Improving Customer Experience in Retail Chains through AI Chatbots

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# ABSTRACT

This study aimed to enhance customer service in the retail industry by creating and deploying a self-hosted AI chatbot prototype for Jumpstart, a retailer. The chatbot, developed using the AI model LLaMA 2, was designed to assist customers in their shopping experience by providing advice on available products and aiding in decision-making. The initiative sought to improve customer engagement and ensure higher security, trust, control, and system lockdown by self-hosting the chatbot.

The implementation was successful, with user testing indicating satisfaction with the chatbot’s performance. However, the speed of the chatbot when serving multiple users simultaneously was identified as a challenge. Alternative methods such as scaling up computational resources, optimizing algorithms, and implementing load balancing were proposed to overcome this challenge. The study demonstrated the potential of AI chatbots in transforming customer service in the retail industry.

# ACKNOWLEDGEMENT

I might like to take advantage of this opportunity to express my gratitude to my family for continuing to support me when I departed for this training session. The people that were challenged had prior familiarity with it. was fueled by their unwavering assistance in seeing that I completed my tasks.

I would like to thank Mrs. Arvinder Kaur and Mrs. Nupur Dongariya for clarity and the guidance over the topic of my thesis. I observed the tools, the lively personality, and the liberal soul, and I understood that my success in completing this project depends much on your help.

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# Introduction

* Background

Customer service has emerged as one of the most important elements in building trust and loyalty in the continually changing retail industry. Artificial intelligence (AI) chatbots are replacing conventional means of client connection because they are more effective and affordable. These AI chatbots have the power to completely change how businesses connect with their customers by delivering individualized experiences, cutting expenses, and boosting productivity.

AI chatbots have been effectively incorporated into retail operations by companies like H&M and Tommy Hilfiger, creating a standard for other companies to follow. However, a lot of these solutions rely on external APIs, which might limit system control and provide security threats.

* Purpose

The purpose of this study is to create and deploy a self-hosted AI chatbot prototype for Jumpstart, a retailer. The chatbot will be created using the AI model LLaMA 2, and it will assist customers in their shopping experience by giving them advice in terms of available products and making up their minds as to picking the best product for them.

This initiative has two objectives. It first seeks to improve customer service by offering a tailored and effective form of engagement. Second, it self-hosts the chatbot to restrict access to only those participating in the project, to guarantee higher security, trust, control, dependability, and system lockdown.

Through user testing, the efficacy of the chatbot will be assessed, and feedback and analytics will be examined to gauge consumer happiness, engagement, and loyalty. This study has the potential to alter how Jumpstart communicates.

# Literature Review

According to Adam, Wessel, & Benlian (2021), AI-based chatbots in customer service significantly increase the likelihood of users complying with a chatbot’s request for service feedback. They found that anthropomorphism and the need for consistency play a crucial role in this process. This research provides valuable insights into how AI chatbots can be designed to enhance user engagement and compliance. The authors suggest that the design of AI chatbots should consider these factors to ensure effective user engagement.

In their Gartner report, Revang, Elliot, & Mullen (2020) provide insights into the Chatbot and Conversational AI Platform Market. They discuss the key challenges in determining what is required from the conversational AI platform for successful adoption and scaling. The report also provides recommendations for application leaders looking at how conversational AI platforms are evolving. This report is particularly useful for businesses looking to implement chatbot technology as it provides a comprehensive overview of the market trends and challenges.

Yang, Chen, Fang, & Fukuoka (2021) conducted a systematic review aimed at evaluating AI chatbot characteristics, functions, and core conversational capacities. They investigated whether AI chatbot interventions were effective in changing physical activity, healthy eating, weight management behaviors, and other related health outcomes. The findings from this review suggest that AI chatbots have significant potential in promoting healthy behaviors and improving health outcomes.

In their paper, Krishnan, Gupta, Gupta, & Singh (2022) provide insight into how AI Chatbots influence user interactions. They discuss how brands are using Chatbots for marketing and customer service and why customers are attracted to interact with augmented agents such as Chatbots. The authors suggest that AI Chatbots can significantly enhance user interactions and provide a personalized user experience.

Følstad & Brandtzaeg (2017) present a review of 137 chatbot papers published between 2007 and 2016 in order to understand the development of chatbot research over time, research themes, and impact. The findings from this review provide valuable insights into how chatbot research has evolved over time and can guide future research in this area.

Gnewuch U., Morana S., Maedche A. (2017) present a design-oriented research approach to develop a taxonomy of design cues for digital assistants based on a literature review and multiple focus groups with users and experts. The findings from this study can guide designers in creating more effective and engaging digital assistants.

Wollny et al. (2021) conducted a systematic literature review investigating the areas of education where chatbots have already been applied. The authors found that chatbots have significant potential in enhancing educational experiences and personalizing learning.

# Research Plan

* What is Research?

Research is defined as a systematic investigation into a study of materials and sources to establish facts and reach new conclusions. It involves inductive and deductive methods. Inductive methods analyze an observed event, while deductive methods verify the observed event.

* What is its purpose?

The purpose of research is to enhance society by advancing knowledge to the developer to certificate theories, concepts, and ideas. Our research purposes led to reforming hypothesis, cholesterol, analyzing results, forming conclusions, implementing findings in the real-life applications, and forming new research questions.

* What is its significance?

The significance of research lies in its contribution to the advantage of knowledge and development of new technologies. It helps us understand the world around us, find solutions to problems, and develop new technologies. Research is essential to the academic community, as it helps scholars build on previous knowledge and advance their understanding of the world. It’s. It is also important to the public, as it can help solve problems and improve our quality of life.

# Philosophy

* What is the Saunders Onion Theory

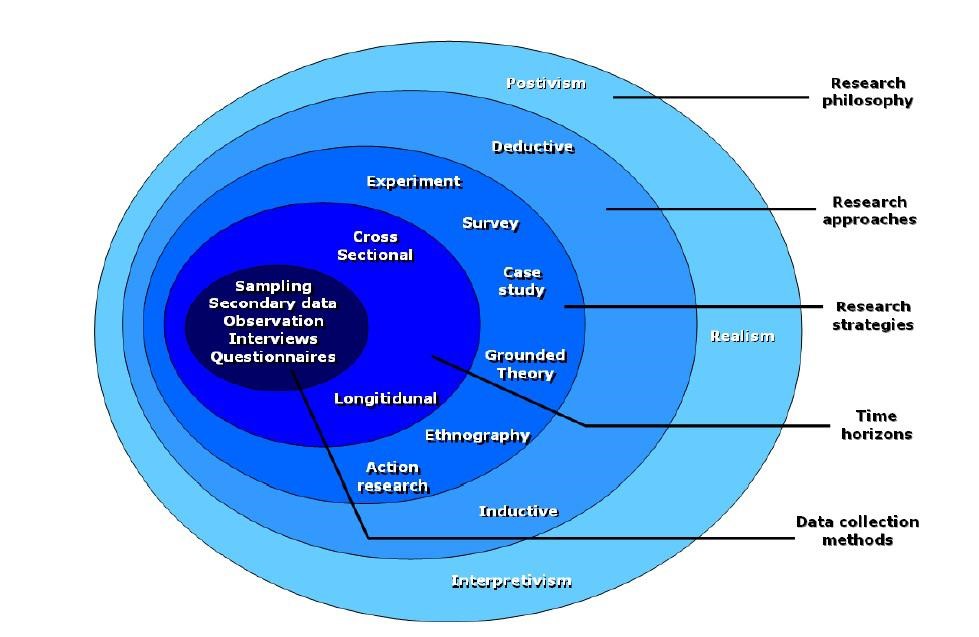
Research philosophy forms the bedrock of any research, shaping the researcher’s perspective and guiding the selection of research methods and approaches. Saunders’s Onion Theory offers a layered view of research philosophy, comprising four primary layers:

