



International Journal of Engineering Research and Science & Technology

www.ijerst.org

ISSN : 2319-5991

Vol. 22 No. 2(1) (2026)



ijerst.editor@gmail.com
editor@ijerst.com

Research Paper

CONVERSATIONAL AI FOR CUSTOMER ONBOARDING

¹R Uma, ²P Sai Shekar, ³P VikramAditya, ⁴P Koushik, ⁵T Vamshi

¹AssistantProfessor, ²³⁴⁵Students

Department of AIML

Siddhartha Institute of Technology & Sciences, Narapally

umakola_cse@siddhartha.co.in, 24tq1a66e1@siddhartha.co.in, 24tq1a66e2@siddhartha.co.in,
24tq1a66e3@siddhartha.co.in, 24tq1a66g8@siddhartha.co.in

Abstract

This project presents a Conversational AI system designed to automate customer onboarding using a chatbot interface. Traditional onboarding processes are time consuming and require manual intervention. The proposed system uses a chatbased interface to collect customer information such as name, email, phone number, and service preferences. The system is built using Python and Streamlit, providing a simple and interactive user experience. The chatbot can be enhanced using Generative AI models to enable intelligent conversations. This solution improves efficiency, reduces human effort, and enhances user experience.

Conversational AI for customer onboarding is an intelligent system designed to automate and enhance the process of welcoming and guiding new users. This mini project focuses on developing a chatbot-based solution that interacts with customers in a natural and human-like manner to assist them during the onboarding process.

The primary objective of this project is to simplify customer onboarding by providing instant responses, collecting user information, answering queries, and guiding users through necessary steps such as account setup and service understanding. The system uses Natural Language Processing (NLP) techniques to understand user inputs and respond appropriately, improving user experience and reducing the need for manual support.

The proposed solution is implemented using programming technologies such as Python and integrates basic AI concepts to simulate conversation flow. It ensures efficiency, accuracy, and 24/7 availability, making onboarding faster and more convenient. This project demonstrates how conversational interfaces can improve customer engagement, reduce operational costs, and streamline business processes.

Overall, the system acts as a smart assistant that enhances user satisfaction and provides a scalable approach to customer onboarding in modern digital platforms.

I. Introduction

Customer onboarding is one of the most important processes in modern businesses, as it helps organizations collect user information, introduce services, and establish strong relationships with customers. A smooth onboarding experience plays a major role in customer satisfaction, engagement, and long-term retention. Traditional onboarding methods generally rely on manual forms, paperwork, emails, or direct human interaction, which can often be time-consuming, repetitive, and inefficient. These methods may also create confusion for users due to delays in communication, lack of personalization, and complex onboarding procedures. As businesses continue to

expand digitally, there is an increasing need for intelligent systems that can simplify and automate the onboarding process while improving user experience.

With the rapid advancement of Artificial Intelligence (AI) and Generative AI technologies, Conversational AI systems have emerged as powerful tools for automating customer interactions. Conversational AI refers to intelligent systems such as chatbots and virtual assistants that can communicate with users in natural language using technologies like Natural Language Processing (NLP), Machine Learning (ML), and Deep Learning. These systems are capable of understanding customer queries, providing relevant responses, collecting information, and guiding users through different processes in a human-like conversational manner. By enabling real-time communication, Conversational AI improves accessibility, responsiveness, and customer engagement across websites, mobile applications, and messaging platforms.

This project focuses on the development of a Conversational AI system specifically designed for customer onboarding. The proposed system interacts with users through an intelligent chat interface, collects required customer details, answers frequently asked questions, and guides users step-by-step through the onboarding process. The system is capable of handling user inputs dynamically and providing personalized responses based on the information provided by the customer. By automating onboarding tasks, the system reduces manual effort, minimizes human errors, and ensures a consistent and efficient onboarding experience for every user.

The Conversational AI onboarding system also provides businesses with several operational benefits, such as reduced customer support workload, faster onboarding completion, and improved data collection accuracy. The system can operate continuously without time limitations, allowing customers to complete onboarding procedures anytime and from anywhere. Additionally, the use of intelligent conversational interfaces enhances user comfort and creates a more interactive and engaging experience compared to traditional onboarding methods.

