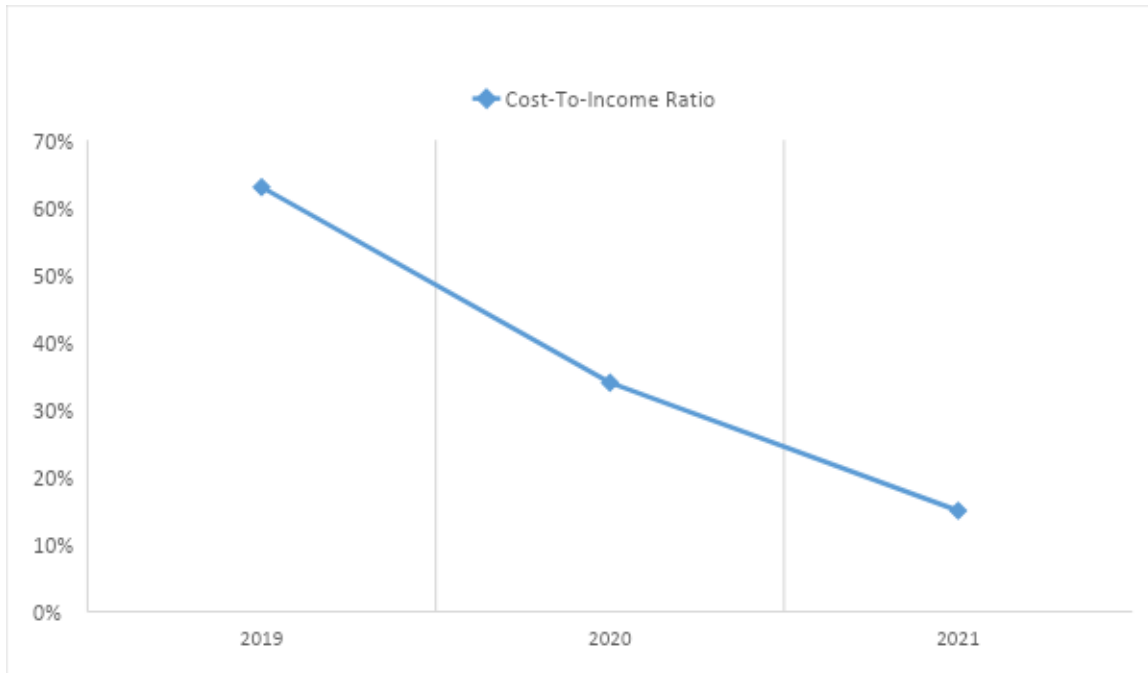
Figure 02: Cost-to-Income Ratio of Tech Garlic

This graph shows Tech Garlic Limited's cost-to-income ratio from 2019 to 2021. As can be seen, the ratio was lower in 2020 and 2021, indicating the business was running effectively in those years. However, it was high in 2019, indicating costs were increasing more quickly than revenue. The ratio was significantly lower in 2021 than it had been in the previous three years, indicating that Tech Garlic had improved its efficiency in the previous year.

2.7.2 Return on Investment:

The rate of return that investors in a corporation receive on their investment is effectively calculated by the return on equity ratio. The return on equity of a company reveals how well it earns returns on the investments made by its owners.
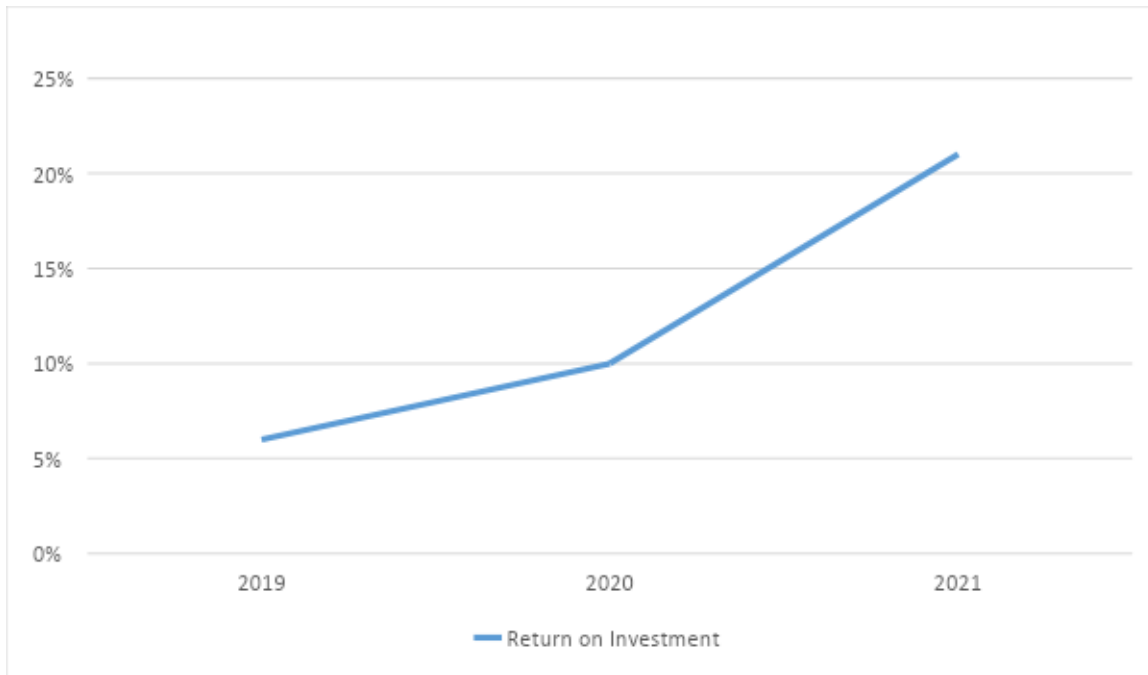
Figure 03: Return on Investment

During 2019 at the beginning of the operation of Tech Garlic Limited the return of investment was the lowest at 5% ROI, during 2020 return on investment saw a 4% increase which was 10% return on investments but during the year 2021 after Tech Garlic launched its flagship service DotKom the company show an 11% ROI increase from the previous year which was 21% return of investment.