**Positivism**: The outermost layer, positivism, presumes an objective reality that can be empirically observed and measured. It favors quantitative methods and aims to identify cause-effect relationships.

**Realism**: Just beneath positivism, realism accepts the existence of an external reality but acknowledges that it might not be entirely quantifiable. Realism often uses a blend of methods to capture both quantitative and qualitative elements.

**Interpretivism**: Further inward, interpretivism posits that individuals create their own realities, emphasizing personal experiences and interpretations. Interpretive research typically uses qualitative methods to delve into these subjective viewpoints.

**Pragmatism**: At the core of the onion, pragmatism proposes that the choice of research philosophy should be dictated by the research goals and practical circumstances. Pragmatists often use a mix of methods to effectively address research queries.

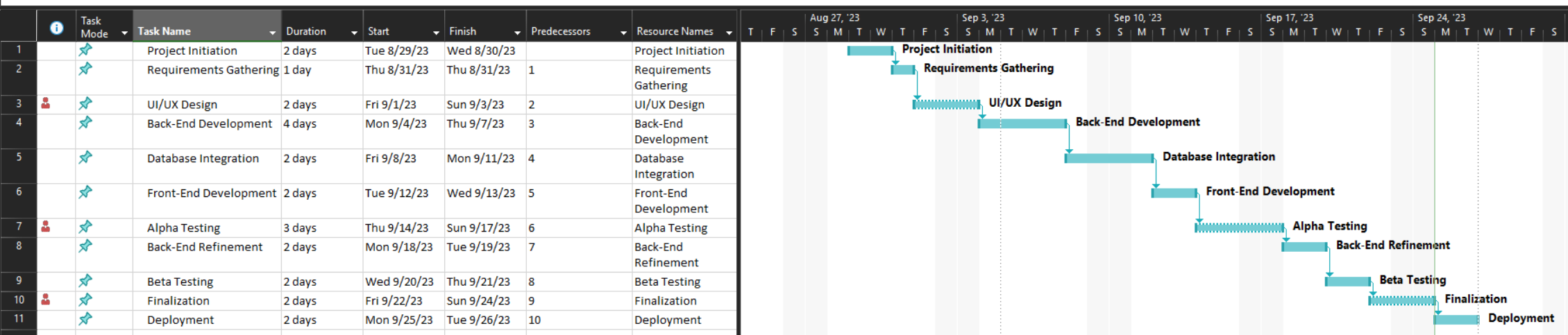


In relation to this study, a pragmatist approach will be employed. Pragmatism offers flexibility in selecting research methods and aligning them with the practical objectives of the research. This approach is apt for tackling the complex challenges of enhancing inventory management at Jumpstart.

* + 1. What are the stages?
       1. Research philosophy
          - This stage defines the set of beliefs and assumptions that underpin the research. It can be based on ontology (the nature reality) or epistemology (the nature of knowledge). There are three main types of research philosophy: positivism, interpretivism, and pragmatism.
       2. Research approach
          - This stage determines the logic and reasoning behind the research. It can be deductive (testing a theory) or inductive (building a theory).
       3. Research strategy
          - This stage specifies the plan and technique for conducting the research. It can be experimental, descriptive, action, grounded theory, or other types of research strategy.
       4. Research choice
          - This stage indicates the type and extent of data collection and analysis. It can be quantitative (using numerical data), qualitative (using non numerical data), or mixed methods (using both types of data).
       5. Time Horizon
          - This stage of rest of the time frame and scope of the research. It can be cross sectional of environmentalist studying a phenomenon of the specific point in time) or longitudinal (studying a phenomenon over a period).
       6. Techniques and procedures
          - This stage describes the specific methods and tools used to collect and analyze the data. It can include sampling, data collection methods, data analysis methods, validity, reliability, and ethical issues.
       7. Research Outcome
          - This stage presents the findings and conclusions of the research. It can include data presentation, interpretation, discussion, implications, limitations, and recommendations.
       8. Research Evaluation
          - This stage assessed the quality and value of the research. It can include critical reflection, feedback, peer review, and dissemination.
  1. Gantt Chart and Work Breakdown Structures (WBS)
     1. Gantt Chart

A screenshot of a computer

Description automatically generated



# Research Methodologies

Research techniques are the foundation of any scientific investigation because they offer a methodical means of addressing research issues. They are essential to the planning of a research project and include a range of methodologies and strategies for data gathering and analysis.

Here are some of the Research Methodologies performed during this study:

a. Survey

1. Definition
   1. A survey is a research method used for collecting data from a pre-defined group of respondents to gain information and insights on various topics of interest.
2. Merits
   1. Surveys are cost-effective, have a broad scope, can reach a large demographic in a relatively short time, and are practical for data gathering.
3. Demerits
   1. Surveys can be time-consuming, there’s a risk of people providing dishonest answers, some questions might not get answers, and there can be differences in how people understand the survey questions.
4. Pitfalls
   1. Surveys rely on respondents’ ability to accurately and honestly recall details about their lives, circumstances, thoughts, opinions, or behaviors.

b. Interview

1. Definition
   1. In research, an interview is a qualitative technique that entails questioning participants to get information. In most cases, there are two or more participants, one of whom is the interviewer who poses the questions.
2. Merits
   1. Interviews offer a wide range of replies and can validate the conclusions reached from other approaches. They can produce rich data and are simple to organize.
3. Demerits
   1. Interviewing candidates may be expensive and time-consuming. Due to the interviewer's race, class, age, or physical attributes, the respondent's responses may be biased as a result.
4. Pitfalls
   1. Interviewees must be able to recollect information about their lives, circumstances, ideas, opinions, and behaviors with accuracy and sincerity. They need a lot of work and can be emotionally draining.

