

Summer 2023 Technology Internship: Internal Data Discrepancies in Customer Servicing Platform

Artificial Intelligence's effect on Customer Service

A Thesis Prospectus
In STS 4500
Presented to
The Faculty of the
School of Engineering and Applied Science
University of Virginia
In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science in Computer Science

By
Alex Catahan

December 1, 2023

On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

ADVISORS

Joshua Earle, Department of Engineering and Society
Briana Morrison, Department of Computer Science

Introduction

In an age where technology continually reshapes our interactions and experiences, the integration of Artificial Intelligence (AI) into customer service presents a compelling area of research. This prospectus explores the multifaceted effects of AI on customer service, seeking to understand how AI and customer service fields can be effectively integrated while addressing the challenges that come with such technological advancements.

My technical report will be an in-depth summarization of my summer internship experience, thoroughly discussing my project and key takeaways from the internship. My STS project is a research paper answering the question of how AI chatbots have affected the customer service industry, and how these fields can continue to be integrated with each other. During my summer internship, I developed a new feature for a company's customer agent servicing platform, which connects my technical report to my STS project through customer service. As I was leaving the company, there were discussions about integrating AI into their customer service platforms, which struck my curiosity as to the ramifications, benefits, and possible concerns about that business decision. While this integration promises enhanced efficiency, it also raises intricate questions about customer satisfaction, data privacy, and the overall impact on business-customer relationships. Researching the questions that come with the integration of AI into customer service is paramount to ensuring that this technology does not discriminate and perpetuate existing biases, but rather provides more efficient and effective services to all customers equally with 24/7 availability.

Technical Project

Title: Summer Technology Internship: Internal Data Discrepancies in Customer Servicing Platform

The company I worked for, a prominent North American banking company, has struggled with a critical issue in its newly developed customer agent servicing platform—an issue involving internal data discrepancies that affects around 20,000 customers. To address the challenges stemming from this issue, my team and I utilized Vue.js and Node.js to develop the front-end and back-end of a system that detects an internal data discrepancy in a customer's account and promptly notifies the customer service agent through a modal. My team utilized an agile methodology to streamline and coordinate our workflow, and we used different javascript libraries to develop and test our code. I also practiced cross-team communication skills, and gained the ability to work in an enormous codebase. This project is expected to reduce customer agent incident tickets by 5-10 weekly, and decrease agent handling time by an average of 20%. This system will be extended to other components of the customer agent servicing platform, and will be maintained as the platform continues to develop.

The full-draft of this report will be completed by December 1st, 2023, and should be published in the following semester.

STS Project

How have AI chatbots affected customer service and how can these fields be integrated fully?

The automation of customer service through chatbots has numerous benefits including improved efficiency and scalability, 24/7 availability, and virtually instant data analysis.

However, there also exist many drawbacks, making the question of how AI will affect this field an interesting one to consider. Currently, “over 92% of online shoppers [have] experience with artificial intelligence customer service,” however 30% of customers in a random sample of 670 customers are very resistant to AI (Li et. al., 2020). This illustrates how widespread AI in customer service already is, but shows the need for initiatives and growth for AI customer service chatbots to be fully accepted by the general public.

As with any technological advancement, there are copious concerns about integrating AI into customer service. For example, data privacy is a concern when information is being given to a machine that analyzes large data sets. A study conducted in 2018 demonstrated that customers’ “interactions with [AI chatbots] lead them to develop concerns about their personal privacy,” which is a sentiment that potentially causes suspicion towards the company employing the chatbot (Bouhia et. al., 2022). Moreover, even the training of these AI models create data privacy concerns. Oftentimes, training a language model responsible for handling customer service relies on collecting large datasets of personal and sensitive information for processing and storage. This could lead to misuse of data and data breaches even before deployment of the AI.

Beyond the technical concerns and implications, adopting AI into a business ecosystem has significant effects on customer-business relations. While automating tasks yields various benefits for a business, studies show that “based on [customers’] last interaction with a virtual

agent, only 1 in 3 customers would recommend that business to others” (Sherwood, 2022). As illustrated by this study, there are important business implications needed to be considered, as AI in its current state could have negative impacts on the customer experience. Moreover, algorithms behind AI could potentially magnify existing oppressions and offer unfair services based on race, demographics, or class. Insights gleaned from bias AI models, such as “women can never be doctors or presidents... [and] black people are more likely to owe many than to have it owed to them,” highlight the dangers of developers failing to ensure a fair and unbiased model is produced (Williams, 2023).

The prevalence of AI in customer service offers very interesting effects that my research will uncover, and I will also attempt to answer the question of how the percentage of customers who are resistant to AI can be decreased. For my STS project much research still needs to be done. A thorough analysis of existing AI chatbots in production will provide more context on how the customer service field has already been affected by the emergence of AI. Case studies of businesses that have already deployed AI powered customer service mechanisms will also illuminate how customers have reacted to the beginnings of this integration. To conduct this research I will gather scholarly articles from reputable sources such as Google Scholar and JSTOR.