2.8   Industry Analysis & Competitive Analysis

2.8.1 SWOT Analysis

A SWOT analysis serves as a realistic, evidence-based, and information evaluation of the benefits and drawbacks of a business, its initiatives, or the industry in which it competes. A SWOT analysis of Tech Garlic Limited is shown below:

Strengths:

- ❖ **Use of Cutting-Edge Technologies**
- ❖ **A Broad Range of Products**
- ❖ **Excellent Service Quality**
- ❖ **Consistent Consumer Base**

❖ **Well-Organized Staff and A Capable Management Group** .

Weaknesses:

❖ **Lack of Marketing Channels**

❖ **Low Employee Retention Rate**

❖ **High Operating Cost**

❖ **Time-consuming R&D Process**

Opportunities:

❖ **A Developing Market of E-commerce and F-commerce**

❖ **Unique Software Solutions**

❖ **New Technologies**

❖ **Niche Target Market**

❖ **Unfilled Customer Needs**

Threats:

❖ **Shift of Market Demand**

❖ **Entry of New Competitors**

❖ **Innovation of New Technologies**

Extending the points

2.8.2 Porter's Five Forces Analysis:

Competitive Rivalry				Threat of New Substitute
LOW	Power of Buyers	Power of Suppliers	Threat of New Entrants	**HIGH**
	LOW	**LOW**	**HIGH**	

The following is a discussion of Porter's five forces as it relates to Tech Garlic Limited:

❖ **Competitive Rivalry:**

There are very few companies providing similar services which Tech Garlic is providing. The quality and efficiency of the services and software solutions provided by Tech Garlic are far superior. Other similar services and software providers are generations behind what Tech Garlic's offering. So, the competitive rivalry is very low.

❖ **Power of Buyers:**

The power of buyers is very low when it comes to Tech Garlic's solutions like Zerocium, DotKom, and Chumbok. The reason for this situation is that similar services and solutions provided by other competitors are very inefficient as well as ineffective as features of the solutions offered by Tech Garlic are unmatched.

❖ **Power of Suppliers:**

The power of suppliers when it comes to software-related products is very low. As we live in the modern age of information and technology any alternative of information or resource related to technology is just one click away. There are thousands of options when it comes to technological supplies.

❖ **Threat of New Entrants:**

The threat of new is very high when it comes to the tech industry. If a well-known company decided to start a tech business related to an existing start-up organization like Tech Garlic Limited it can be very alarming. As well-established tech companies already have enough resources to replicate similar solutions by themselves within a very short period of time it can be very dangerous for the business.

❖ **Threat of Substitutes:**

The threat of substitutes is very high when it comes to the software solutions we are providing. As with any software solution, a website, or app is very easily replicable.

Every software or tech solution available in the market has its alternative and the success or failure of the solution depends on the efficiency of the solution. So, any new better performing alternative solution to the existing service that Tech Garlic LTD is providing can be very dangerous for the company.

2.9   Summary and Conclusions

Tech Garlic Limited is a startup established in 2019. It focuses on new and innovative software solutions to meet the needs of its clients. The main focus of Tech Garlic is to create solutions that give brands the required data in the shortest time possible. Without accurate data set from social media, it is almost impossible to identify the success of a campaign or the sentiments of consumers about a brand. Innovative and efficient solutions provided by Tech Garlic Limited are helping brands to gather accurate data sets which are helping them to create efficient and engaging marketing campaigns and also valuable customer insights which is making customer retention easier.

Tech Garlic Limited is a versatile and creative workplace where employees have the experience of working with the biggest brands in the country. It is a place where learning starts from the very first minute. As a marketing major Tech Garlic Limited was the perfect fit as it helped me to understand how to engage, plan and complete projects which led to successful marketing campaigns for brands like Robi, Airtel, British American Tobacco, and Nagad. This type of first-hand experience is crucial for any fresh graduate going into the creative world of marketing.

2.10   Recommendations

Working with Tech Garlic Limited is a fantastic opportunity. They offer a fantastic workplace atmosphere, which is a major selling point to prospective interns. Everyone there is extremely professional, but they also go out of their way to be kind and helpful. Considering Tech Garlic is an excellent business with which to collaborate, I can't provide much advice. For me, it's impossible to focus for more than 8 hours a day, thus I think it's important that offices stick to regular hours. Interns like myself,

who have to commute from a long distance, would benefit greatly from a transportation service for staff members. Finally, there is room for improvement in the interns' access to resources, since delayed resources have the potential to dampen motivation and reduce output.

Chapter 3

Project Part

3.1 Introduction

3.1.1 Literature Review

Understanding consumer sentiment is an essential part of a brand to make better decisions about its products and services. Understanding how consumers react to a certain attribute or offerings of a product or service is necessary for customer retention. A new generation of customer intelligence solutions with various model behaviors is called AI Customer Behavior Analytics. Using a similarly designed solution we are able to analyze the consumer sentiments of different brands from our diversified portfolio. These behavioral analysis data also help us to understand and predict consumer sentiments which helps us to design successful marketing campaigns on social media.

The possibilities of Artificial Intelligence to analyze consumer behavior is endless. Real-time behavioral analysis, customer insights, and customer sentiments are all now possible because of Artificial Intelligence. Real-time data is pivotal to constructing successful marketing campaigns and predicting efficient ways of communication through social media platforms in the future.

Regardless of the blessings of Artificial Intelligence, there are still a few limitations. As these analyses are done through various algorithms based on several sentiment analysis models hundred percent efficiency is yet to be achieved. Full efficiency can only be reached by fetching more data and feeding the data to A.I solution. As hardware is becoming more and more powerful each generation this obstacle can be overcome within a very short period of time.

3.1.2 Broad Objective

The broad objective of this report is to conduct academic research on implementing A.I based solutions to understand & predict consumer sentiment. This research has been conducted for the purpose of completing the internship.

3.1.3 Specific Objectives

The specific objectives of this report are the following:

- To understand what Consumer Sentiments mean
- To find out the benefits of incorporating Artificial Intelligence to analyze consumer sentiment.
- To identify the challenges and limitations of A.I while Analyzing Consumer Sentiment Analysis.

3.1.4 Significance

This research will give an overview to its readers about how A.I (Artificial Intelligence) based solutions are used to analyze and predict consumer sentiment. The report can also be used to get an idea of the benefits of analyzing consumer behavior with A.I and also shed a light on its readers' limitations and challenges while analyzing consumer sentiment using A.I based solutions. This research will also have a positive impact on its reader about implementing A.I based solutions while analyzing and predicting consumer sentiment in the future.

