Improvement of customer service through generative AI

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Abstract: This paper explore the possibility to use a conversational agent system architecture to support customer services and digital marketing. An implementation of chatbot through generative AI for customer service brings a significant improvement in customer relationships. The proposed prototype system is built in a real- word of telecommunication environment. To illustrate this system as well as possible ,various technologies have been analyzed and implemented, such as : artificial intelligence, natural language processing, knowledge bases. For the proposed system, an assessment of the improvement it brings has been made , the results were satisfactory , which shows the efficiency of this system in the environment where it was implemented. This paper also explore and address some emerging issues during the system implementation.

Keywords: Generative AI, prototype disgne, costumer service

1 Introduction

Artificial intelligence is for sure one of the fields that has the highest interest from researcher. Generative AI is a type of artificial intelligence technology that is capable to generate new content that imitates human like creativity and decision making. It operates by realizing patterns from large datasets and then using that knowledge to produce new and original content. Generative AI has applications in various fields, but in this paper we will show how generative AI components can be used to improve the functions of conversational agents in customer service. In customer service as has been shown in previous literature AI can automate responses, personalize interactions, analyze data, and improve the overall customer experience. Through the use of chatbots, natural language analysis and personalization of the customer experience, companies can offer faster, more efficient and tailored service. Chatbots have become popular over the past years in social networking sites, such that a useful and helpful chatbot is positively associated with consumer attitudes toward the brand [1] and reduces the perceived intrusiveness of subsequent chatbot advertising [2] . Chatbots and virtual assistants

are AI-based systems that can communicate with customers via chat or voice, simulating a human conversation. These systems can be integrated into various channels, such as websites, apps, social media, instant messaging or telephone, and can provide 24/7 support with no wait times. Thanks to machine learning, chatbots can constantly improve their abilities to understand and respond to user requests can be used in different ways to improve customer service, depending on the needs and objectives of each company. One of the characteristics of AI, in fact, is the extreme flexibility of the solutions, which can have practically an infinite number of declinations to be adapted to the specific case and respond to the specific needs of the user.Research Objective This study's research goal is to undertake a detailed narrative analysis of the role of generative Artificial Intelligence (AI) in transformation of customer service management. The study's goal is to investigate and explore the effects of AI chatbot components on customer service operations and customer experiences. The methodology used is an valuation of relevant literature, academic papers, and case studies relating to the use of AI in customer service management. The study will also evaluate a framework design for chatbot prototype with a generative AI component.

2 Literature review

By implementing AI-based customer service approach, companies can offer users direct benefits in various ways. By using AI component costumer service is informed and designed using algorithms that constantly learn from historical datasets and real-time data from different source. This is very important to personalize the service involvement to fit the customer's needs. This results in a more relevant and effective service that addresses the customer's wants and needs [3]. From the user's evaluation, AI-based services are often very cost-effective as they can be provided at a fraction of the cost of high-touch human-delivered services and, in some cases, are offered entirely for free [4]. In addition , AI-powered customer service is significantly less expensive than conventional human-delivered service and can be easily transformed with minimal additional cost. This includes even virtual service robots, such as chatbots. While the digital service revolution offers many exciting possibilities, it also brings potential downsides and risks for service users [5][6].

When using AI technologies the companies will have to negotiate with data and privacy concerns. Ethical dilemmas are posed by digital technology advancements such as AI, intelligent automation, and machine learning.[5]

In many studies, different architectures and frameworks have been presented for building a task-oriented chatbot, including tourism [7], e-commerce [8], and telecommunication [9]. Also a prototype for a knowledge based conversational agent to support e-commerce customers sale and marketing [10]. The proposed

prototypes according to the evaluation results, report that chatbot perform very well and significantly improve the user experience.

3 Prototype design for a generative AI agent to improve customer service.

In this study we evaluate and propose a framework, to integrate generative AI with a conversational agent. This will help companies to move from a reactive to a proactive approach to customer service management. By analyzing the collected data, AI can predict problems before they occur and propose solutions, reducing the number of complaints and improving customer satisfaction. The proposed prototype flowchart has different processes (figure 1):

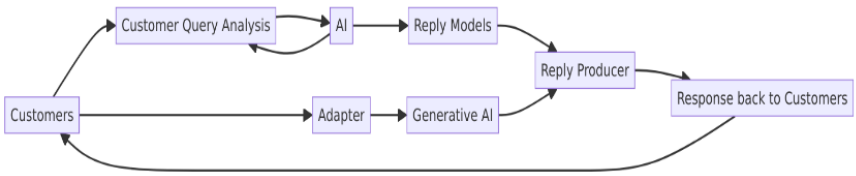

Figure 1
Prototype flowchart

The system design (figure 2) describes an integrated process that combines Natural Language Processing (NLP) and various AI models to handle customer service inquiries effectively.

