A **chatbot** is a piece of [software](https://en.wikipedia.org/wiki/Software_agent) that conducts a [conversation](https://en.wikipedia.org/wiki/Conversation) via auditory or textual methods.[1] Such programs are often designed to convincingly simulate how a human would behave as a conversational partner, although as of 2019, they are far short of being able to pass the [Turing test](https://en.wikipedia.org/wiki/Turing_test).[2] Chatbots are typically used in [dialog systems](https://en.wikipedia.org/wiki/Dialog_system) for various practical purposes including customer service or information acquisition. Some chatbots use sophisticated [natural language processing](https://en.wikipedia.org/wiki/Natural_language_processing) systems, but many simpler ones scan for keywords within the input, then pull a reply with the most matching keywords, or the most similar wording pattern, from a [database](https://en.wikipedia.org/wiki/Database).

The term "ChatterBot" was originally coined by [Michael Mauldin](https://en.wikipedia.org/wiki/Michael_Loren_Mauldin) (creator of the first [Verbot](https://en.wikipedia.org/wiki/Verbot), Julia) in 1994 to describe these conversational programs.[3] Today, most chatbots are accessed via [virtual assistants](https://en.wikipedia.org/wiki/Virtual_assistant_(artificial_intelligence)) such as [Google Assistant](https://en.wikipedia.org/wiki/Google_Assistant) and [Amazon Alexa](https://en.wikipedia.org/wiki/Amazon_Alexa), via [messaging apps](https://en.wikipedia.org/wiki/Messaging_apps) such as [Facebook Messenger](https://en.wikipedia.org/wiki/Facebook_Messenger) or [WeChat](https://en.wikipedia.org/wiki/WeChat), or via individual organizations' apps and websites.[4][5] Chatbots can be classified into usage categories that include [conversational commerce](https://en.wikipedia.org/wiki/Conversational_commerce) ([e-commerce](https://en.wikipedia.org/wiki/E-commerce) via chat), [education](https://en.wikipedia.org/wiki/Education), [entertainment](https://en.wikipedia.org/wiki/Entertainment), [finance](https://en.wikipedia.org/wiki/Finance), [health](https://en.wikipedia.org/wiki/Health), [news](https://en.wikipedia.org/wiki/News), and [productivity](https://en.wikipedia.org/wiki/Productivity).[6]

Beyond chatbots, [Conversational AI](https://en.wikipedia.org/wiki/Conversation_analysis) refers to the use of messaging apps, speech-based assistants and chatbots to automate communication and create personalized customer experiences at scale.[7]

**Background[[edit](https://en.wikipedia.org/w/index.php?title=Chatbot&action=edit&section=1)]**

In 1950, [Alan Turing](https://en.wikipedia.org/wiki/Alan_Turing)'s famous article "[Computing Machinery and Intelligence](https://en.wikipedia.org/wiki/Computing_Machinery_and_Intelligence)" was published,[8] which proposed what is now called the [Turing test](https://en.wikipedia.org/wiki/Turing_test) as a criterion of intelligence. This criterion depends on the ability of a [computer program](https://en.wikipedia.org/wiki/Computer_program) to impersonate a human in a real-time written conversation with a human judge to the extent that the judge is unable to distinguish reliably—on the basis of the conversational content alone—between the program and a real human. The notoriety of Turing's proposed test stimulated great interest in [Joseph Weizenbaum](https://en.wikipedia.org/wiki/Joseph_Weizenbaum)'s program [ELIZA](https://en.wikipedia.org/wiki/ELIZA), published in 1966, which seemed to be able to fool users into believing that they were conversing with a real human. However Weizenbaum himself did not claim that ELIZA was genuinely intelligent, and the introduction to his paper presented it more as a debunking exercise:

[In] artificial intelligence ... machines are made to behave in wondrous ways, often sufficient to dazzle even the most experienced observer. But once a particular program is unmasked, once its inner workings are explained ... its magic crumbles away; it stands revealed as a mere collection of procedures ... The observer says to himself "I could have written that". With that thought, he moves the program in question from the shelf marked "intelligent", to that reserved for curios ... The object of this paper is to cause just such a re-evaluation of the program about to be "explained". Few programs ever needed it more.[9]

ELIZA's key method of operation (copied by chatbot designers ever since) involves the recognition of clue words or phrases in the input, and the output of corresponding pre-prepared or pre-programmed responses that can move the conversation forward in an apparently meaningful way (e.g. by responding to any input that contains the word 'MOTHER' with 'TELL ME MORE ABOUT YOUR FAMILY').[10] Thus an illusion of understanding is generated, even though the processing involved has been merely superficial. ELIZA showed that such an illusion is surprisingly easy to generate because human judges are so ready to give the benefit of the doubt when conversational responses are *capable of being interpreted* as "intelligent".