I will employ the social construction of technology (SCoT) framework to investigate how a suite of AI powered chatbots were adopted by different businesses. In my use of this framework, the businesses would represent social groups. The customers’ sentiment of a deployed AI chatbot and a study of how the business reshaped or reinforced their customer service decisions with AI will provide an interesting discussion on how human action has shaped the integration of AI into the customer service field.

Key Texts

- Andrade, I. M. D., & Tumelero, C. (2022). Increasing customer service efficiency through artificial intelligence chatbot. *Revista de Gestão*, 29(3). Emerald.

<https://doi.org/10.1108/rege-07-2021-0120>

This article's main argument is that the AI powered customer service mechanisms have handled a significant amount of interactions and attendances in 2020, and have successfully diminished wait times at call and relationship centers. These benefits enable human employees to perform more intricate inquiries. This is very relevant to my topic because it demonstrates how AI powered customer service mechanisms have been successfully integrated into real business scenarios, and illuminates the positive side of AI's effects on the customer service field.

- Castillo, D., Canhoto, A. I., & Said, E. (2020). The dark side of AI-powered service interactions: Exploring the process of co-destruction from the customer perspective. *The Service Industries Journal*, 41(13-14), 1–26.

<https://doi.org/10.1080/02642069.2020.1787993>

The main argument of this article is that with the shift of customer service to a technology-dominant field, and the lackluster state of current AI powered customer service mechanisms, customers are almost expected to solve their issues themselves. This leads to customer dissatisfaction, but the article also offers service managers insights on how to “avoid and mitigate value co-destruction in AI service settings,” where co-destruction refers to the failure of the AI chatbot to help, and then the failure of the customer to solve their own issue. This is relevant to my topic because it provides technical reasons why the integration of AI into

customer service needs to be carefully done, and gives customer anecdotes with bad AI customer service experiences to learn from.

-Andrade, I. M. D., & Tumelero, C. (2022). Increasing customer service efficiency through artificial intelligence chatbot. *Revista de Gestão*, 29(3). Emerald.

<https://doi.org/10.1108/rege-07-2021-0120>

This article's main point is that the integration of AI into the customer service field has led to 181 million interactions and 7.6 million attendances in 2020, which improves services efficiency, agility, availability, accessibility, resoluteness, and transshipment capacity. It also asserts that the chatbot services have reduced the queues of call centers and relationship centers, which allows the human workers to perform more complex attendances, offering another benefit of the integration of AI service chatbots. This is very relevant to my topic because it shows how AI powered customer service mechanisms have been integrated into real-business scenarios successfully, and illuminates one side of AI's effect on the customer service field.

- Nicolescu, L., & Tudorache, M. T. (2022). Human-Computer Interaction in Customer Service:

The Experience with AI Chatbots—A Systematic Literature Review. *Electronics*, 11(10), 1579. <https://doi.org/10.3390/electronics11101579>

This article explores artificial intelligence's use as conversational agents in the form of chatbots for customer service. The main argument of this piece is that conversational agents can improve the customer service experience and benefit businesses by removing the need for

man-power when the task is simple. This is relevant to my topic because it discusses a positive point in using artificial intelligence in customer service.

Bibliography

- Andrade, I. M. D., & Tumelero, C. (2022). Increasing customer service efficiency through artificial intelligence chatbot. *Revista de Gestão*, 29(3). Emerald.
<https://doi.org/10.1108/rege-07-2021-0120>
- Bouhia, M., Rajaobelina, L., PromTep, S., Arcand, M., & Ricard, L. (2022). Drivers of privacy concerns when interacting with a chatbot in a customer service encounter. *International Journal of Bank Marketing*. <https://doi.org/10.1108/ijbm-09-2021-0442>
- Castillo, D., Canhoto, A. I., & Said, E. (2020). The dark side of AI-powered service interactions: Exploring the process of co-destruction from the customer perspective. *The Service Industries Journal*, 41(13-14), 1–26. <https://doi.org/10.1080/02642069.2020.1787993>
- Li, Chenzhuoer, et al. “Research on Artificial Intelligence Customer Service on consumer attitude and its impact during online shopping.” *Journal of Physics: Conference Series*, vol. 1575, no. 1, 2020, p. 012192, <https://doi.org/10.1088/1742-6596/1575/1/012192>.
- Niculescu, L., & Tudorache, M. T. (2022). Human-Computer Interaction in Customer Service: The Experience with AI Chatbots—A Systematic Literature Review. *Electronics*, 11(10), 1579. <https://doi.org/10.3390/electronics11101579>
- Noble, S. U. (2018). *Algorithms of Oppression: How Search Engines Reinforce Racism*. New York University Press.

Sherwood, Tim. *Human and AI Partnerships Are Integral to the Future of Customer Experience*,
21 Nov. 2022.

Williams, D. P. (2023). Bias Optimizers. *American Scientist, Suppl.SPECIAL ISSUE: Scientific Modeling*, 111(4), 204-207.

<https://proxy1.library.virginia.edu/login?url=https%3A%2F%2Fwww.proquest.com%2Fscholarly-journals%2Fbias-optimizers%2Fdocview%2F2840653932%2Fse-2%3Faccountid%3D14678>