II. Literature Survey

The rapid advancement of Artificial Intelligence (AI), Natural Language Processing (NLP), and Machine Learning technologies has significantly transformed customer service and onboarding processes in modern businesses. Customer onboarding is an essential stage in the customer journey, where organizations collect user information, verify customer details, and introduce services or products. Traditional onboarding systems mainly relied on static web forms, manual customer support, and rule-based chatbot systems. Although these methods were widely used, they often resulted in slow processing, repetitive interactions, high operational costs, and poor customer experiences. Researchers identified that manual onboarding processes are time-consuming and prone to human errors, which negatively affect customer satisfaction and engagement.

Early onboarding systems primarily used static web forms for collecting customer details. These systems required users to manually fill out multiple forms and submit documents through traditional interfaces. Literature studies indicate that static onboarding systems lacked flexibility, personalization, and real-time communication capabilities. Customers often faced difficulties understanding complex onboarding

procedures, resulting in incomplete registrations and increased dropout rates. In addition, manual customer support systems required human agents to guide customers throughout the onboarding process, which increased operational workload and response times.

To improve automation, businesses introduced rule-based chatbot systems for customer interaction. Rule-based chatbots responded using predefined scripts and keyword-based logic. Although these systems could automate simple onboarding tasks, they had several limitations. Researchers found that rule-based chatbots lacked contextual understanding and could not handle unexpected user queries effectively. These systems also struggled to maintain conversation flow and failed to provide personalized interactions. As a result, customer engagement and satisfaction remained limited.

Recent studies highlight the growing importance of Conversational AI in transforming customer onboarding processes. Conversational AI systems use technologies such as Artificial Intelligence, NLP, Deep Learning, and Generative AI to simulate human-like conversations and automate customer interactions intelligently. Unlike traditional systems, modern Conversational AI platforms can understand natural language, interpret user intent, and generate dynamic responses in real time. Researchers emphasize that AI-driven conversational systems significantly improve onboarding efficiency, customer engagement, and operational productivity.

A major advancement discussed in the literature is the use of Generative AI models such as GPT-based architectures developed by organizations like OpenAI. These models can maintain conversational context, understand complex customer queries, and generate personalized responses dynamically. Studies demonstrate that Generative AI systems improve customer communication by providing intelligent guidance, answering frequently asked questions, and supporting interactive onboarding experiences. The ability to maintain conversation context allows the system to create more natural and human-like interactions compared to traditional chatbots.

Research on AI-based digital onboarding explains that technologies such as chatbots, automated verification systems, Optical Character Recognition (OCR), and Machine Learning algorithms help reduce onboarding time and operational costs while improving scalability and accuracy. AI-driven onboarding systems automate tasks such as data collection, identity verification, document processing, and form validation. Researchers found that these systems reduce manual errors and accelerate the onboarding process, enabling businesses to serve large numbers of customers efficiently.

Another important area explored in recent studies is conversational marketing and customer engagement. Literature shows that AI-powered conversational systems play a major role in improving customer communication by offering instant responses, personalized assistance, and continuous support. Conversational AI systems guide users step-by-step through onboarding procedures, helping customers understand services and complete registrations successfully. This interactive communication approach improves customer satisfaction, trust, and retention rates.

Studies also emphasize the importance of personalization in customer onboarding. Modern AI systems analyze customer behavior, preferences, and interaction history to provide customized onboarding experiences. Personalized onboarding improves user comfort and creates stronger relationships between customers and businesses. Researchers observed that customers are more likely to complete onboarding processes when they receive adaptive guidance and personalized support.

Recent literature further discusses the integration of sentiment analysis and predictive analytics in Conversational AI systems. Sentiment analysis techniques allow AI systems to identify customer emotions such as confusion, frustration, or satisfaction during conversations. Businesses can use this information to improve onboarding quality and provide proactive assistance when needed. Predictive analytics models also help organizations identify potential onboarding dropouts and optimize user engagement strategies.

