Chapter 3
Trends in Conversational Artificial Intelligence: Who Controls the Voice Behind the Bot?

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ABSTRACT

This study presents an exploration of emerging trends in Conversational Artificial Intelligence (AI), highlighting advancements in natural language processing, machine learning, and human-computer interaction. As AI-driven chatbots and virtual assistants become more sophisticated, trends such as enhanced contextual understanding, multimodal interactions, and emotional intelligence are shaping the future of conversational systems. The integration of large language models, real-time personalization, and ethical AI considerations are driving improvements in user experience, making AI interactions more seamless and human-like. Additionally, the rise of multilingual AI, domain-specific chatbots, and voice-enabled assistants is expanding AI's applications across industries, including healthcare, customer service, and education. However, challenges related to bias, data privacy, and misinformation persist, necessitating ongoing research and regulatory frameworks. This study examines these trends and their implications for the future development of Conversational AI.

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1. INTRODUCTION

The quest to enable intelligent, responsive, and flexible conversations with robotic systems is a long-standing goal of artificial intelligence research and touches many areas beyond AI alone, such as social psychology, cognitive science, formal philosophy, linguistics, and human-computer interaction. Conversational AI systems go by many names, among them chatterbots, computer conversation systems, dialogue systems, or whatever else practitioners felt was timely and trendy over the years (Shafik, 2023). Here, we will use the most recent trend term, conversational AI system, or conversational AI for short. Conversational agents, in the more traditional sense, have been around since at least the early 1960s, with the first time that a conversational agent passed a behavioral test being the implementation of a famous program in the mid-1960s. Since then, key work in rules- and pattern-based systems, hand-crafted rule-based systems, and, more recently, large-scale neural network-based systems has been undertaken at different times (Bunt & Petukhova, 2023).

Artificial intelligence plays an important role in the fourth industrial revolution, which is a continuation of the rapid industrialization brought about by previous industrial revolutions. Artificial intelligence has developed rapidly in a relatively short period. It has already been applied to various fields, such as medical treatment, stock price forecasts, and translation. Conversational artificial intelligence is a product of artificial intelligence, as its categories are presented in Figure 1. It focuses on the development of a conversational agent. A conversational agent is an artificial intelligence tool that simulates natural language conversation. For example, we can talk with it and ask it to answer questions or perform tasks for us (Seminck, 2023). Conversational AI has developed rapidly due to smartphone AI assistants. In general, smartphone AI assistants can help us with music and videos, making phone calls, setting up meetings, weather inquiries, and opening other apps. Recently, many organizations and academia have begun to consider focusing on developing a conversational agent. In the standard development process, you need to prepare a conversational model, which can be used to convert speech to text and then generate a response (Sonie et al., 2022). Until now, most spoken language systems have used hand-coded rules and state machines to process a given speech signal, but due to a trend toward using artificial neural networks, their potential is not fully utilized. The high performance of artificial neural networks in perceptual tasks suggests that it is also possible to bypass the intermediate encoding of linguistic information and create end-to-end conversational models (Ponnusamy et al., 2021).