c. Focus Group

1. Definition
   1. A focus group is a qualitative research method used to gather in-depth insights and opinions from a group of individuals about a particular product, service, concept, or idea. The focus group typically consists of 6-10 participants who are selected based on shared characteristics such as demographics, interests, or experiences.
2. Merits
   1. Focus groups provide a diverse set of responses based on participant profiles and can confirm insights obtained from other methodologies. They are straightforward to organize and can yield rich data.
3. Demerits
   1. Focus groups can lead to skewed results, groupthink, dishonest responses, and moderator bias.
4. Pitfalls
   1. Focus groups are unpredictable and depend on the dynamics of the group discussion. They can lead to over-disclosure by some participants, and the interpretation of focus group results must be carefully monitored and regulated.

d. Observation

1. Definition
   1. Observation is a way of collecting data through observing. This data collection method is classified as a participatory study because the researcher must immerse herself in the setting where her respondents are, while taking notes and/or recording. Observation data collection method may involve watching, listening, reading, touching, and recording behavior and characteristics of phenomena.
2. Merits
   1. The simplest method of data collection is the method of observation. Very minimal technical knowledge is required, and even though scientifically controlled observations require some technical skills, it is still more accessible and more straightforward than other methods. The observation method of data collection describes the observed phenomenon precisely and does not introduce any artificiality like other methods. They describe the phenomenon precisely as it occurs in the natural research environment. The observation method is not as restricted as the experiment. High accuracy: In interview methods and questionnaire methods, the respondents’ information provides us with the information with which the researchers must work. These are all indirect methods, and there is no means to investigate the accuracy. But in the observation method, the information accuracy can be checked by various testing. So, the data collected by observation is much more reliable.
3. Demerits
   1. The observation method is a very time-consuming process, and there are chances that the observer and the observed will lose interest in it after a certain point in time. In the observation method, the very minimum cooperation of the respondent is required. Some phenomena of study are abstract in nature. Reliability Lacks in information. Slow and Costly.
4. Pitfalls
   1. Bias, confounding, and issues with validity are more common in observational studies. The major problem with observational methods is that the investigator has little control over the situation he is interested in observing. In the natural setting, too many extraneous factors influence the phenomenon. As a result, it is difficult to assess what causes or determines the behaviors of researcher’s interest.

# Research Approaches

* 1. Qualitative Research
     1. Definition

Qualitative Research involves collecting and analyzing non-numerical data (e.g., text, video, or audio) to understand main concepts, opinions, and experiences.

* + 1. Techniques

Common approaches for Qualitative Research include grounded theory, ethnography, action research, phenomenological research, and narrative research.

* + 1. Examples
       - * How does social media shape body image in teenagers?
         * How do children and adults interpret healthy eating in the UK?
    2. Merits

Qualitative Research provides in-depth insights and helps to understand the context and captures human experiences.

* + 1. Demerits

Qualitative Research can be time consuming, subjective, and difficult to replicate.

* 1. Quantitative Research
     1. Definition

Quantitative Research is the process of collecting and analyzing numerical data. It can be used to find patterns and averages, make predictions, test causal relationships, and generalize results to wider populations.

* + 1. Techniques

Common techniques for Quantitative Research include experiments, surveys, and systematic observations.

* + 1. Examples
       - * What is the demographic makeup of Singapore in 2020?
         * How has the average temperature changed globally over the last century?
    2. Merits

Quantitative research provides measurable and numerical data, allows for statistical analysis, and resources can be generalized.

* + 1. Demerits

Quantitative research lacks deaf and context and may not capture the full complexity of human experiences.

* 1. Mixed Research Approach
     1. Definition

Mixed methods research combines elements of quantitative research and qualitative research to answer your research question. It integrates benefits of both methods.

* + 1. Techniques

Mixed research involves collecting, analyzing, interpreting, and reporting both qualitative and quantitative data.

* + 1. Examples
       - * To what extent does the frequency of traffic accidents (quantitative) reflect cyclist perceptions of road safety (qualitative) in Amsterdam?
    2. Merits

Mixed research provides a more complete understanding, allows for triangulation, and can provide richer detail.

* + 1. Demerits

Mixed research can be time consuming, complex design and implement, and requires expertise in both qualitative and quantitative research.

# Research Design

* 1. Saunders Research Onion Theory

In research design, a comprehensive plan for executing a study is formulated, detailing the methods for data collection and analysis to effectively meet the research objectives. The selection of a research design is guided by the research philosophy, approach, and specific research questions. In this section, we’ll explore the Saunders Research Onion Theory and evaluate various research methods and approaches.

Here’s a straightforward breakdown of the layers of the Research Onion:

* Research Philosophy
* Research Approach
* Research Strategies (Qualitative, Quantitative, or Mixed)
* Methods for Data Collection
* Techniques for Data Analysis

The selection at each layer impacts the subsequent layers and molds the overall research design.

* 1. Compare research methods and research approaches.
     1. Comparison of Data Approaches

|  |  |  |
| --- | --- | --- |
| Quantitative Research | Qualitative Research | Mixed Research |
| * Numerical Approach * Uses Surveys, experiments, quasi experiments, secondary data analysis * Statistical analysis * Generalizability, precision, objectivity * Can be reductionist, may not capture the complexity of the project. | * Non-numerical * Interviews, focus groups, observations, document analysis * Thematic analysis, discourse analysis, content analysis * Depth, richness, detail, subjectivity * Can be difficult to generalize findings, may be biased by the researcher. | * Both numerical and non-numerical * Any combination of quantitative and qualitative methods * A combination of quantitative and qualitative analysis. * Completeness, comprehensiveness, triangulation * Can be complex and time-consuming to conduct |

For this study, the researchers opted to go with Quantitative Research approach to better utilize the surveying system in gathering information from users. This lets the researchers gather data relating to their experience through questionnaires and assess the effectivity of this product.

* + 1. Comparison of Primary Methods

|  |  |  |  |
| --- | --- | --- | --- |
| **Survey** | Interview | Focus group | Observation |
| * Can collect data from a large number of people. * Quick and inexpensive to create * Quick to handle | * Can collect much more detailed information and behavior. * Takes more time. * Expensive to conduct | * Utilizes a moderator. * Can generate a lot of data in a short amount of time. * Difficult to moderate. | * Provides rich and detailed data * Usually used to study phenomena that are difficult to study using other methods, * Time consuming * Potential biases |

To maintain the highest form of accuracy, the researchers decided to go with the Survey method which utilizes a bunch of questionnaires for each participant to answer and fill out. This allows the researchers to get a detailed look about their experience in the product itself and how it can be translated back into data the researchers can use easily to improve their product.

* + 1. Comparison of Secondary Methods

|  |  |  |  |
| --- | --- | --- | --- |
| **LR/document analysis** | Grounded Theory | **Case Study** | Ethnography |
| * Can be used to collect data of a variety of topics. * Inexpensive to conduct * Time Consuming | * Allows researchers to develop new theories that are grounded in data. * Can be time consuming and challenging to conduct. | * Can provide rich and detailed data on a single case, can be used to study complex phenomena. * May be difficult to generalize findings for other cases. | * Can provide rich and detailed data on a culture or community. * Can be used to understand multiple perspective and experiences from people. * Can be time consuming and challenging to conduct. * Difficult to generalize findings to other cultures and communities. |

In this study, the researchers chose the case study methodology because it allows for a detailed examination of the AI chatbot implementation in a real-world setting, providing rich qualitative data. The case study strategy is both exploratory and descriptive, enabling you to delve into the specifics of how the chatbot functions and how customers interact with it, while also describing in detail its impact on the customer experience. This approach is flexible, allowing for the use of various data collection methods within the same study. The goal is to gain a deep understanding of the situation and the processes involved in the AI chatbot’s implementation and use, focusing on the ‘how’ and ‘why’ questions, providing a comprehensive understanding of the phenomenon.