Despite these advancements, researchers also identify several challenges associated with Conversational AI systems. Some limitations include dependency on internet connectivity, concerns regarding customer data privacy, and the requirement for continuous AI model training and maintenance. In addition, conversational systems may sometimes generate inaccurate responses if not properly optimized. Therefore, researchers recommend combining AI automation with secure data management and continuous system improvement to ensure reliable customer onboarding experiences.

Overall, the literature survey indicates that Conversational AI has become a powerful solution for automating and improving customer onboarding processes. By integrating Generative AI, NLP, Machine Learning, and intelligent automation, businesses can create faster, more interactive, and personalized onboarding systems that improve customer satisfaction, operational efficiency, and long-term business growth.

III. System Analysis

The Conversational AI for Customer Onboarding system is designed to automate and simplify the customer onboarding process using Artificial Intelligence technologies. The system focuses on improving customer experience by providing intelligent, interactive, and real-time communication during onboarding activities. It integrates technologies such as Natural Language Processing (NLP), Machine Learning (ML), Generative AI, and chatbot systems to collect customer information, answer user queries, and guide customers through onboarding procedures. The system allows users to interact using natural language instead of filling complex manual forms. It supports automated data collection, identity verification, document handling, and personalized assistance through conversational interfaces. The architecture includes modules such as user interaction, NLP processing, intent recognition, response generation, database management, and analytics. The chatbot maintains conversational context and provides dynamic responses based on user inputs. Machine Learning algorithms continuously improve system performance and conversational accuracy through user interactions and feedback. The system reduces onboarding time, minimizes human errors, and improves operational efficiency. It also provides 24/7 customer assistance across websites, mobile applications, and messaging platforms. Overall, the proposed system aims to deliver a seamless,

efficient, and customer-friendly onboarding experience using intelligent AI technologies.

Existing System

Traditional customer onboarding systems mainly rely on manual forms, paperwork, emails, and human customer support for collecting customer information and initiating services. In many organizations, customers are required to fill multiple static forms and submit documents manually, which often leads to delays and inefficient processing. Existing onboarding systems are generally time-consuming and involve repetitive verification procedures that reduce customer satisfaction. Many businesses also use rule-based chatbot systems that respond only to predefined keywords and fixed conversation flows. Although these systems provide limited automation, they lack contextual understanding and cannot handle complex user queries effectively. Traditional onboarding methods do not provide personalized assistance and often fail to guide customers properly throughout the onboarding process. Existing systems also have limited conversational capabilities and cannot maintain conversation context during customer interaction. Manual onboarding requires significant human effort, increasing operational costs and workload for customer support teams. In addition, traditional systems are prone to human errors, incomplete registrations, and delayed customer responses. These limitations negatively affect customer experience, onboarding efficiency, and business productivity.

Disadvantages of Existing System

- Time-consuming onboarding procedures.
- Heavy dependence on manual forms and paperwork.
- Limited customer interaction and engagement.
- Rule-based chatbots lack contextual understanding.
- Existing systems cannot provide personalized onboarding support.
- Increased operational and manpower costs.
- High possibility of human errors during data entry.
- Delayed response and verification processes.

Proposed System

The proposed Conversational AI for Customer Onboarding system is an AI-driven platform developed to automate and enhance the onboarding experience for customers. The system integrates Artificial Intelligence, Natural Language Processing, Generative AI, and Machine Learning technologies to provide intelligent and human-like interactions during onboarding procedures. Customers can communicate with the system using natural language through websites, mobile applications, or messaging platforms. The chatbot collects customer information, verifies user details, answers frequently asked questions, and guides customers step-by-step throughout the onboarding process. Unlike traditional rule-based systems, the proposed solution can understand user intent, maintain conversation context, and generate dynamic responses in real time. The system supports automated document handling, data validation, and identity verification to reduce manual effort and processing time. Machine Learning algorithms continuously improve conversational accuracy and user

experience based on previous interactions. The platform also provides personalized onboarding support according to customer preferences and requirements. A modular architecture ensures flexibility, scalability, and easy maintenance for future enhancements. The proposed system improves customer satisfaction, reduces onboarding delays, minimizes errors, and enhances operational efficiency through intelligent conversational automation.