3.1.5 Methodology

- **Primary Data Collection:** Data from the solution have been used to collect primary data.
- **Secondary Data Collection:** Secondary will be collected via websites, articles, and published papers.

3.2 Artificial Intelligence and Consumer Sentiment Analysis

3.3.1 Definition of Artificial Intelligence

Andreas Kaplan (Professor of Marketing at the ESCP Business School) gave an idea about artificial intelligence in his book *Artificial Intelligence, Business and Civilization Our Fate Made in Machines.*

"Artificial intelligence is the ability of a computer program

or a machine to think and learn."

The capacity of a digital computer or computer-controlled robot to carry out actions frequently associated with intelligent creatures is known as Artificial Intelligence. The phrase is widely used in reference to the effort to create Artificial Intelligence systems that possess human-like cognitive abilities including the capacity for reasoning, meaning-finding, generalization, and experience-based learning. It has been proven that computers can be programmed to perform extremely complicated tasks—like, for example, finding proofs for mathematical theorems or playing chess. The performance levels of certain programs, however, have surpassed those of human specialists and professionals. For example, scraping important data from Facebook and other social media platforms is almost impossible without the help of Artificial Intelligence. Scraping data means collecting consumer data from a website through various methods. Artificial Intelligence is taught how to go to a specific page or group and crawl data from those specific groups and pages then the Artificial Intelligence-based solution sorts out data accordingly depending on the requirements provided by the users.

3.3.2 Consumer Sentiment Analysis

According to *Olivera Grljevic* from the University of Novi Sad - Department of Business Informatics and Quantitative Methods

"Sentiment analysis allows companies to analyze public opinion, attitudes, and emotions directed at a particular entity"

Customer sentiment analysis is an automated method for identifying emotions in online conversations to learn what customers think about your product, service, or brand. It assists companies in learning more about their consumers and efficiently responding to them. Sentiment analysis models are able to find patterns in text and automatically categorize opinions as positive, negative, or neutral using Natural Language Processing (NLP) and a number of algorithms.

● **Positive Sentiment**

Positive sentiment refers to customer expression of satisfaction or delight regarding a brand's service or marketing campaign. It is basically the indicator of the positive reaction of a customer towards a brand. Positive sentiment defines what values or ideas are appreciated by a customer of a certain brand regarding the products or services of that brand.

● **Neutral Sentiment:**

The neutral sentiment means neither good nor bad. The reputation of the brand is not helped by neutral postings in any way, but it is also not injured by them. They are neither positive nor negative. When describing a brand, consumers often use phrases such as "acceptable" or "sufficient." There is a window of opportunity here to interact with those who are posting posts about the company that is neither positive nor negative.

● **Negative Sentiment**

Negative sentiment is the opposite of positive sentiment. It refers to customer expression of dissatisfaction or displease regarding a brand's service or marketing campaign. It is basically the indicator of the negative reaction of a customer towards a brand. Negative sentiment defines what values or ideas are rejected by a customer of a certain brand regarding the products or services of that brand.

Sentiment analysis, in essence, automates the tasks you detest, such as reading and labeling data, allowing you to direct client issues to the appropriate teams and handle them as quickly as possible.

- **Natural Language Processing (NLP)**

  The study of how to design computers to process and evaluate huge volumes of natural language data is known as natural language processing (NLP), which is a branch of linguistics, computer science, and Artificial Intelligence. The end objective is a computer that can "understand" what's written in a document, even down to the subtleties of the language used. In this way, the technology can correctly classify the papers and retrieve the information and insights hidden inside them. A few examples of NLP are:

  Email Filters.

  Smart Assistants.

  Search Results.

  Predictive Text.

  Language Translation.

  Digital Phone Calls.

  Data Analysis.

  Text Analytics.

3.3 Importance of Artificial Intelligence on Consumer Sentiment Analysis

Conducting a consumer sentiment analysis on social media can be a hard process to go through as there are millions of data floating around on each page and groups with just human interference it is almost impossible to collect a big amount of data, this is where

Artificial Intelligence comes in. Functioning Artificial Intelligence solutions are able to collect terabytes of data within a very small period of time and are also able to sort these data simultaneously.

The process of data collection can be understood by the example given below:

Figure 05: Web Scraping Workflow

3.4 Web Scraping

Data scraping is often used for online data extraction, also known as web scraping, web harvesting, or web data extraction. Using the Hypertext Transfer Protocol (HTTP) or a web browser, web scraping software may connect directly to the Internet. While it is possible for a software user to manually do web scraping, the phrase is most often associated with automated procedures carried out by means of a bot or web crawler. It's a way of saving information on the web for later use, usually into a local database or spreadsheet.

3.5 Web Scraping Workflow

A web scraping tool or solution works in a few steps. The first step is to provide the tool or solution with the Uniform Resource Locators (URL) or simply speaking the address of a website. After defining or assigning the address of a website to the web scraping tool it uses machine learning code to extract data from that assigned website or web page. The type of data to be extracted from the website or webpage is assigned earlier. The web scraper finds the fastest and the most optimal way to extract data from the assigned website in the shortest time possible. After the second step, the web scraping tool then stores the data to a local or online database which can be used to analyze differently for various purposes.

3.6 Implementing Artificial Intelligence-Based Solutions to Understand & Predict Consumer Sentiment Using DotKom (A.I Based Sentiment Analysis Solution) Developed by Tech Garlic.

3.6.1 Introduction to DotKom

Dotkom is an Artificial Intelligence based social media listening solution created by Tech Garlic Limited. Software that tracks and examines online conversations regarding a brand, a certain subject, rivals, or anything else that is pertinent to the business is called a social media listening tool. It gathers mentions of chosen keywords and aids in their analysis by marketers.