1. Research Conduct and Analysis
   1. Survey System
      1. Consider Costs, Access, and Ethical Issues

|  |  |
| --- | --- |
| Survey Considerations | Description |
| Cost | Google’s Form system is used to create the survey form which can then be used by the respondents. Google Form has been trusted by over millions of people, so it is the *de facto* choice for our form system. |
| Access | Us, researchers, and our respondents can use Google Forms anywhere with an internet connection. |
| Ethics | All data must be kept confidential, and the users are required to abide with the Data Privacy Act. |

* + 1. Objective of the Survey

The objectives for this research survey include:

* + - 1. **Understand Customer Experience**: To gain insights into the customers’ experiences with customer service in the retail industry and their interactions with AI chatbots.
      2. **Evaluate AI Chatbot Effectiveness**: To evaluate the effectiveness of the AI chatbot in improving the shopping experience, advising on available products, and helping customers make purchase decisions.
      3. **Assess Security and Trust**: To assess whether customers find the AI chatbot to be a secure and trustworthy platform.
      4. **Measure Efficiency**: To measure whether customers find the AI chatbot more efficient than traditional customer service methods.
      5. **Improve Future Interactions**: To gather feedback that can be used to improve future interactions with the AI chatbot.
    1. Identify the Tool
       1. Google Forms

Google Forms is an online tool that allows you to create and share forms, surveys, and questionnaires1. Here are some of its features:

* **Create an Online Form**: You can create an online form as easily as creating a document. You can select from multiple question types, drag-and-drop to reorder questions, and customize values.
* **Customize Forms**: You can customize colors, images, and fonts to adjust the look and feel or reflect your organization’s branding1. You can also add custom logic that shows questions based on answers, for a more seamless experience.
* **Analyze Responses**: Google Forms provides automatic summaries and charts with response data that update in real-time. You can also open the raw data with Google Sheets for deeper analysis or automation.
* **Collaboration**: You can add collaborators to build questions together in real-time. Then analyze results together without having to share multiple versions of the file.
* **Security and Privacy**: Google Forms uses industry-leading security measures to keep your data safe, including advanced malware protections. All files uploaded to Google Drive or created in Forms are encrypted in transit and at rest.
* You can access, create, and edit forms on-the-go, from screens big and small. Others can respond to your survey from wherever they are—from any mobile device, tablet, or computer.
  + 1. Frame Questions for Survey

All Questions: 10 or 15

Open Ended: 2 or 3

Close-Ended: more than 8

Sample Questions:

1. How often do you interact with real life customer experience in the retail industry before the COVID-19 pandemic?

a. Very Often

b. Often

c. Mediocre

d. Not a lot

e. Never

2. How often do you interact with real life customer experience in the retail industry during the COVID-19 pandemic?

a. Very Often

b. Often

c. Mediocre

d. Not a lot

e. Never

3. Have you ever interacted with an AI chatbot for customer service?

a. Yes

b. No

4. Do you believe AI chatbots are more effective than traditional human customer service methods?

a. Yes

b. No

5. Can you share your experience with customer service in the retail industry? (Paragraph Form)

6. Have you ever interacted with the AI chatbots of other retail chains from SM or Ayala?

a. Yes

b. No

7. Do you think AI chatbots can help optimize your buying decisions?

a. Heavily

b. Rarely

c. Never

8. If you have chatted with an AI chatbot before, how often do you interact with it?

a. Heavily

b. Rarely

c. Never

9. How do you feel about AI chatbots delivering individualized experiences?

a. Excited

b. Average

c. No

10. If Jumpstart plans to implement an AI chatbot in your shopping experience, would you be excited to use it?

a. Excited

b. Average

c. No

* + 1. Population Sampling
       1. Participants must be customers of any retail chain.
       2. Participants must be accustomed to online retail chains.
       3. Participants should be familiar with GPT tools like ChatGPT, Google Bard and LLaMA.
       4. Participants must be proficient in English.
       5. Participants should have access to the internet.
       6. Participants should be willing to participate in the survey.
       7. Participants should agree to the Data Privacy Act.
    2. Distribute Survey

Customers of Jumpstart and other retail chains, both those who employ AI chatbots and those who do not, are included in the target audience for this poll. We can collect a wide range of viewpoints and experiences on AI chatbot interactions thanks to this diverse demographic. To learn how experiences might change depending on age, geography, and other aspects, it also covers clients who shop online frequently who are likely to interact with AI chatbots more.

The survey will be distributed using Google Forms, a web application that makes it simple to distribute and gather replies. Because Google Forms is usable on numerous platforms and devices, participants may easily complete the survey at their own pace. We can collect both quantitative and qualitative data thanks to the range of question kinds it permits. The responses will be automatically gathered and arranged, making data analysis more effective.

* + 1. Collect and analyze results.

A pie chart with colorful circles

Description automatically generated A pie chart with different colored circles

Description automatically generated

A pie chart with red and blue circles

Description automatically generated A blue and red pie chart

Description automatically generated A pie chart with a number of percentages

Description automatically generated

A pie chart with text and numbers

Description automatically generated A pie chart with text below

Description automatically generated A blue and red pie chart

Description automatically generated

A pie chart with a red triangle and blue circle

Description automatically generated

Based on the customer data, it’s clear that before the COVID-19 pandemic, customers frequently interacted with real-life customer service. However, during the pandemic, this interaction significantly decreased, with the majority of customers reporting minimal interaction.

Interestingly, when asked about their interaction with AI chatbots, the majority responded positively, indicating a shift in customer service interaction patterns during the pandemic. Furthermore, most customers believe that AI chatbots can be more effective than traditional human customer service, suggesting a high level of acceptance and trust in AI technology.

However, when asked about their interaction with AI chatbots from other retail chains like SM or Ayala Malls, the majority responded negatively, indicating a potential gap in the market that Jumpstart could fill.

The prospect of AI chatbots delivering individualized experiences was met with excitement by the majority of customers, indicating a positive expectation and acceptance of personalized AI interactions. Similarly, the announcement of Jumpstart implementing an AI chatbot was also met with excitement, suggesting that customers are looking forward to this new development.

In conclusion, the data suggests a positive outlook for the implementation of an AI chatbot at Jumpstart, with customers showing a high level of acceptance and excitement for AI technology in customer service.