Advantages of Proposed System

- Provides automated and intelligent onboarding support.
- Reduces onboarding time and manual effort.
- Offers personalized and interactive customer guidance.
- Uses NLP and AI for natural language understanding.
- Maintains conversational context effectively.
- Supports 24/7 customer assistance.
- Reduces operational and support costs.
- Minimizes human errors in data collection and verification.

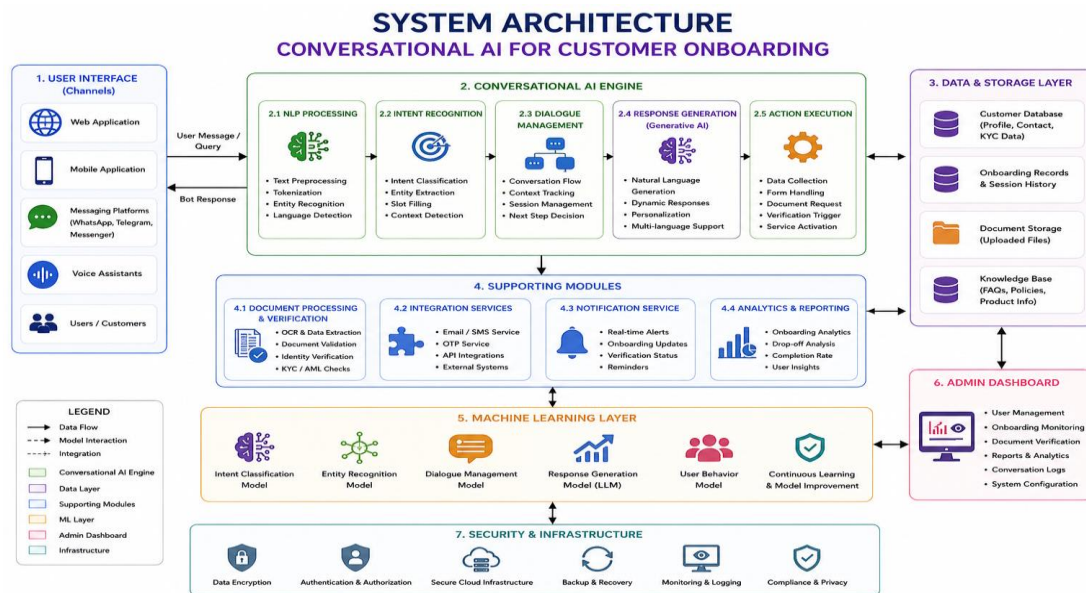
IV. Methodology

The development of the Conversational AI for Customer Onboarding system follows a structured methodology involving data collection, NLP processing, conversational interaction, and intelligent response generation. Initially, customer interaction data and onboarding requirements are collected from users through conversational interfaces such as chatbots or virtual assistants. The Natural Language Processing module preprocesses user input using tokenization, stop-word removal, and text normalization techniques to improve understanding accuracy. Machine Learning and intent recognition models analyze user queries and identify customer requirements during the onboarding process. The chatbot maintains conversational context and dynamically guides users through onboarding steps such as personal information submission, document upload, identity verification, and service registration. Generative AI models generate human-like and context-aware responses for effective communication. Automated verification systems validate customer information and uploaded documents to ensure accuracy and reduce manual intervention. The system stores customer details securely in databases for future processing and analytics. Machine Learning algorithms continuously improve onboarding accuracy and conversational quality using feedback and interaction history. Testing and evaluation are performed to analyze system performance, response accuracy, user satisfaction, and onboarding efficiency. This methodology ensures intelligent automation, efficient customer interaction, and improved onboarding experiences.