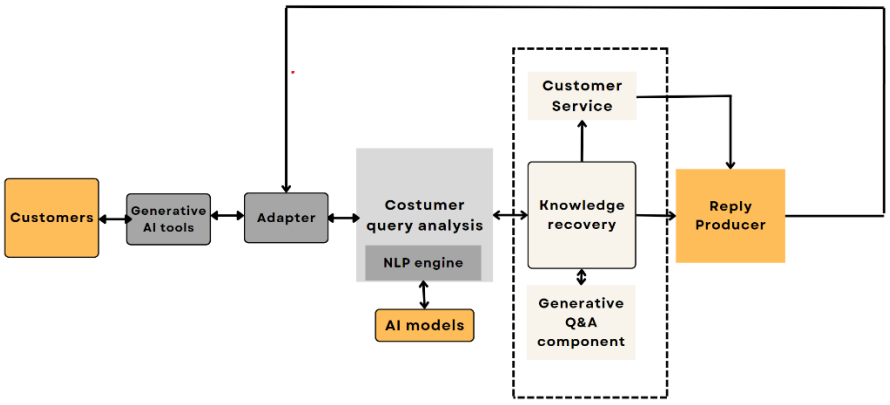

Figure 2
Prototype architecture

Customers as the initiators of service process submit their queries through various channels such as email, chat, or web forms. **Generative AI Tools** utilize AI technologies to preprocess the customer queries. This may include tasks like language translation, sentiment analysis, and initial categorization. In this path it is possible to involve tools like chatbot frameworks, machine learning models, and automated response generators. The **adapter** transforms and formats the data coming from the generative AI tools to ensure compatibility with the next processing steps. Acts as a middleware, ensuring seamless data flow within the system.

Customer Query Analysis is one of the main component. Queries can be understood combing different NLP and machine learning techniques. The queries from customers are first processed using generative AI tools, which may involve initial filtering, language translation, or format standardization. **NLP Engine**: Breaks down the natural language input to understand the context and intent behind the queries. It involves parsing, tokenization, and semantic analysis. **AI Models**: Includes specific models trained for various purposes such as classification, intent recognition, and contextual understanding. These models analyze the parsed data to derive actionable insights.

Knowledge Recovery: Searches internal and external databases for relevant information, it can include knowledge bases, documentation, and past resolved queries. The information will be transmitted to the reply generator if the knowledge recovery has all the required information. The knowledge recovery will forward the customer's request to the appropriate human customer service if the necessary information cannot be found. The **reply producer** will get the answer it needs from the customer support agent when they have finished answering the question. In order to build a response and send it back to the user via the adapter, the reply producer combine the templates for responding to queries with different purposes and the information that has been obtained.

Generative Q&A Component: Uses AI to formulate answers based on the retrieved information and is capable of constructing responses that are coherent and contextually appropriate, potentially leveraging generative models like GPT.

4 Evaluating the integration of AI generative component in costumer management process: Challenges and Benefits.

4.1 Challenges to considerate

Before introducing AI in costumer we have to considerate some aspect of every commercial activity:

Choose the right AI solutions - Before making choices,must be evaluated company's specific needs and select the most suitable AI solutions. Not all solutions are the same, so it's important to choose the ones that best align with customer service aims.

Improve the staff AI expertise - In spite of the automation offered by AI, human staff remains essential to customer service. It is important to provide adequate training to agents to work in cooperation with AI systems and effectively manage complex situations.

Integrate AI with existing systems - The implementation of AI in customer service must be integrated with existing systems and processes, such as CRM, to ensure a complete and effective experience. In fact, AI does not operate in isolation. Integration with CRM, data management systems and analytics platforms makes AI even more powerful. For example, CRM integration can provide chatbots with immediate access to customer information, allowing for more accurate and personalized responses.

Monitoring system results -Finally, it is important to continually monitor the performance of AI systems and analyze data to identify areas for improvement and ensure that the objectives we set ourselves are achieved.

4.2 Benefits

Improvement of costumer experience - Improve the possibility to personalize the experience of the customer, who loves to be recognized in his needs and to be treated as unique and not as one among many, one of the major advantages of AI in customer service is the ability to quickly carry out this customization based on customer preferences and behavior, to then be applied to the individual case.

Continuous system progress – As the system adopts the NLP technology ang machine learning technique to retrieve updated and the most relevant information on the Internet, the system can be adjusted continuously with new data.

Efficiency gains in human operation - Most of the costumer queries are managed automatically by a machine, human experts are invoked only to handle more complex queries that the machine cannot resolve.

Conclusion

The application of generative AI in customer service offers a revolutionary way to improve customer interactions, especially when it comes to the complicated processes involved in consumer question analysis. In order to respond to customer enquiries in a quick and correct manner, it is necessary that Natural Language Processing (NLP) and AI models be integrated. This enables for a comprehensive and tailoring of consumer questions. Furthermore, proactive customer care is made possible by the use of generative AI, since any problems may be identified early on and resolved before they become more serious.it is To successfully integrate generative AI in customer service important to deal with the difficulties posed by

such a system, such as choosing the best AI solutions, enhancing employee AI knowledge, etc.

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