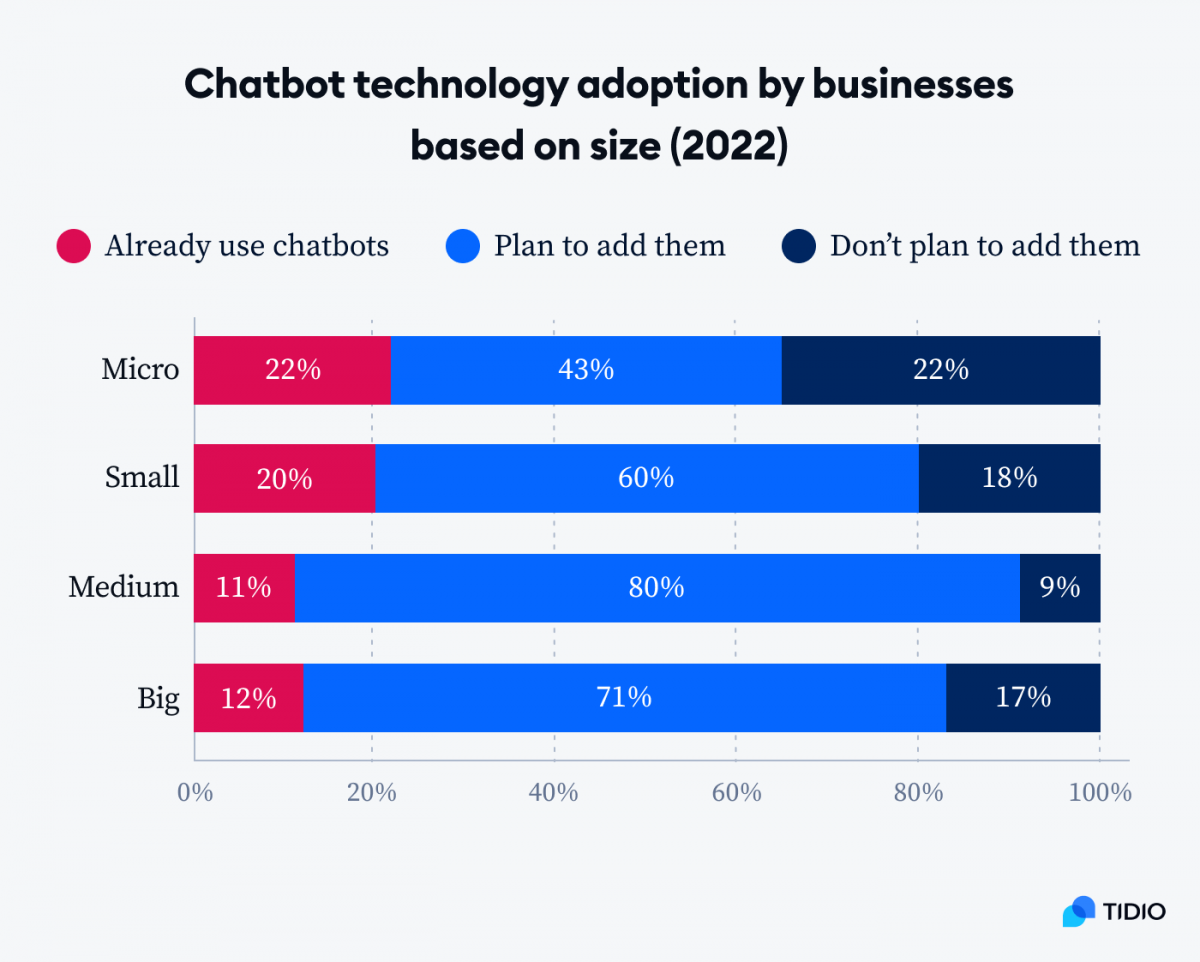
* 1. Conducting Secondary Research
     1. Consider Costs, Access, and Ethical Issues

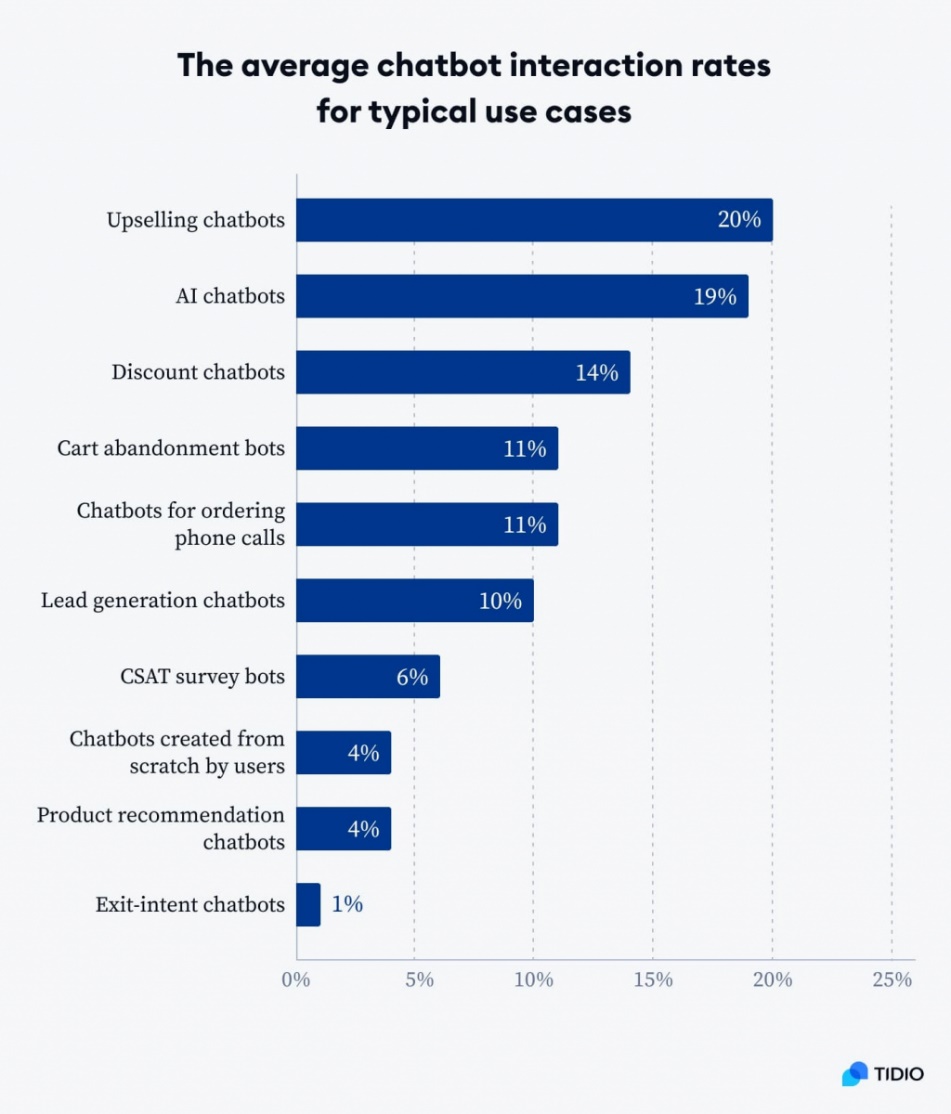
|  |  |
| --- | --- |
| Literature Review Considerations | Description |
| Cost | The studies picked are picked from the internet. The free articles/journals will be read and analyzed. |
| Access | Articles that can be accessed are going to be analyzed. |
| Ethical | Ensure that the authors are properly credited on the study. |

