



Conversational Artificial Intelligence in E-Customer Relationship Management

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Abstract: *E-Customer Relationship Management (E-CRM) is a digital strategy used by businesses to manage and improve customer relationships and interactions via various online channels. To provide an integrated customer experience, E-CRM incorporates a variety of technologies such as social media, email, chat, mobile applications, and web-based customer service portals. E-primary CRM's goals are to improve customer engagement, increase customer satisfaction, and foster customer loyalty. Companies can gather valuable customer data and insights by leveraging digital technologies, which can then be used to personalise interactions with customers and provide them with relevant information and support. Conversational Artificial Intelligence (CAI) refers to technology that enables computers to simulate human-like conversations, understand and interpret human language, and respond in natural language. CAI is widely used in applications such as chatbots, voice assistants, customer service bots, and virtual agents. The goal of CAI is to create a seamless and natural communication experience between humans and computers. CAI technologies such as Natural Language Processing (NLP) and Deep Learning are constantly improving, leading to a more advanced and human-like conversational experience. In this report we will determine how Conversational Artificial Intelligence helps E-CRM to become as a powerful tool for businesses seeking to improve customer relationships and drive customer loyalty and how companies can provide an integrated customer experience that is both personal and efficient by leveraging digital technologies and gathering valuable customer data.*

Key Words: *E-Customer Relationship Management, E- CRM, Conversational Artificial Intelligence, CAI, Natural Language Processing, Deep Learning.*

1. INTRODUCTION:

E-Customer Relationship Management (E-CRM) is a digital approach to managing customer interactions and relationships through technology. It encompasses a range of techniques and platforms, including website design and development, email marketing, social media, and data analytics, to create a comprehensive and seamless customer experience. The goal of E-CRM is to increase customer satisfaction, loyalty, and advocacy through improved customer engagement and communication. E-CRM also provides organizations with a wealth of customer data that can be used to gain insights into customer behaviour, preferences, and needs. Through the use of data analytics, companies can analyse customer data to identify patterns and trends, and then use this information to develop more effective marketing strategies and improve the customer experience. Conversational Artificial Intelligence (CAI) refers to the use of natural



language processing (NLP) and other related technologies to enable machines to interact with humans in a way that mimics human conversation. This involves the creation of virtual agents, chatbots, voice assistants, and other conversational interfaces that can understand and respond to human requests and queries. The goal of CAI is to make interactions with technology more intuitive and human-like, allowing for a more seamless and enjoyable experience for users.

2. LITERATURE REVIEW:

- **BlueCRM: A New Trend of Customer Relationship Management Systems**

BlueCRM, a new proactive Customer Relationship Management (CRM) system, is proposed in this paper. In addition to its common use as a communication channel, Bluetooth is used in the proposed system as an automatic identification token. The system provides a low-cost proactive CRM system, which is the trend for such systems in the future. The prototype system's software implementation consists of two parts: a database management programme and an intuitive user interface. A Bluetooth-enabled device and a Bluetooth dongle are included in the hardware. Because of its feasibility and ease of deployment, the architecture has a significant advantage over previous solutions. Furthermore, the architecture can be implemented in a variety of ways, including as a standalone or as an integrated component of an existing information system.

- **Conversational AI: An Overview of Methodologies, Applications & Future Scope**

A subfield of artificial intelligence called "conversational AI" deals with speech- or text-based AI agents that can simulate and automate verbal interactions and conversations. Because of two major developments, conversational AI agents such as chatbots and voice assistants have proliferated. On the one hand, the methods required to develop highly accurate AI models, such as Machine Learning and Deep Learning, have seen tremendous advancement due to increased research interest in these fields, which has been accompanied by progress in achieving higher computing power with the help of complex hardware architectures such as GPUs and TPUs.

