Chapter 13
Building a Conversational Chatbot Using Machine Learning:
Towards a More Intelligent Healthcare Application

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ABSTRACT

The healthcare industry is facing numerous challenges in providing efficient and effective care to patients, including increased demand, limited resources, and a growing shortage of healthcare providers. To address these challenges, many healthcare organizations are turning to technology, specifically artificial intelligence (AI) and machine learning (ML), to improve patient care and outcomes. In response, the development of smart chatbots has emerged as a promising solution in the healthcare field. This chapter focuses on the design and implementation of a smart chatbot using AI and ML for healthcare applications. The main goal of the chatbot is to provide a more convenient and accessible method of delivering healthcare information and services to patients. This chapter will also explore the various components and algorithms used in the design of the chatbot, as well as its potential impact on the healthcare industry. Overall, this chapter demonstrates the value of AI and ML in healthcare and encourages further exploration and development of chatbots for healthcare applications.

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INTRODUCTION

Software made for automation has dramatically reduced the need for human interaction in routine, rules-based, and repeatable business operations in a wide range of fields, such as manufacturing, utilities, energy, financial services, healthcare, and telecommunications, to name a few (Garcia, 2023; Pilueta et al., 2022). With artificial intelligence getting better and more accessible for more people to use, people may be able to take advantage of new ways to automate their processes and operate more intelligence and cognitive understanding in their work. Robotic process automation (RPA) is one area where technological progress has made it easier to automate business tasks. On the other hand, the latest advances in chatbot technology and conversational artificial intelligence (Meshram et al., 2021) could soon change how people care and use automation. As shown by the idea of conversational RPA, the way forward may lie in a mix of the two. With this method, the benefits of both understanding natural language and deep learning can be combined. This makes it possible to automate processes involving talking to customers or employees.

The first step is to do an analysis that compares and contrasts these two methods and technologies. It has been shown that using more software robots, also called "bots," to automate routine tasks at a large scale can greatly increase production while lowering costs and shortening cycle times. This is the next step that makes sense in the long history of business process automation, which started long ago. In this conversation, "technology" can mean many different things, from simple rules to automate a process to more complicated solutions based on machine learning (Garcia et al., 2019). At the lower end of the spectrum, solutions usually include an extension of standard business processes and rules management. On the other hand, at the higher end of the scale, data scientists have to build very customized AI solutions that are expensive and hard to change when demand changes. The following characteristics define RPA: It works well for business procedures that follow a set of standards that have already been set or that can be predicted in some other way. Some of the back-office departments in charge of process analysis are the ones in control of finances, operations, production, human resources, and distribution. Because of this, it can't easily adapt to new things or deal with unusual situations effectively (Kadariya et al., 2019). In conclusion, RPA projects are often driven by IT, with help from the business.

People often think of RPA software and Chatbots as robots or bots, which is where the confusion comes from. The first ones are called "bots" for RPA, and the second ones are called "chatbots" for artificial intelligence (AI) (often also referred to as conversational bots, AI bots, chatbots, or digital assistants). In contrast to chatbots, RPA bots don't use natural language processing to try to mimic human interactions. In the early stages of chatbot development, most people thought of them as digital assistants that answered simple questions. They have become much more intelligent conversational bots that can do things like automate complex tasks and routines, recognize emotions, adapt to new situations, and handle digital journeys with many different paths. It can be used for any spoken (telephone, physical, or voice-activated interface) or text-based user-centric operation or journey (text, chat, email, web, etc). Because it is based on automating interactions with customers (or employees) across various digital platforms, it is an important part of how organizations are changing. One reason why it's so important is because of this.

Conversational AI uses natural language processing (NLP) technology to mimic human intent and automate the tasks needed to carry it out. Conversations (Tuncel et al., 2021) that can be free-form or directed and are based on unstructured data, with the option to hand off to a human worker if necessary. This strategy starts at the top and works its way down. It puts a lot of weight on data and communica-