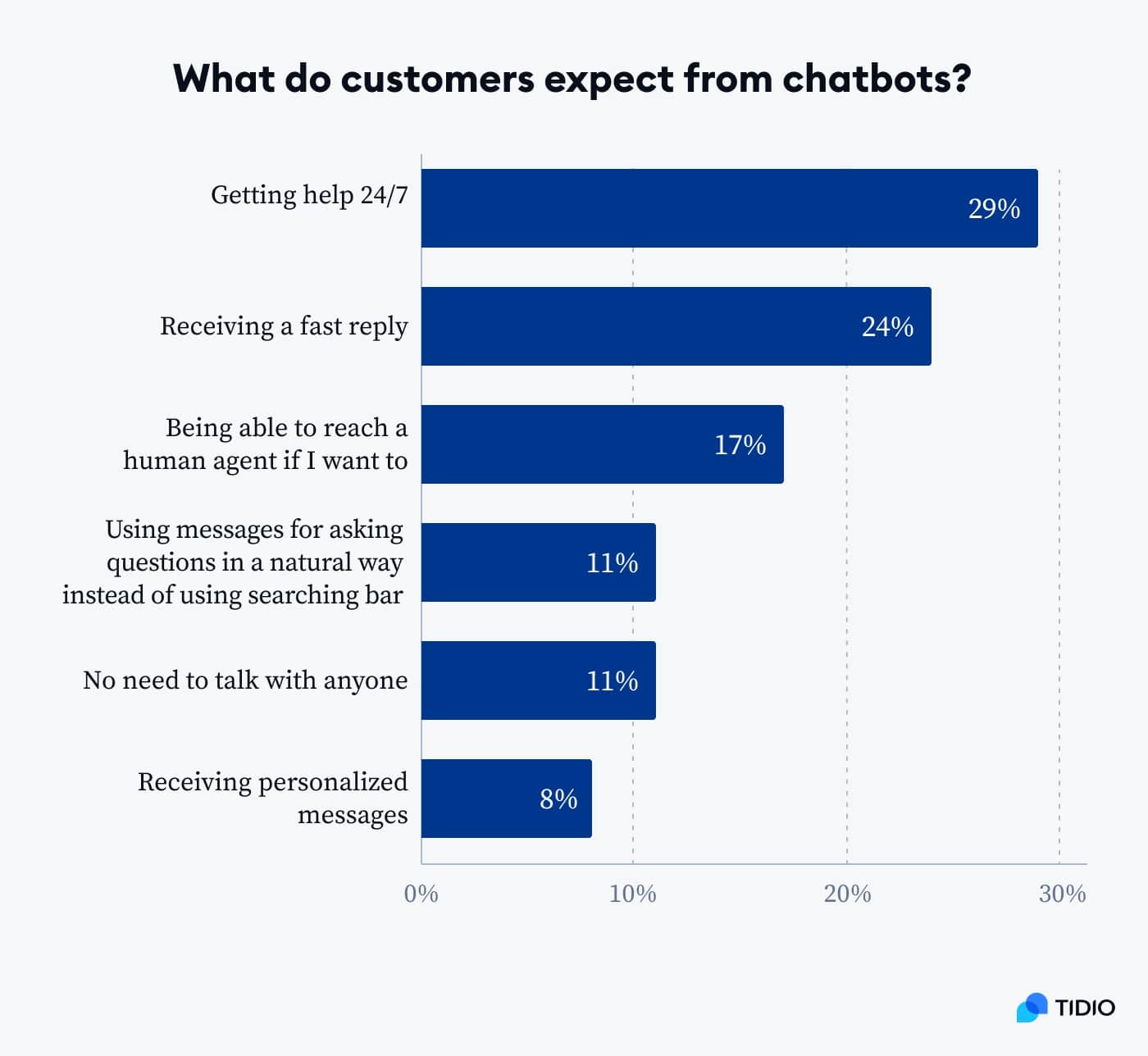
* + - 1. Content Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| S. No. | Title | Reference Link | Outcomes |
| 1 | AI-based chatbots in customer service and their effects on user compliance | <https://link.springer.com/article/10.1007/s12525-020-00414-7> | This research provides insights into how chatbots can influence user compliance with their requests for service feedback. The paper reports an online experiment that manipulated the verbal anthropomorphic design cues and the foot-in-the-door technique of a chatbot in a customer service scenario. The paper finds that both factors increase user compliance, and that social presence mediates the effect of anthropomorphic design cues. The paper contributes to the understanding of chatbot design and user behavior in self-service contexts. |
| 2 | Making Sense of the Chatbot and Conversational AI Platform Market | <https://www.gartner.com/en/documents/3993709> | This research provides insights into how conversational AI platforms (CAIPs) are evolving and how they can be used to develop chatbots and virtual assistants. The paper analyzes the market of CAIPs based on their level of sophistication, vendor strategies, and language support. The paper also provides recommendations for application leaders to select the best CAIPs for their needs and objectives. The paper aims to help decision makers navigate the diverse and dynamic market of CAIPs and leverage their potential for improving customer service. |
| 3 | A systematic review of artificial intelligence chatbots for promoting physical activity, healthy diet, and weight loss | <https://ijbnpa.biomedcentral.com/articles/10.1186/s12966-021-01224-6> | This research provides insights into the use of AI chatbots for promoting physical activity, healthy eating, and weight management behaviors. The paper reviews nine studies that applied chatbots as interventions for these lifestyle behaviors and evaluates their characteristics, functions, and conversational capacities. The paper finds that chatbots may improve physical activity, but the evidence for diet and weight outcomes is limited and inconsistent. The paper also identifies the need for standardization and evaluation of chatbot design and reporting in this emerging field of research. |
| 4 | Impact of Artificial Intelligence-Based Chatbots on Customer Engagement and Business Growth | <https://link.springer.com/chapter/10.1007/978-3-031-10869-3_11> | This research provides insights into how AI chatbots can influence user interactions, marketing, and customer service. The paper discusses the advantages and challenges of using chatbots for various purposes, such as providing information, assistance, entertainment, and social connection. The paper also explores the role of anthropomorphic design cues and compliance techniques in enhancing user engagement and satisfaction with chatbots1. The paper aims to contribute to the understanding of chatbots as a new and disruptive technology that can create value for both businesses and customers. |
| 5 | Why people use chatbots | <https://sintef.brage.unit.no/sintef-xmlui/bitstream/handle/11250/2468333/Brandtzaeg_Folstad_why+people+use+chatbots_authors+version.pdf?sequence=2> | This research provides insights into the motivations behind people’s use of chatbots. An online survey of 146 chatbot users aged 16-55 years from the US revealed that the primary motivation for using chatbots is “productivity”, as chatbots provide timely and efficient assistance or information. Other motivations include entertainment, social and relational factors, and curiosity about this new technology. The study, which is discussed in the context of the uses and gratifications theory, offers valuable insights for developers aiming to enhance human-chatbot interaction experiences. It also suggests potential design guidelines that take into account the different motivations of chatbot users. |
| 6 | Towards Designing Cooperative and Social Conversational Agents for Customer Service | <https://www.researchgate.net/publication/320015931_Towards_Designing_Cooperative_and_Social_Conversational_Agents_for_Customer_Service> | This research provides insights into how to design cooperative and social conversational agents for customer service. The paper discusses the challenges and opportunities of using chatbots or digital assistants to communicate with customers through natural language. The paper proposes preliminary meta-requirements and design principles based on the cooperative principle of conversation and social response theory. The paper also describes the plan to develop and evaluate a prototype of a cooperative and social conversational agent. The paper aims to contribute to the design science research on conversational agents in customer service. |
| 7 | Are We There Yet? - A Systematic Literature Review on Chatbots in Education | <https://www.frontiersin.org/articles/10.3389/frai.2021.654924/full> | This research provides insights into the application of chatbots in education, based on a systematic literature review of 2,678 publications. The study explores the areas of education where chatbots have been used, their pedagogical roles, their use for mentoring purposes, and their potential to personalize education. The paper addresses five research questions to provide an overview of the current state-of-the-art of this educational technology. It concludes by identifying three main research challenges: aligning chatbot evaluations with implementation objectives, exploring the potential of chatbots for mentoring students, and exploring and leveraging the adaptation capabilities of chatbots. The paper also suggests future research opportunities in these areas. |