DotKom operates using a common dashboard for all users where they can assign tasks like group and page listening. The solution tracks conversations among the assigned groups and pages where the Artificial Intelligence goes through each post and conversation and scrapes data. Brands can use specific keywords to track how many times their brand was mentioned on social media with a click of a button. It is important to note that data is only collected from the conversation where the brand name is mentioned. After collecting data, Artificial Intelligence goes through all sets of data that were collected, understands the tone of the conversation, and is able to provide accurate sentiments of customers on social media. Here is a brief workflow of a listening tool:
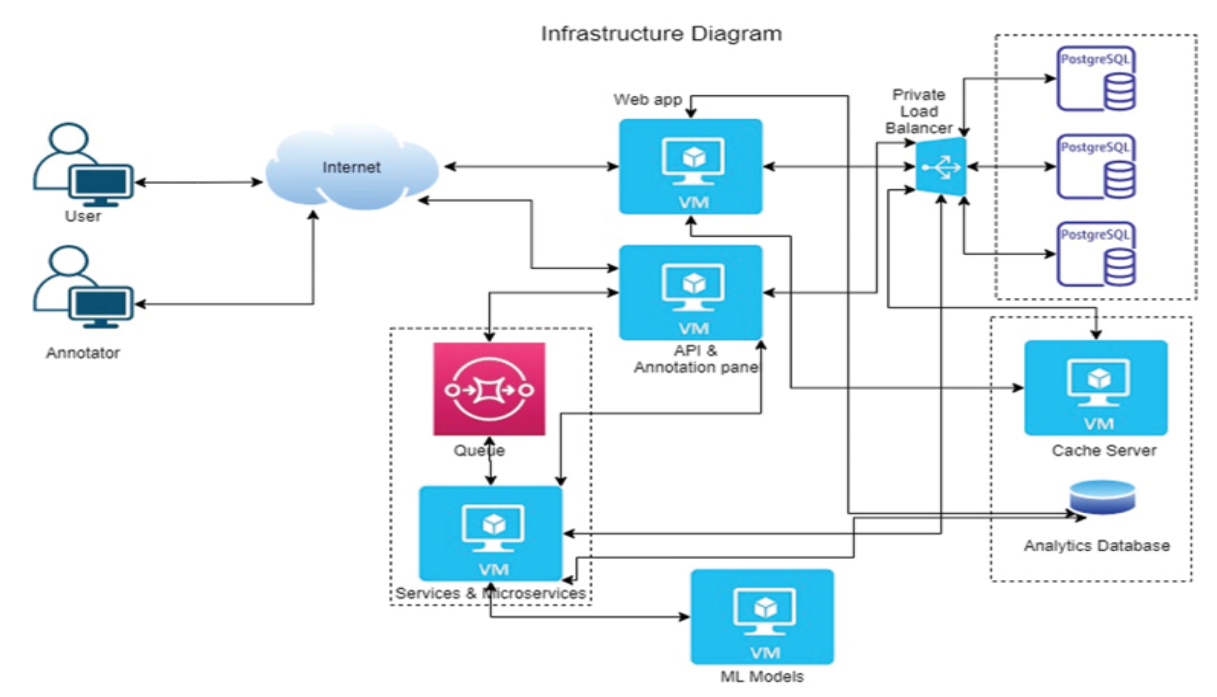
After DotKom's Artificial Intelligence is able to provide successful sentiment analysis of customers regarding a campaign, we can easily get to a conclusion about the success rate of that campaign as well as have a better understanding of the mind of customers. This helps to learn about the aspects of a brand that the customers hate and the segments where the brand makes a better connection to the customers. It helps to create better and more efficient social media campaigns in the future and keeps the brands ahead of its competitors.

3.6.2 DotKom's Customers

DotKom is a B2B solution as it only focuses to help business to understand their target audience more efficiently. DotKom is currently working with 25+ different brands including multi-national companies, telecommunication companies, electronics manufacturing companies, and more. Here is the list of a few mention worthy customers of DotKom:

British American Tobacco

Robi

Airtel

Nagad

Samsung

Vuse

3.6.3 Customers Requirements

The term "customer requirements" is used to describe the characteristics or criteria of a product or service that are considered essential by the target market. Customers are prompted to make a purchase if the product or service meets these specifications. Market research may help businesses learn about their target audience's wants and needs, which can then be used to develop products and services that satisfy their demands. The common requirements among all of the customers of DotKom are:

User-Friendly Dashboard

Powerful Analytical Tools

Fast and Responsive Website

Refined and Compact Data Set

Accurate Sentiment Analysis

Highly Secure Payment Gateway

3.6.4 Customer Complaints

A consumer complaint or customer complaint is "an expression of dissatisfaction by a consumer to a responsible party." It can also be seen as a positive report from a customer that shows proof of a problem with a product or service. Solving customers' complaints and making changes accordingly to the customers' complaints is essential for a company to upscale the service and ensure customer satisfaction. Complaints about DotKom were collected using the data from the customer's review and feedback section of the solution. From those data we were able to outline the common complaints from the customers of DotKom, which are:

Inaccurate Sentiment Report
Software Bug-Related Issues
Slow Data Processing
Software Limitations
Connectivity Issue
Server Problems
Device Limitations

3.7 Findings and Analysis

3.7.1 Robi Shera Internet Campaign

Robi Shera Internet Campaign was launched by Robi a renowned telecom service provider in Bangladesh. The goal of the campaign was to show the capability of Robi regarding high-speed cellular internet. Robi chose Saim Ahmed and Safa Kabir (renowned actors) to launch their campaign. To identify if the campaign was successful or not it was very important to understand the customer sentiments regarding the campaign. Here is where DotKom comes in. Through Dotkom we are able to successfully determine the rate of positive, neutral, and negative sentiments of the customer regarding Robi Shera Internet Campaign, and were able to underline the issue as well as provide valuable recommendations which helped robi to design more efficient and positive marketing campaign later on.

3.7.2 Sentiment Analysis of Robi Shera Internet Campaign

Through DotKom we were able to analyze customer sentiment regarding the campaign. We used a sample size of 1,520 to create a customer sentiment analysis report consisting three main sentiments, which are:

Positive Sentiment

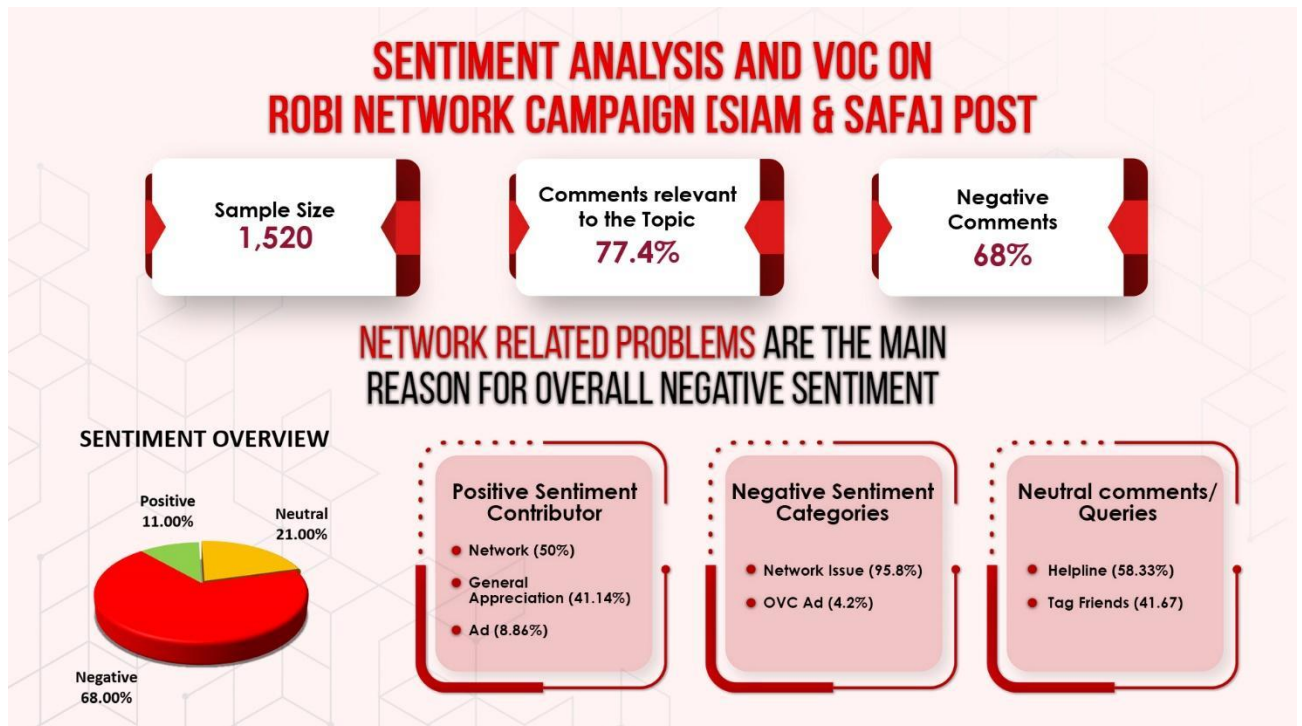Negative Sentiment

Neutral Sentiment

Figure 07: Sentiment Analysis Robi

Here we can see from the analysis that the campaign had 11% Positive Sentiments, 21% Neutral Sentiments, and 68% Negative Sentiments. Comments made on social media related to the campaign had 77.4% relativity whereas the majority of the comments were negative which was 68%.

50% of the positive sentiments were related to their good network and connectivity around different parts of the country, 41.14% of positive sentiments were general appreciation of the service provided by Robi, and 8.86% of the positive sentiments were an appreciation for the advertisement.

95.85% of the negative sentiments consisted of network issues faced by the customers and 4.86% of negative sentiments were due to a lack of appreciation of the customers regarding the advertisement.

3.7.3 Negative Sentiment Analysis With DotKom

With the help of DotKom we analyzed Robi Shera Network Campaign. With a sample size of 1,520, our Artificial Intelligence found that almost 68% of the comments were negative and the majority of the negative sentiments were regarding network issues.
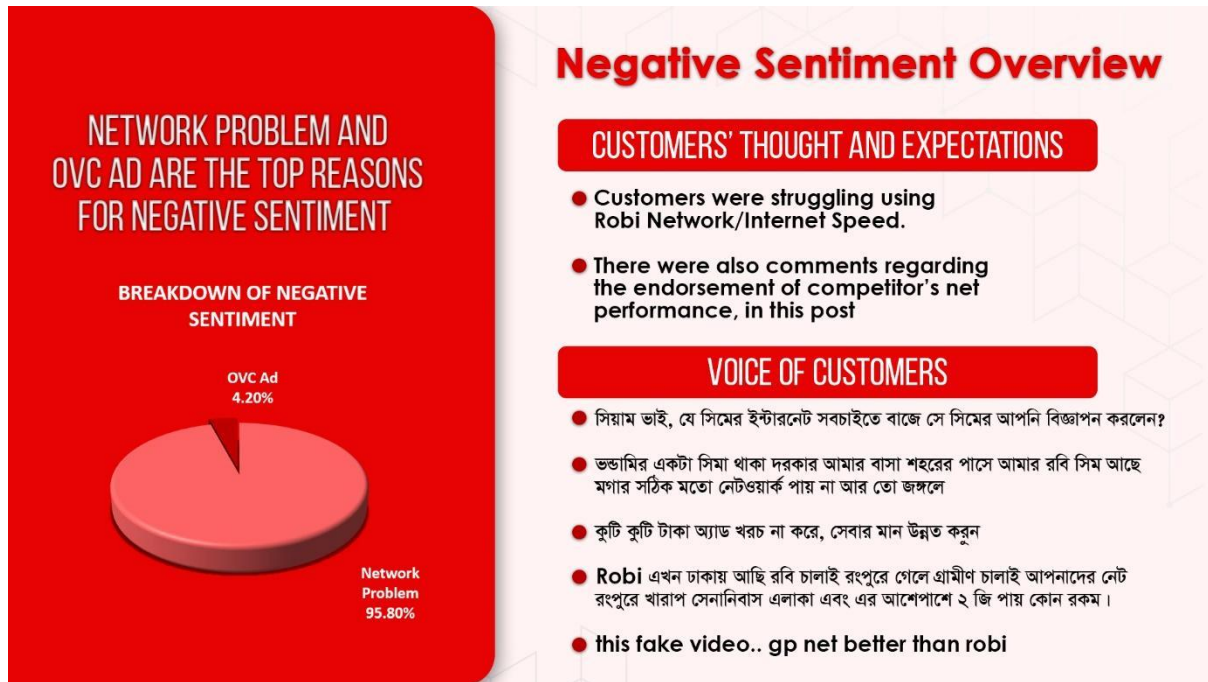

Figure 08: Negative Sentiment Analysis Robi

95.85% of the negative sentiments consisted of network issues faced by the customers and 4.86% of negative sentiments were due to a lack of appreciation of the customers regarding the advertisement.

DotKoms' sentiment analysis algorithm suggested that customers from different regions were struggling with network issues and due to network issues, they were not getting high internet speed. This resulted in a high rate of negativity among the customers of Robi. Customers using multiple telecom services also stated that other telecom service providers were able to provide better overall network and internet speed in those particular regions.