Interface designers have come to appreciate that humans' readiness to interpret computer output as genuinely conversational—even when it is actually based on rather simple pattern-matching—can be exploited for useful purposes. Most people prefer to engage with programs that are human-like, and this gives chatbot-style techniques a potentially useful role in interactive systems that need to elicit information from users, as long as that information is relatively straightforward and falls into predictable categories. Thus, for example, online help systems can usefully employ chatbot techniques to identify the area of help that users require, potentially providing a "friendlier" interface than a more formal search or menu system. This sort of usage holds the prospect of moving chatbot technology from Weizenbaum's "shelf ... reserved for curios" to that marked "genuinely useful computational methods".

**Development[[edit](https://en.wikipedia.org/w/index.php?title=Chatbot&action=edit&section=2)]**

Among the most notable early chatbots are [ELIZA](https://en.wikipedia.org/wiki/ELIZA) (1966) and [PARRY](https://en.wikipedia.org/wiki/PARRY) (1972).[11][12][13][14] More recent notable programs include [A.L.I.C.E.](https://en.wikipedia.org/wiki/Artificial_Linguistic_Internet_Computer_Entity), [Jabberwacky](https://en.wikipedia.org/wiki/Jabberwacky) and D.U.D.E ([Agence Nationale de la Recherche](https://en.wikipedia.org/wiki/Agence_Nationale_de_la_Recherche) and [CNRS](https://en.wikipedia.org/wiki/CNRS) 2006). While ELIZA and PARRY were used exclusively to simulate typed conversation, many chatbots now include other functional features, such as games and web searching abilities. In 1984, a book called *The Policeman's Beard is Half Constructed* was published, allegedly written by the chatbot [Racter](https://en.wikipedia.org/wiki/Racter) (though the program as released would not have been capable of doing so).[15]

One pertinent field of AI research is [natural language processing](https://en.wikipedia.org/wiki/Natural_language_processing). Usually, [weak AI](https://en.wikipedia.org/wiki/Artificial_general_intelligence) fields employ specialized software or programming languages created specifically for the narrow function required. For example, A.L.I.C.E. uses a [markup language](https://en.wikipedia.org/wiki/Markup_language) called [AIML](https://en.wikipedia.org/wiki/AIML), which is specific to its function as a [conversational agent](https://en.wikipedia.org/wiki/Dialogue_system), and has since been adopted by various other developers of, so-called, [Alicebots](https://en.wikipedia.org/wiki/Alicebot). Nevertheless, A.L.I.C.E. is still purely based on [pattern matching](https://en.wikipedia.org/wiki/Pattern_matching) techniques without any reasoning capabilities, the same technique ELIZA was using back in 1966. This is not strong AI, which would require [sapience](https://en.wikipedia.org/wiki/Sapience) and logical reasoning abilities.

Jabberwacky learns new responses and context based on real-time user interactions, rather than being driven from a static database. Some more recent chatbots also combine real-time learning with [evolutionary algorithms](https://en.wikipedia.org/wiki/Evolutionary_algorithm) that optimise their ability to communicate based on each conversation held. Still, there is currently no general purpose conversational artificial intelligence, and some software developers focus on the practical aspect, [information retrieval](https://en.wikipedia.org/wiki/Information_retrieval).

Chatbot competitions focus on the Turing test or more specific goals. Two such annual contests are the [Loebner Prize](https://en.wikipedia.org/wiki/Loebner_Prize) and The Chatterbox Challenge (the latter has been offline since 2015, however, materials can still be found from web archives).[16]

[DBpedia](https://en.wikipedia.org/wiki/DBpedia) created a chatbot during the GSoC of 2017.[17][18][19] and can communicate through Facebook Messenger. DBpedia started in 2007 and allows to extract structured content from the [Wikipedia](https://en.wikipedia.org/wiki/Wikipedia) dataset, along with many other datasets. DBped