* + - 1. Trend Analysis







* + 1. Conclusion

In conclusion, AI chatbots are revolutionizing customer service in the retail industry by providing personalized experiences, reducing costs, and increasing efficiency. The research summaries provided highlight the various applications and effectiveness of AI chatbots in different contexts. They have been found to be effective in promoting physical activity, influencing user interactions, and even changing diet and weight status. However, the studies also point out the need for further research and standardization in chatbot design and reporting.

In relation to the background provided, companies like H&M and Tommy Hilfiger have successfully integrated AI chatbots into their retail operations, setting a benchmark for others. However, the reliance on external APIs could pose potential security risks and limit system control. Therefore, while AI chatbots offer promising benefits, careful consideration should be given to their design, implementation, and the security aspects to fully harness their potential and ensure customer trust and satisfaction.

* + 1. References

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# Project Proposal

* 1. Project Aim
     1. Objectives

The project’s primary goal is to design and implement a self-hosted AI chatbot for Jumpstart. This chatbot will use LLaMA 2 to integrate with Jumpstart’s REST API, providing information about stock and product descriptions. The chatbot will be evaluated and tested with real users, with the feedback and metrics analyzed to measure customer satisfaction, engagement, and loyalty. The project will also explore successful AI chatbots in retail, such as those used by H&M and Tommy Hilfiger, with the chatbot running on our own systems for greater security and control.

The project’s scope includes understanding the benefits and challenges of using AI chatbots in retail, designing and implementing the chatbot prototype, evaluating its performance with real users, and studying successful examples in the industry. The objectives are to review existing research on AI chatbots in retail, identify key features for a successful chatbot, develop a prototype for Jumpstart using LLaMA 2, and provide recommendations for improvement.

The project requirements include using ReactJS for the front-end development, a Ryzen 7 System costing around $300, Spring Boot for the application framework, and MySQL Server for the database management system.

* + 1. Scope

• The benefits and challenges of utilizing AI chatbots for retail customer sevice such as reducing costs, increasing efficiency, personalizing interactions and building trust.

• The design and implementation of an AI chatbot prototype for Jumpstart, using LLaMA 2 to integrate with their REST API and provide information about stock and product description.

• The evaluation and testing of the AI chatbot prototype with real users, and the analysis of the feedback and metrics to measure customer satisfaction, engagement, and loyalty.

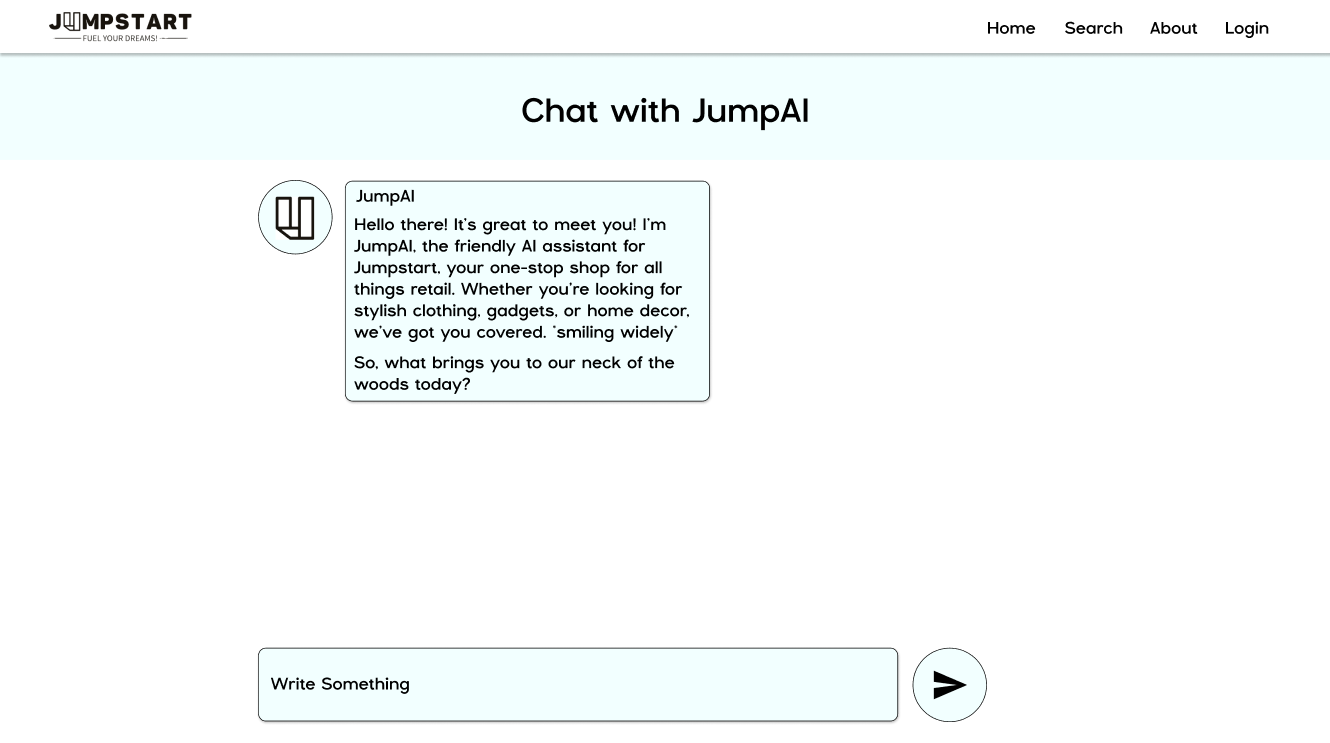
• The best practices and examples of successful AI chatbots in retail, such as those utilized by H&M, Tommy Hillfiger and the like on how they use AI to provide advice to users, helpful comparisons and product recommendations.