Dotkoms' automated sentiment analysis also pointed out that customers were also not satisfied with the advertisement approach of Robi. Which resulted in an overall 4.20% negative sentiment.
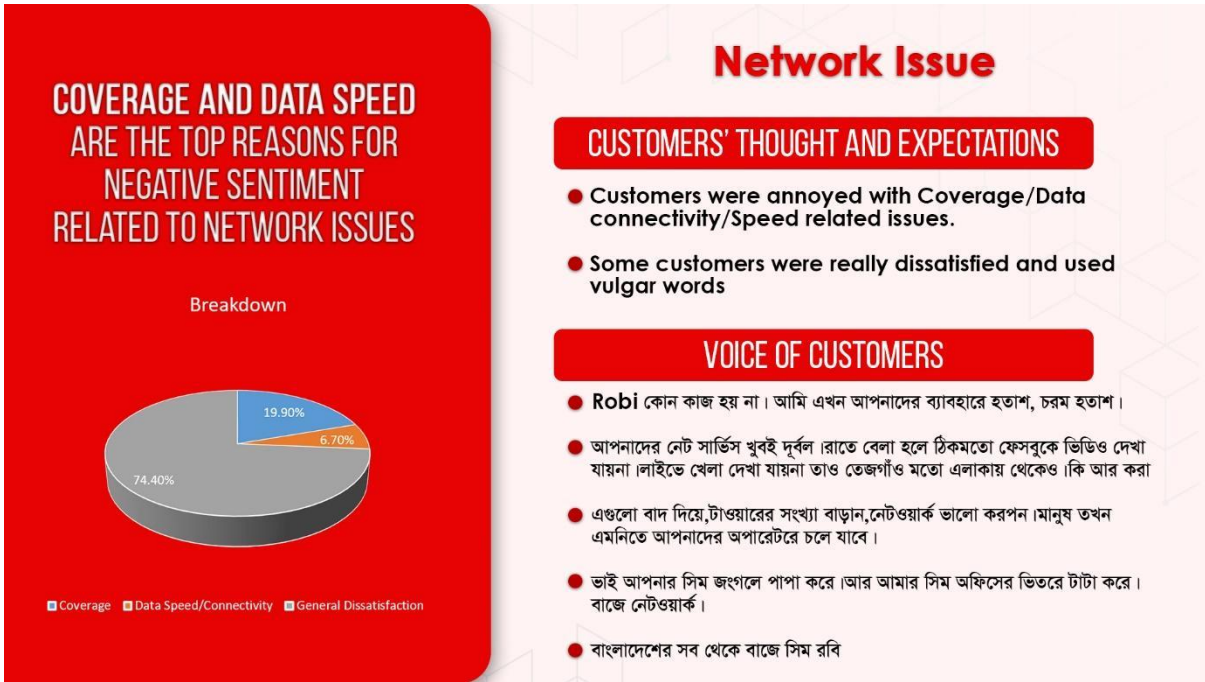
Figure 09: Negative Sentiment Analysis Robi

Coverage and data speed was the main concern of the customers which were the main reason for their negative sentiments toward the brand.
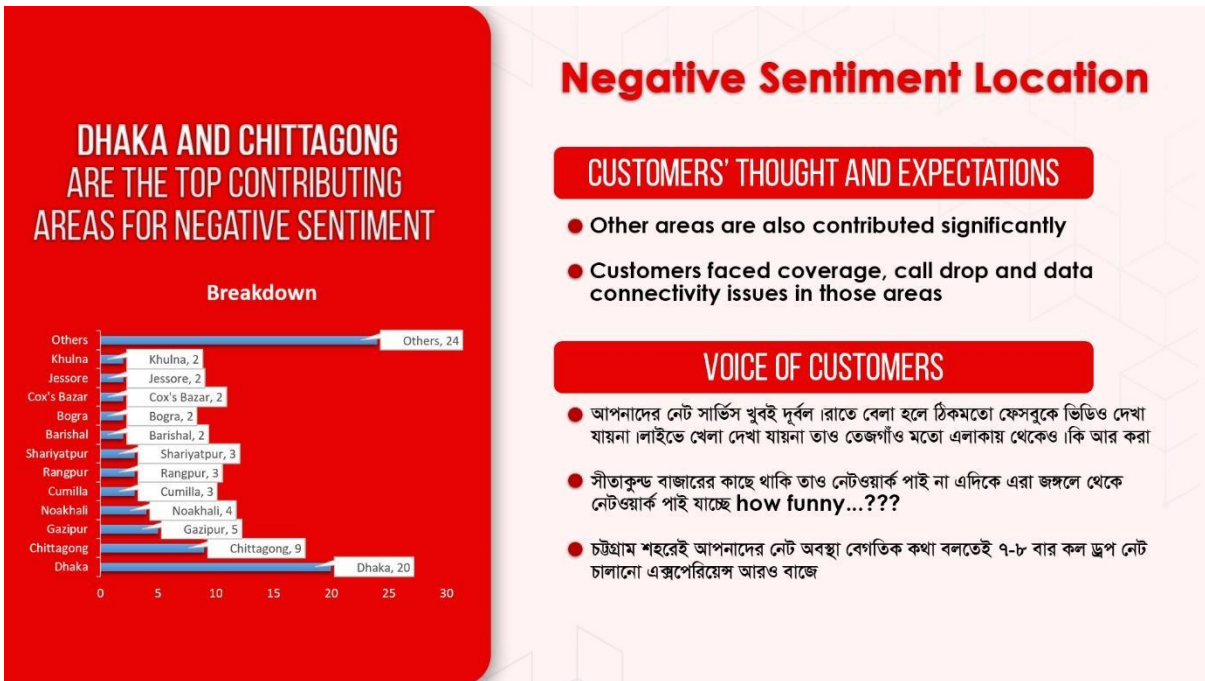

Figure 10: Negative Sentiment Location Analysis Robi

According to DotKom artificial intelligence majority of the negative sentiments originated from Dhaka and Chittagong region. Dotkoms' automated artificial intelligence-based solution

was able to pinpoint the major factors which contributed to the negative sentiments of the customers of Robi regarding the Robi Shera Network Campaign.