Second, conversational agents have been perceived as a natural match in a range of applications like healthcare, customer service, e-commerce, and education because of the Natural Language interface and the nature of their design. This increase in practical implementation and demand has made Conversational AI a fertile ground for innovation and novel research. The introduction of newer and more intricate models for each of the fundamental elements of a conversational AI architecture is occurring at an unprecedented rate. This study aims to highlight the advancements made by these unique innovations over their more established equivalents while also shedding light on recent developments in Conversational AI architecture. This paper also provides a thorough overview of some of the research prospects in the conversational AI field, laying the groundwork for more study and advancement in this area.

- **Research on Customer Relationship Management System Based on SOA**

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3. THE CRM AND CUSTOMER EQUITY:

CRM (Customer Relationship Management) is a business strategy that focuses on managing and optimizing interactions with customers to improve customer satisfaction, loyalty, and advocacy. This can include techniques for managing and analysing customer interactions and data throughout the customer lifecycle, with the goal of improving business relationships with customers, driving sales growth, and ultimately increasing customer equity.

Customer equity is a term used to describe the total combined value of all the relationships a company has with its customers. It takes into account customer loyalty, lifetime value, and the value of the brand. A company with a high



customer equity has valuable relationships with its customers, which can lead to long-term business success. CRM and customer equity are related as they both focus on maximizing the value of the customer relationships. An effective CRM strategy can help a company to build and maintain customer relationships, increase customer satisfaction and loyalty, and ultimately increase customer equity.

4. THE EFFECT OF CUSTOMER RELATIONSHIP ON CUSTOMER AND BRAND:

The effect of CRM on customers and brand can be significant and positive. When implemented properly, CRM can:

1.Improve customer satisfaction: By collecting and analysing customer data, companies can understand their customers' needs and preferences and provide personalized experiences that meet those needs. This can lead to increased customer satisfaction and loyalty.

2.Increase customer loyalty: Companies that use CRM to manage customer interactions can provide more consistent and high-quality customer experiences, which can lead to increased customer loyalty.

3.Enhance customer experience: CRM can help companies to track customer interactions across multiple channels and provide a more seamless and integrated customer experience.

4.Increase customer engagement: CRM can help companies to identify and target customers who are most likely to be engaged, and to develop tailored marketing campaigns that drive engagement.

5.Strengthen the brand: Companies that consistently provide positive customer experiences can build a strong brand reputation, which can attract new customers and increase customer equity.

In summary, CRM can positively impact both customers and brand by providing a better understanding of customer needs and preferences, improving the customer experience, increasing customer satisfaction and loyalty, and strengthening the brand.

5. METHODOLOGY:

The most crucial aspect of a company's brand and trust-building strategy is customer relationship management. If this customer connection is not correctly handled by the company, it might have an impact on the company's development and brand reputations. By combining CRM with conversational AI, this situation will be improved.

These are the steps in integrating CAI with CRM:

- 1.Using chatbots for CRM and dialogue management
- 2.Recommendation by Interrupting a Human Dialogue
- 3.Tailoring Conversations with Chatbots to User Personality and Mood
- 4.A Chatbot for Virtual Social Promotion that Can Persuade and Coordinate Rhetoric
- 5.Justifications for Resolving Customer Issues
- 6.Concept-Based Learning of Complainants' Behaviour,
- 7.Reasoning and customer mental attitude simulation

6. CONCLUSION:

CRM is an exciting area of study that has the potential to significantly advance business development. CRM improves the effectiveness of information use, which raises the management level of businesses. The study has presented that the integration of Conversational Artificial Intelligence may improve the customer relationship management

REFERENCES:

1. L. Qiu, Y. Chen, H. Jia and Z. Zhang, "Query Intent Recognition Based on Multi-Class Features," in IEEE Access, vol. 6, pp. 52195- 52204, 2018.
2. J. Chen, R. Prasad, S. Stoyanchev, E. Selfridge, S. Bangalore and M. Johnston, "Corpus and Annotation Towards NLU for Customer Ordering Dialogs," 2018 IEEE Spoken Language Technology Workshop (SLT), Athens, Greece, 2018, pp. 707-713.
3. Razzaq M.A., Khan W.A., Lee S. (2017) Intent-Context Fusioning in Healthcare Dialogue-Based Systems Using JDL Model., Enhanced Quality of Life and Smart Living. ICOST 2017. Lecture Notes in Computer Science, vol 10461. Springer, Cham.