* + 1. Constraints
       1. **Budget**: The system must be built within a budget of around $300.
       2. **Technology**: The project requires the use of specific technologies such as ReactJS for front-end development, Spring Boot for the application framework, and MySQL Server for the database management system.
       3. **Time**: The project must be completed within a specified timeframe, including the design, implementation, and evaluation phases.
    2. Assumptions
       1. **User Participation**: It is assumed that users will be willing to participate in the testing and evaluation of the AI chatbot.
       2. **API Integration**: It is assumed that the AI chatbot will be able to successfully integrate with Jumpstart’s REST API.
       3. **AI Model**: It is assumed that LLaMA 2 is suitable for developing the AI chatbot.
    3. Dependencies
       1. **Hardware**: The project depends on the availability of a Ryzen 7 System.
       2. **Software**: The project depends on the availability and compatibility of ReactJS, Spring Boot, and MySQL Server.
       3. **Data**: The project depends on the availability of stock and product description data from Jumpstart’s REST API.
       4. **User Feedback**: The project’s success depends on the feedback and metrics from real users to measure customer satisfaction, engagement, and loyalty.
       5. **Industry Examples**: The project depends on the study of successful AI chatbots in retail for best practices and examples.
  1. Project Environment
     1. Hardware Requirements
        1. CPU: AMD Ryzen 7 5800HS
        2. RAM: 16GB DDR4
        3. Storage: 512GB SSD
     2. Software Requirements
        1. Windows 11
        2. Docker
        3. ReactJS
        4. Spring Boot
        5. MySQL Server
        6. Serge AI
        7. Meta LLaMA 2
     3. User Requirements
     4. Project Blueprint
        1. Flowchart
           + Business Model  
             A diagram of a flowchart

             Description automatically generated
           + Back-End Model A computer tower with a spring boot

             Description automatically generated
        2. Storyboard
           + Home A screenshot of a computer

             Description automatically generated
           + Register A screenshot of a register

             Description automatically generated
           + Chat 
           + ProductA screen shot of a product

             Description automatically generated

1. Communication with Stakeholders

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sender | Receiver | Purpose | Medium | Frequency |
| Acedora PM | Jumpstart Emplyee/customer | Communicate to provide the solution & recommendation | Microsoft Teams | once in project Life |
| Acedora PM | Senior Manager of Acedora | Plan project flow | Email, Microsoft Teams | Twice per week |
| Jumpstart | Project Manager of Acedora | Feedback of the project | Email, Cisco Webex | During the life of the project |

1. Project Implementation
   1. Source Code
      1. Register  
          A screenshot of a computer program

         Description automatically generated
      2. PhotoController A screen shot of a computer program

         Description automatically generated
      3. SecurityConfig A screen shot of a computer program

         Description automatically generated
      4. Entity Directory  
          A screenshot of a computer

         Description automatically generated
      5. Home

A screenshot of a computer

Description automatically generated

* + 1. Register   
       A screenshot of a register

       Description automatically generated
    2. Chat  
       A screenshot of a chat

       Description automatically generated
    3. Product  
       A screen shot of a product

       Description automatically generated
  1. Post-Implementation Survey
     1. Questions
        1. How was your experience interacting with our new AI chatbot?
           + 1-5 (Terrible to Great)
        2. Did you find the AI chatbot helpful in your shopping experience?
           + Yes
           + No
        3. Was the AI chatbot able to effectively advise you on the products and compare them?
           + Yes
           + No
        4. Did the AI chatbot help you in making a decision about which product to buy?
           + Yes
           + No
        5. Can you share your experience with customer service in the retail industry?
        6. Do you find the AI chatbot to be trustworthy?
           + Yes
           + No
        7. Did the AI chatbot improve your overall shopping experience?
           + Made shopping faster.
           + Provided better product comparisons.
           + Provided better product recommendations.
        8. What do you think of the performance of the AI chatbot?
           + 1 – 5 (Slow to Fast)
        9. Would you prefer to interact with our AI chatbot for future shopping experiences?
           + Yes
           + No
        10. Do you have any suggestions for improving our AI chatbot?
     2. Data Results

A screenshot of a chatbot

Description automatically generated

A pie chart with a red circle and blue circle

Description automatically generated A pie chart with text below

Description automatically generated

A pie chart with red and blue circles

Description automatically generated A screenshot of a survey

Description automatically generated

A pie chart with a red and blue circle

Description automatically generated

A pie chart with text below

Description automatically generated

A graph with purple rectangles

Description automatically generated

A blue and red pie chart

Description automatically generated

A screenshot of a chatbot

Description automatically generated

* + 1. Conclusion

In conclusion, the implementation of the AI chatbot at Jumpstart has been a success, with users expressing high levels of satisfaction, trust, and preference for the chatbot. With continued improvements based on user feedback, the AI chatbot is poised to significantly enhance the shopping experience at Jumpstart.

1. Reflection on Research Models
   1. Effectiveness and challenges of methods applied.

The AI chatbot prototype for Jumpstart, created using the AI model LLaMA 2, has proven to be effective in enhancing customer service by providing a personalized and efficient form of engagement. The chatbot was successful in assisting customers in their shopping experience by offering advice on available products and helping them make informed decisions.

However, the challenge encountered was related to the speed of the chatbot, especially when it was serving multiple users simultaneously. This indicates a need for more computational resources or optimization of the chatbot’s algorithms to handle larger user loads.

* 1. Alternative methods to overcome the challenges.

To address the speed issue, several alternative methods can be considered:

* **Scaling Up**: Increase the computational resources such as CPU and memory allocated to the chatbot. This can improve the chatbot’s response time.
* **Optimization**: Optimize the chatbot’s algorithms and data structures to reduce computational complexity, which can lead to faster response times.
* **Load Balancing**: Implement a load balancing solution that distributes network traffic across multiple servers. This can ensure no single server becomes overwhelmed, improving response times.
  1. Conclusion

The implementation of the AI chatbot for Jumpstart has been a success, with participants expressing satisfaction with its performance. Despite the challenge with speed, the chatbot has shown potential in transforming customer service in the retail industry by providing personalized and efficient engagement. With the suggested alternative methods, it is expected that the speed issue can be resolved, further enhancing the chatbot’s effectiveness.

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Appendix IA screenshot of a computer

Description automatically generated

A screenshot of a cell phone

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