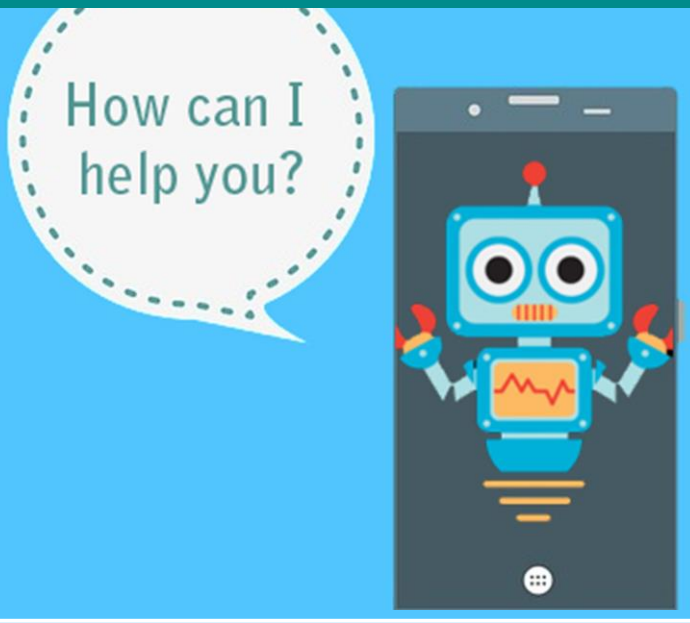
Artificial Intelligence and Chatbots in Technical Communication – A Primer



It seems likely that artificial intelligence (AI) and AI-driven chatbots will play a key role in helping users in the future. Amazon, Facebook, Google, IBM and Microsoft, as well as smaller technology companies, are all developing general-purpose solutions that organizations can use to power their own AI-driven systems.

So what does this mean for technical communicators and for User Assistance?

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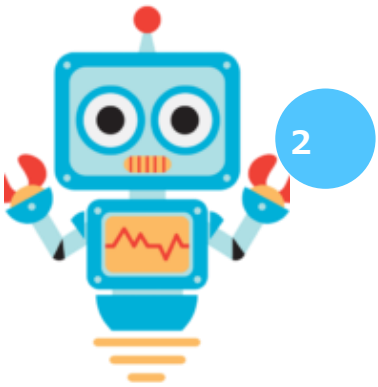
Part 1 – What Are Chatbots?

A chatbot is a service that people interact with via a chat interface. You can ask questions using your voice or by typing in the same way you would ask a person. The chatbot will usually respond in a conversational style, and it may carry out actions in response to your conversation (for example, order something for you). It often runs inside a popular messaging application, such as Facebook Messenger, Slack, or SMS. It answers your question, rather than directing you to a website.



The Two Types of Chatbots

According to **Chatbots Magazine**, there are two main types of chatbots:

1. One operates based on a set of rules. It can only respond to very specific commands. If you, as the user don't use the right command or words, the chatbot doesn't know what you mean.
2. The other type uses machine learning and artificial intelligence to provide the best response. We'll call these AI-powered chatbots. It:

    - ✓ Understands language, as well as commands.
    - ✓ Has the ability to constantly learn from user interactions to become better at predicting their needs.
    - ✓ Can chat in a similar way a staff member would with a person.
    - ✓ Can store and categorize the information it receives from each interaction.
    - ✓ It can assess information to identify which information is of no value and which isn't.
    - ✓ Knows where to store that information, so it can access it again in the future.

In reality, there are also chatbots that are less rigid than the first, but not as capable as the second. In this article, we'll focus mostly on the AI-powered chatbots. AI-powered chatbots can interpret and carry out more complex requests - ones that involve a series of complex tasks. This means users don't have to use specific commands to use it.

Use Cases

At the moment, chatbots are generally focused on a single purpose. This is easier for organizations to develop and manage, and it requires less initial investment. They do so by combining two innovative features:

1. Feature One: A Conversational User Interface (CUI). This can be text-based or spoken.
2. Feature Two: A way to poll and source answers from different sources and in a variety of different formats.

Ordering Something

Let's look at **a potential use case, described by Maruti Techlabs** - a chatbot that helps a user book a hotel room.

- If the user asks "Are premium rooms available?" on a specific date, a rules-based chatbot could use a set of predefined rules to see if that is true, and reply.

- If the user asks "Are there any cheaper rooms closer to the airport?", the question is more complex. The chatbot needs to understand the language nuances in this question to identify the user need. It needs to understand: the location of the user, the location of the airport, the prices of the different hotels, the room availability on that date, and so on. In that situation, you would need an AI-powered chatbot in order to give a relevant answer.

Intelligent Routing of Customer Queries & Call Deflection

Since the 1980s, people have been predicting computers will use artificial intelligence to answer people's questions. At that time, we saw clinical decision support systems emerge. These are similar to AI systems, in that they ask questions about a patient's symptoms and use Bayesian probabilities to make an initial medical diagnosis.

AI-powered chatbots can also reduce the complexity of finding and delivering answers to customer queries.