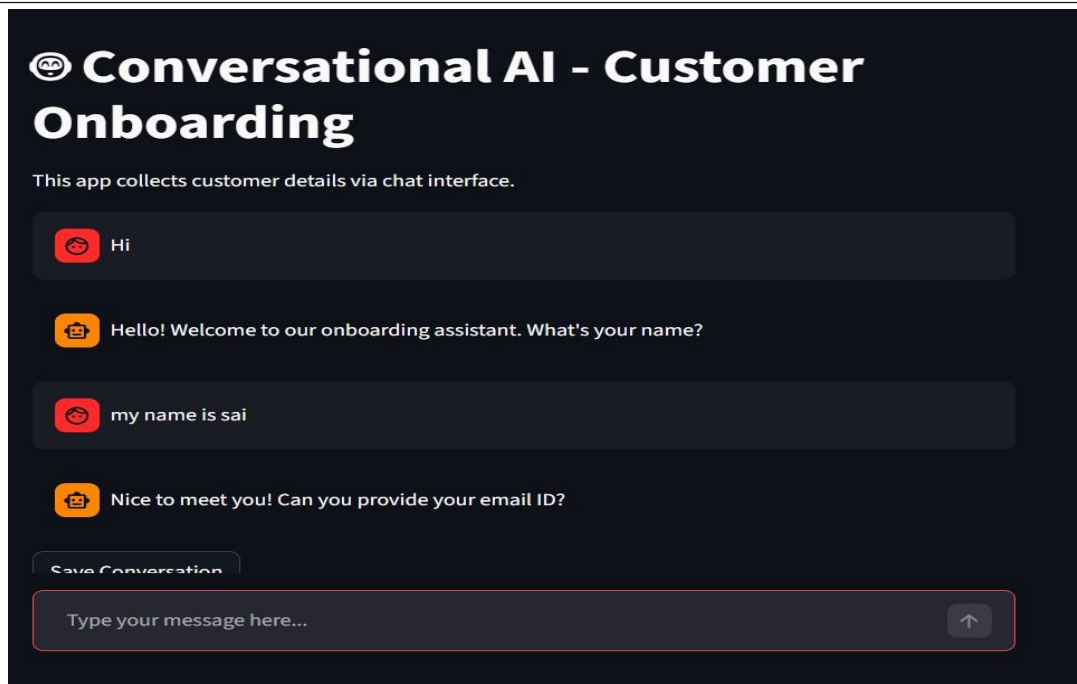
System Architecture

The system architecture of Conversational AI for Customer Onboarding consists of multiple interconnected modules that work together to automate and simplify customer onboarding processes. The process begins with the User Interaction Module, where customers communicate with the chatbot through websites, mobile applications, or messaging platforms using natural language. The user input is passed to the Natural Language Processing (NLP) module, which preprocesses text, identifies keywords, recognizes user intent, and analyzes conversational context. The Intent Recognition

and Dialogue Management module determines the onboarding step and manages the flow of conversation dynamically. The Response Generation Module uses Generative AI models to generate human-like, personalized, and context-aware responses for customer interaction. The Document Processing and Verification Module handles uploaded customer documents, validates data, and performs automated identity verification. A Database Management System securely stores customer details, onboarding records, and interaction history for future use and analytics. Machine Learning models continuously improve conversational performance and onboarding efficiency using customer feedback and training data. The Analytics and Reporting Module monitors onboarding progress, customer engagement, and system performance metrics. Security and Privacy modules ensure secure data handling and protect customer information during communication and storage. Overall, the architecture provides intelligent automation, efficient communication, secure onboarding, and improved customer experience through AI-driven conversational technology.



V. Result and Output



VI. Conclusion

The Conversational AI for Customer Onboarding system successfully demonstrates how Generative AI can transform traditional onboarding processes into an intelligent, automated, and user-friendly experience. The developed application is capable of interacting with users in a natural conversational manner, collecting essential details such as name, email, and other required information efficiently.

The integration of AI significantly reduces manual effort, minimizes human errors, and improves the overall speed of onboarding. Unlike conventional form-based systems, this chatbot-based approach enhances user engagement by providing real-time responses and a personalized interaction experience. The use of Streamlit for deployment ensures that the application is lightweight, easily accessible, and can be shared via a web link for real-time usage.