4. X. Dong, L. Qian, Y. Guan, L. Huang, Q. Yu and J. Yang, "A multiclass classification method based on deep learning for named entity recognition in electronic medical records," 2016 New York Scientific Data Summit (NYSDS), New York, NY, 2016, pp. 1-10.
5. J.Devlin, M.-W.Chang, K.Lee, K.Toutanova ,Bert: pre-training of deep bidirectional transformers for language understanding,arXiv:1810.04805.
6. [6] Young, S. (2017). Statistical Spoken Dialogue Systems and the Challenges for Machine Learning. Proceedings of the Tenth ACM International Conference on Web Search and Data Mining – WSDM'17.
7. T. Young, D. Hazarika, S. Poria and E. Cambria, "Recent Trends in Deep Learning Based Natural Language Processing [Review Article]," in IEEE Computational Intelligence Magazine, vol. 13, no. 3, pp. 55-75, Aug. 2018. [8] B. H. Juang and Tsuhan Chen, "The past, present, and future of speech processing," in IEEE Signal Processing Magazine, vol. 15, no. 3, pp. 2448, May 1998.
8. M. C. Surabhi, "Natural language processing future," 2013 International Conference on Optical Imaging Sensor and Security (ICOSS), Coimbatore, 2013, pp. 1-3.
9. Ek, T., Kirkegaard, C., Jonsson, H., & Nugues, P. (2011). Named Entity Recognition for Short Text Messages. *Procedia - Social and Behavioral Sciences*, 27, 178–187.
10. A Khanna, B. Pandey, B. Pradeepkumar, K. Kalia, T. Das and K. Vashista, "A study of today's A.I. through chatbots and a rediscovery of machine intelligence," unpublished
11. W. O. Anderson, Jr., "Customer Relationship Management in an E-Business," in Proceedings of International Engineering Management Conference (IEMC '01), 2001, pp. 311-316.
12. J. Washburn and R. Plank. Measuring brand equity: An evaluation of a consumer-based brand equity scale. *J. Mark. Theory Pract.*, vol. 10, pp. 46-61, winter 2002.
13. W. Reinartz, M. Krafft, and W. Hoyer. "The customer relationship management process: Its measurement and impact on performance," *J. Mark. Res.* Vol. 41, pp. 293-305, August 2004.
14. A.Payne and P. Frow, "A strategic framework for customer relationship management," *J. Mark.*, vol. 69, pp. 167-176, October 2005.
15. E. Peelen, K. van Montfort, R. Beltman, and A. Klerkx, "An empirical study into the foundations of CRM success," *J. Strategic Mark.*, vol. 17, pp. 453-471, December 2009.
- I. Rahimi and U. Berman, "Building a CSF framework for CRM implementation," *J. Database Mark. and Custom. Strat. Manag.* vol. 16, pp.253-265, October 2009.
16. S. Maklan, S. Knox, L. Ryals, "New trends in innovation and customer relationship management: A challenge for market researchers," *Intern. J. Mark. Res.* Vol. 50, pp. 221-240, May 2007.
17. W. Reinartz, J. Thomas, and V. Kumar, "Balancing customer acquisition and retention resources to maximize customer profitability," *J. Mark.*, vol. 69, pp. 63-79, January 2005.
18. R. Rust, K. Lemon, and V. Zeithaml (2005), "Return on marketing: Using customer equity to focus marketing strategy," *J. Mark.*, vol. 68, pp. 109-127, January 2005.