3.7.4 Neutral Sentiment Analysis

The neutral sentiment means Neither good nor bad. The reputation of the brand is not helped by neutral postings in any way, but it is also not injured by them. They are neither positive nor negative. When describing a brand, consumers often use phrases such as "acceptable" or "sufficient." There is a window of opportunity here to interact with those who are posting posts about the company that is neither positive nor negative. DotKoms' artificial intelligence was able to identify the neutral sentiment of the customers regarding Robi Shera Internet Campaign.

The sentiment analysis report indicated that customers were having queries about helpline related services and customers were tagging their friends in the comment section where they were discussing about the campaign.
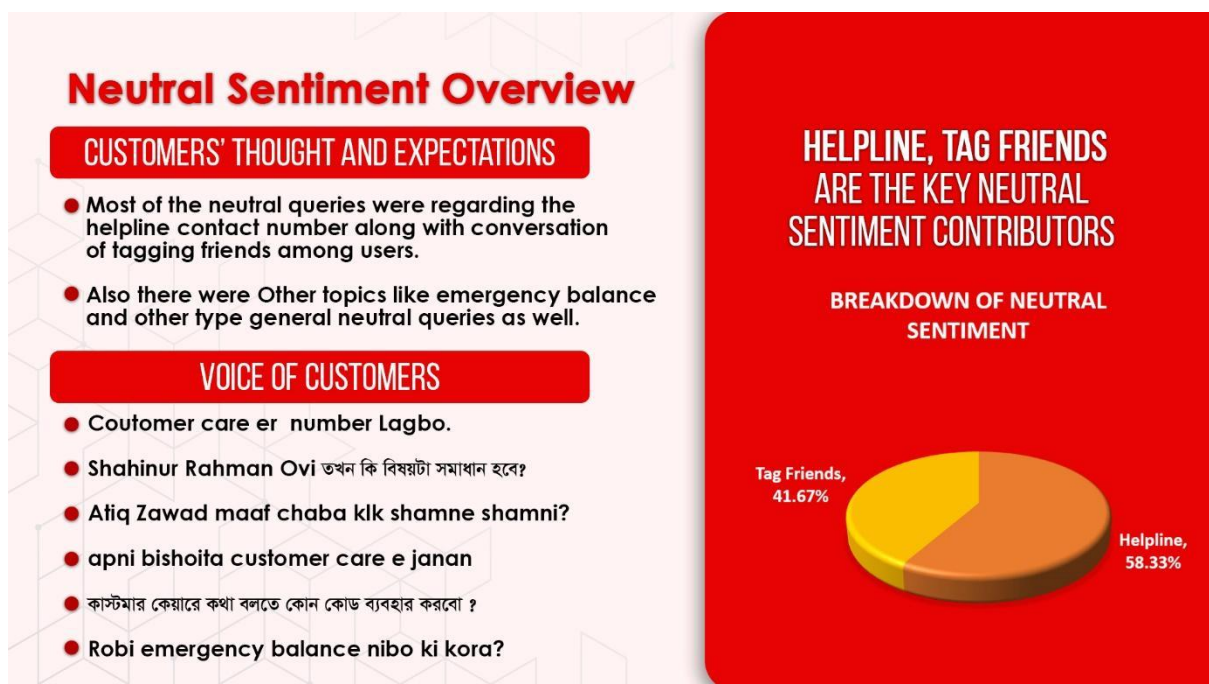

Figure 11: Neutral Sentiment Analysis Robi

The majority of the neutral sentiments were regarding the helpline, which was 58.33% and the rest of the 41.67% neutral sentiments were customers and followers of Robi tagging their friends in the comment section.

3.7.5 Positive Sentiment Analysis

Positive sentiment refers to customer expression of satisfaction or delight regarding a brand's service or marketing campaign. It is basically the indicator of the positive reaction of a customer towards a brand. Positive sentiment defines what values or ideas are appreciated by a customer of a certain brand regarding the products or services of that brand.

Robi Shera Internet campaign saw 11% positive sentiment according to DotKom's sentiment analysis tool powered by artificial intelligence technology. Positive sentiments regarding the campaign can be divided into 3 sections which are:

Advertisement Appreciation 8.86%

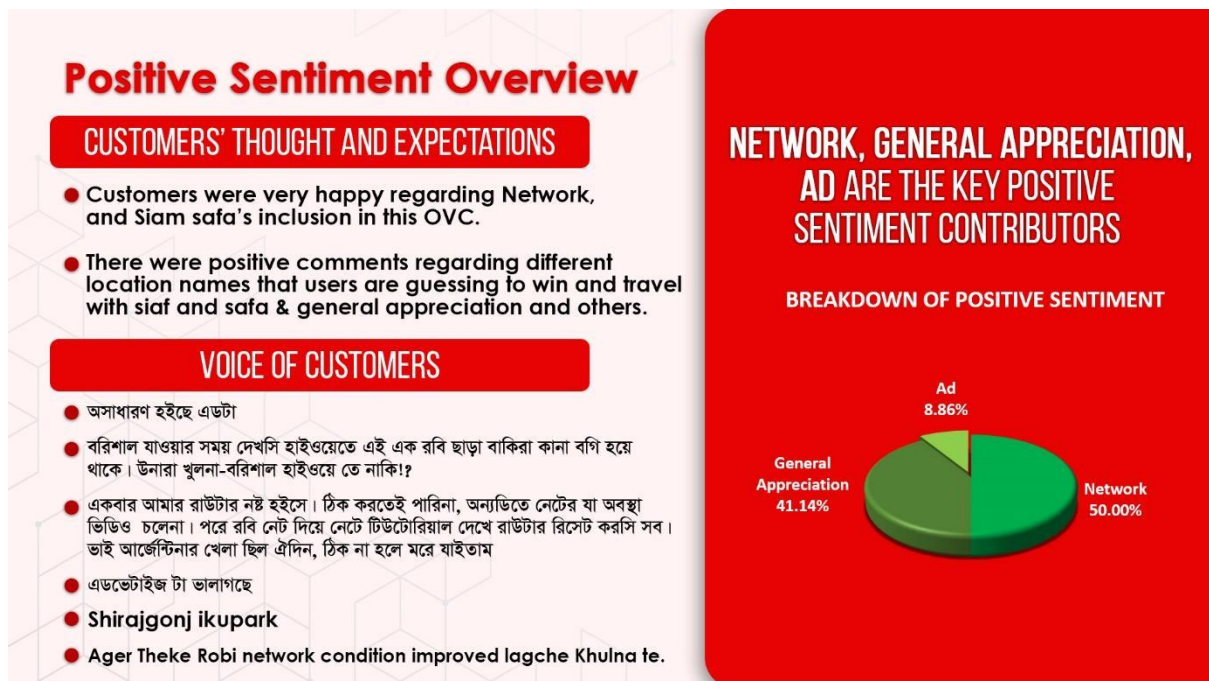General Appreciation 41.14%

Network Related Positivity 50.00%

Figure 12: Positive Sentiment Analysis Robi

Advertisement-related positive sentiments were appreciation comments regarding the advertisement campaign. People were praising Robi for their approach and creativity in the advertisement. This consisted of 8.86% of the positive sentiments.

