

: *Can chatbot technology improve decision support?*

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Chatting using text or computer-generated voice and natural language understanding with an intelligent decision support assistant is now possible. This type of user interface will replace drop-down menus, drag and drop, and even touch. Expect chatting with a smart decision assistant to become the most powerful user interface built so far. Chatbot or voice AI technology can and likely will improve decision support.

Imitating human conversation using software is increasingly possible and realistic with tools like Alexa, Siri, Watson, and Google Assistant. Interactive voice response systems ask and answer questions. Also, these tools help you "tell" your digital assistant to do tasks and other "things". Robotic chat, voice AI, chatbots, talkbots, interactive agents, or other artificial conversational entities are computer programs that converse with a person using text or spoken prompts and replies. Conversation is most often specialized, highly structured, and with a focused narrow purpose. A number of companies and websites advertise and review chatbot/voice AI software for customer service or decision support. For example, Botlist.co, aws.amazon.com/lex, liveperson.com, lp.helpshift.com, comm100.com

liveperson.com sells "ready-to-go bot templates for industry-specific use cases which include pre-configured intents and dialogue flows along with necessary integrations into back office systems." With advanced natural language processing capabilities, the software creates a conversational experience.

With Comm100's AI-powered Chatbot, customers can get quick answers to simple queries, delivered in natural language and with the option to defer to an agent whenever needed (cf., comm100.com) A bot or AI provides 24/7/365 advice, service and support.

There are multiple development chatbot tools. For example, Amazon Lex is a Cloud-based "service for building conversational interfaces into any application using voice and text. Amazon Lex provides the advanced deep learning functionalities of automatic speech recognition (ASR) for converting speech to text, and natural language understanding (NLU) to recognize the intent of the text, to enable you to build applications with highly engaging user experiences and lifelike conversational interactions." Amazon Lex uses the same technologies as Amazon Alexa and makes them available to developers to quickly build sophisticated, natural language, conversational bots (aws.amazon.com/lex)."

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One tool for building a chatbot is a decision logic tree. Lambert (2018) provides a brief description of a chatbot decision tree. He notes a "chat session is essentially a scripted series of questions and answers, leading to a diagnosis. So it could be implemented in a decision tree." He explains "At each node in the decision tree the system asks a typically multiple choice question and, based on the answer, branches to the next node." This approach narrows the problem space and helps formulate a useful response. In 1985, Power reviewed the symptoms, problems and treatment question and answer framework to structure knowledge for building a management expert system. This framework is a classical way of diagnosing situations and arriving at conclusions.

Chatbots can be simple and narrowly focused or more general purpose. They can be stateless or stateful. A stateless chatbot begins each conversation as if it was a new user. Conversely, a stateful chatbot can use data from past interactions and frame new questions and answers in a historical context. In many ways the most important decision related to implementing a chatbot is selecting the right natural language processing (NLP) engine. For example, if the targeted user interacts with the decision assistant through voice, then the chatbot requires a speech recognition engine. For more on this topic see Bunardzic (2016) and <https://searchcrm.techtarget.com/definition/chatbot>.

Voice AI conversational interfaces for a decision assistant can provide input controls, navigational components, and help or informational components. Most importantly Question and Answer dialogs can structure processes, diagnose situations, and clarify decision support needs. A voice AI interface can be very fast, intuitive, and efficient to use.

Hemanth Kumar, Practice Head, Analytics and Data Business at Acuvate Software, asserts "Chatbots enable enterprises to make data-driven decisions with ease and efficiency. Instead of having to depend on human analysis for a report, bots can be used to quickly generate analytics responses." Is this exuberant optimism or a major technology shift? Will fewer data analyst be needed?

Watson (2017), a decision support pioneer, noted in an article about preparing for the cognitive generation of decision support that "The relationships between chatbots and decision support are both obvious and subtle. The obvious relationship is the ability to acquire decision support-related information through a chatbot accessed while in a company's messaging system. ... The more subtle relationship of chatbots with decision support is how customers decide to buy." Voice AI bots extend the possibilities.

A chatbot is a computer program that engages in a natural language conversation with a person

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using either speech or text. The bot understands the intent of the user and replies and responds to the user based on rules and both input and stored data.

The analytics and decision support community should conduct more empirical and design research related to chatbots and voice AI. Perhaps researchers can create interactive general-purpose decision process assistants. Perhaps start with investigating dedicated decision assistants that can help in call centers or provide improved support for phone consultations. Help people make specific routine decisions like what products to order or where to place a new facility. Conversational user interfaces (UI) are part of the future of decision support. Your imagination is the limit in creating innovative uses.

Resources

Botkit, <https://botkit.ai>, an open Slack community.

Botlist, <https://botlist.co/>

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Last update: 2019-06-30 02:05