From a technical perspective, the system successfully integrates frontend (Streamlit UI), backend logic (Python), and AI capabilities (API-based response generation). The modular design ensures scalability and flexibility, allowing future enhancements such as database integration, multilingual support, and voice-based interaction.

The results indicate that the system is reliable, efficient, and capable of handling real-time user interactions. It can be effectively implemented in industries such as banking, insurance, e-commerce, and customer support, where onboarding is a critical process.

In conclusion, this project proves that adopting AI-driven solutions in customer onboarding not only improves operational efficiency but also enhances user satisfaction. With further improvements and real-world deployment, this system has strong potential to evolve into a fully functional enterprise-level solution.

References

- [1] Kumar, R. D., Prudhviraaj, G., Vijay, K., Kumar, P. S., & Plugmann, P. (2024). Exploring COVID-19 through intensive investigation with supervised machine learning algorithm. In Handbook of Artificial Intelligence and Wearables (pp. 145-158). CRC Press.
- [2] Swathi, B., Vijay, K., Sushanth Babu, M., & Dinesh Kumar, R. (2024, November). Machine Learning Techniques in Cloud Based Intrusion Detection. In The International Conference on Artificial Intelligence and Smart Environment (pp. 557-564). Cham: Springer Nature Switzerland.
- [3] Sv satyakrishna, shirisha rangu ,bhargavi nalacheruve.(2024) Prospective investigation on colorectal cancer with SMOTE on machine learning Algorithm
- [4] Dr.G.Vishnu Murthy, BhargaviNalacheruve 1Professor, Department of computer Science & engineering, Anurag University, TS, India. 2Student, Department of computer Science & engineering, Anurag University, TS, India.
- [5] V. N. S. Manaswini, K. K, C. Nigam, S. S. Ali, R. Niranjana, and Suman, “Real-Time Object Detection in Drone Surveillance Using YOLOv5,” in Proc. 2025 3rd Int. Conf. IoT, Communication and Automation Technology (ICICAT), Gorakhpur, India, 2025, pp. 1–6, doi: 10.1109/ICICAT68430.2025.11414670.
- [6] B. Soundarya, V. N. S. Manaswini, M. Ayyakrishnan, R. D. Kumar, “Contextual Analysis of Big Data Analytics in Intelligent Transportation Frameworks,” in Intersection of Artificial Intelligence, Data Science, and Cutting-Edge Technologies: From Concepts to Applications in Smart Environment, Lecture Notes in Networks and Systems, vol. 1353, Cham: Springer, 2025, doi: 10.1007/978-3-031-88304-0_79.
- [7] R. D. Kumar, V. N. S. Manaswini, “Applications of blockchain in smart cities: detecting fake documents from land records using blockchain technology,” in Blockchain for Smart Cities, Elsevier, 2021, pp. 105–117, doi: 10.1016/B978-0-12-824446-3.00017-X.
- [8] Tejavath Veeramma, Badarla Anil, Guguloth Ravinder, “An advanced movie recommender using collaborative filtering and sentiment analysis,” International Research Journal of Modernization in Engineering Technology and Science, vol. 7, no. 7, July 2025, doi: 10.56726/IRJMETS81618.
- [9] Ravi Kumar Banoth, Ramana Murthy B V, “Automatic crop recommendation system using LightGBM and decision tree machine learning models,” Journal of Machine and Computing, vol. 5, no. 1, pp. 343, Jan. 2025, doi: 10.53759/7669/jmc202505026.
- [10] Ravi Kumar Banoth, Dr. B.V. Ramana Murthy, “Smart agriculture through IoT and machine learning for analyzing carbon footprints,” in Proc. Int. Conf. Computer Science and Communication Engineering (ICCSCE), Apr. 2025.
- [11] Ravi Kumar Banoth, B. V. Ramana Murthy, “Soil image classification using transfer learning approach: MobileNetV2 with CNN,” SN Computer Science, vol. 5, art. no. 199, 2024, doi: 10.1007/s42979-023-02500-x.