General appreciation consisted of appreciation from the customers regarding the service quality Robi was providing. This consisted of 41.14% of the positive sentiments.

The majority of the positive sentiments were regarding the high level of network and internet speed in various regions of the country. This consisted of 50.00% of the positive sentiments.

3.8 Takeaways From The Analysis

All of these data were collected and provided through DotKom. DotKom's artificial intelligence efficiently provided and outlined the concerns of the customers. The report consisted of positive, neutral, and negative sentiment analysis which helped Robi to design new campaigns more efficiently and improve their mode of communication. This sentiment analysis can also be a guideline to improve the quality of their service and increase market share as well.

3.9 New Campaign Suggestions

DotKom's artificial intelligence was able to successfully determine the source of positivity, neutrality, and negativity regarding Robi's Shera Internet Campaign. As per the analysis, Robi had a huge negative sentiment from the region of Chittagong. So, we were able to suggest taking proper steps to increase positivity in the region of Chittagong. Customers appreciate a brand when a brand creates or focuses a marketing or promotional campaign directly relating to that demography. So, we suggested Robi organizes an exclusive event that will focus on the region of Chittagong and its people to promote its brand.

Figure 13: Campaign Design for Robi

According to our suggestions, Robi organized an exclusive event in Chittagong's Radisson Blu Hotel. We also suggested Robi include a famous public figure native to Chittagong. Including a local celebrity will help Robi to gain more positivity due to the higher appeal and acceptance rate of a local idol among the native people of Chittagong. We suggested this because there are negative sentiments regarding current celebrities who were promoting the brand among the customers.

We also suggested Robi provide new exciting Mobile Data Pack offers to ensure a positive sentiment. As there were lots of complaints about internet speed and the high cost of internet packs, better and more cost-effective internet packs can lead to the conversation of negative sentiments to positive sentiments among the customers.

Figure 14: Campaign Design for Robi

3.10 Problems and Solutions

3.10.1 Problems

During the sentiment analysis process, DotKom's software limitation causes many problems which are not alarming but still can be termed as inefficient and harmful to customer retention. Like every other software solution, DotKom is not fully optimized in the same scenarios. Software issues can cause delays while working on a project, can also provide

wrong information, or might provide false sentiment analysis due to software limitations. A few of the major issues while using DotKom are:

Re-occurring Software Errors

This is a common problem when it comes to software solutions. There are sometimes some issues like data input problems, task assigning problems, etc. Occurring during the usage and update of the software.

Server Problem

As DotKom is an online solution, most of its data and the back end of the solution are stored using online servers. Servers are web storage where thousands of data are stored remotely by which programs can be run remotely. But sometimes these servers can have issues working efficiently due to many technical and software problems.

Inaccurate Sentiment Analysis

Many times artificial intelligence is not able to provide accurate sentiment analysis. It is due to wrong input or lack of machine learning data. As DotKom's A.I is still learning this happens sometimes and gradually the inaccuracies will go down as the A.I.'s efficiency gets better.

Limitation of Data Storage

Listening tools like DotKom scrapes terabytes of data and it is impossible to this store amount of data without cloud storage. As cloud storages are very expensive, sometimes data overload causes storage space shortage and can be very problematic for the clients.

Software Bugs

With every new element or functionality added to the solution the software sometimes faces many glitches and bugs. A software bug is a mistake, flaw, or fault in the creation, maintenance, or usage of computer software that results in the production of inaccurate or unexpected results or leads it to act in ways that are not intended.

3.10.2 Solutions

Solutions to problems associated with software-based solutions can be time-consuming. As DotKom is an artificial intelligence-based solution fixing any problem regarding the software can be hard to solve. Software errors and limitations are common issues when it comes to artificial intelligence-based solutions. Here are the common ways to solve these issues:

Constant Monitoring of the Solution

Regular Software Updating

Training Artificial Intelligence to Create Error-Free Algorithm

Pro-active Research and Development Team

3.11 Conclusion and Recommendations

3.11.1 Conclusion

Artificial intelligence-based sentiment analysis makes it feasible for robots to comprehend human emotions in text, which was previously impossible. One factor that influences buying decisions is emotion, which is also a good indicator of brand loyalty and consumer happiness. Businesses may acquire valuable insights to make data-driven business choices by studying consumer sentiment. Sentiment analysis is made available, quick, and scalable by AI-powered systems like DotKom. It is possible to create a unique sentiment analysis model with its collection of no-code tools and begin receiving 24/7 insights from unstructured data. With tools like DotKom businesses will be able to see real-time sentiment analysis of their customers with a click of a button. It will help businesses to understand customers' needs and wants which will help them to make efficient and optimal marketing decisions to have better customer relations and customer retention.

3.11.2 Recommendations

Considering the study's conclusions, I would advise Tech Garlic Limited to take the following actions:

Tech Garlic only focuses on Marketing related software solutions. It would be wise for them to focus on service-based solutions aimed at other industries like logistics, health, agriculture, etc. This is will help them to build a diversified portfolio.

Tech Garlic Limited should also build a stronger Research and Development Team to find better market opportunities and help find better methods to find and solve critical problems when come to the solutions they are providing.

Tech Garlic Limited should also introduce better training and introductory material for their newly recruited employees. This will help the newly recruited to understand the values and morals of the company better.

The human resource department of Tech Garlic Limited needs to improve its methods of evaluating the performance of its employees and ensuring the safety of confidentiality.

All of the solutions developed by Tech Garlic Limited should have a 24/7 helpline service, where customers can easily get in touch with the software developers to solve their issues regarding the solutions. It will also be an amazing step to retain current customers and will be a unique selling point to gain future customers.

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Appendix A.

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