For example, *DoNotPay* is "the world's first robot lawyer". According to **The Guardian,** the chatbot can help refugees fill in an immigration application in the US and Canada. For those in the UK, it helps them apply for asylum support. BI Intelligence reports chatbots will contribute to cutting customer care costs by up to 29 percent. They are starting to be used for handling initial customer queries, and deflecting calls that would otherwise have to be answered by Customer Support staff. (**Source**)

Employee Onboarding

AI-powered chatbots can also help new employees through the onboarding process by introducing them to systems, documents, and procedures they need to do their job. Once the new hire is settled, Obie can be used in a conversational manner to answer questions that start with Who, What, and How. It can cover a variety of company operations, serving up answers that draw on a suite of integrations from Google Drive to Salesforce to Evernote. (Source: **VentureBeat**)

A New User Interface

In many ways, AI is supporting a new User Interface - a Conversational User Interface (CUI). According to content engineer expert **Cruce Saunders**, more and more of us will be using our smartphones to ask AI-mediated questions.

Alper Cugun in his lecture about: 'Conversations are the new Interfaces'. To watch this video click **here.**

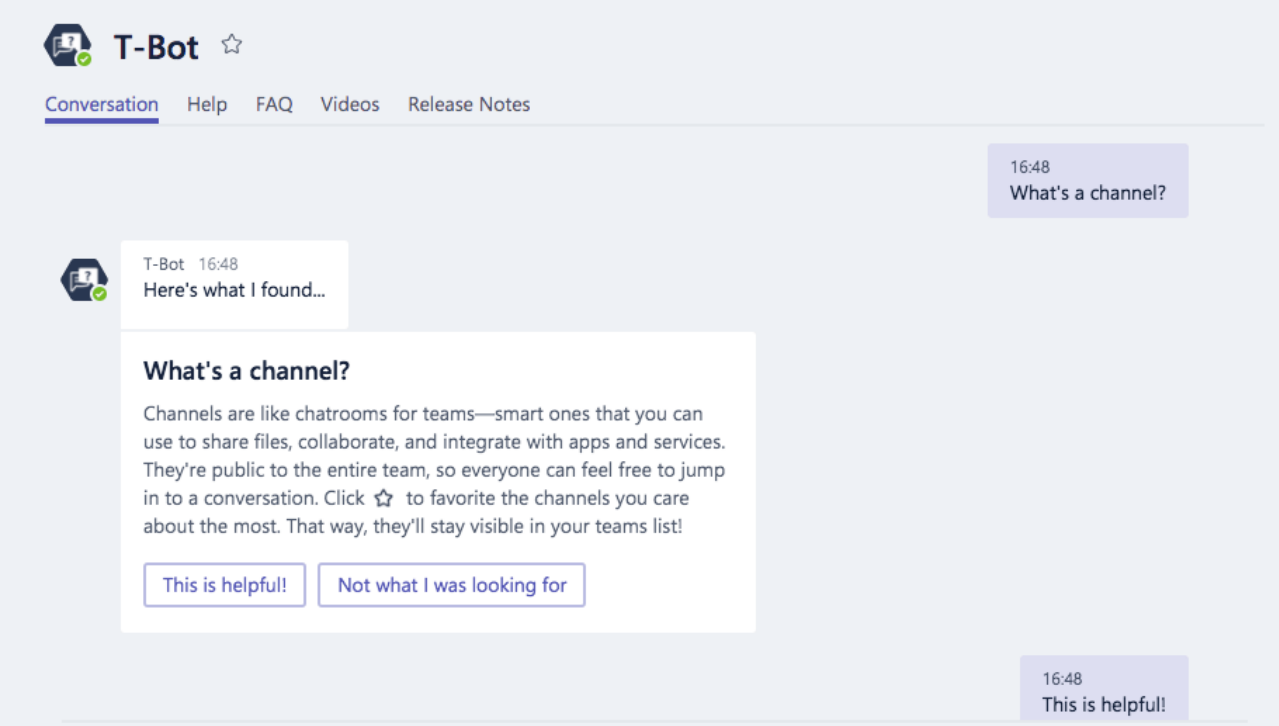
Instead of browsing the Amazon website, you might have a conversation with Alexa to find and order the product you need. Alexa is a voice-controlled intelligent personal assistant service that is part of the Amazon Echo smart speaker. Alexa might converse with you in the same way you might with a shop assistant in a retail store. It could provide personalized recommendations, and assist with on-the-spot purchasing. Alexa could also automatically connect to your existing customer data and confirm your identity.

Voice-activated CUIs, such as Alexa, do affect our privacy. If the CIU is always ready, waiting for us to speak to it, it could be eavesdropping on every conversation in the home.

Chatbots May Appear to Replace Applications

To the end user, it may appear that systems such as Siri and Alexa have replaced software applications (apps) when we ask them to book meetings in our calendars and purchase train tickets for us. In reality, they will encapsulate the apps and sit on top of them. While we may see fewer app icons on our smartphones, we will still need apps in the background for fulfillment and as data repositories.

Personalized User Assistance and Help Content



Microsoft T-Bot example: The intelligent routing capabilities of AI can be used to provide personalized User Assistance. AI-powered chatbots are already being used in applications for onboarding and product walkthroughs.

By **understanding the context** in which it will be used, the content can be personalized. For example, the information may change based on:

- the product,
- the location,
- the time,
- the user's profile,
- the user's past behavior
- and environmental factors.

The AI system could predict the likelihood of a known customer wanting to see a specific piece of content. If content is sufficiently described, using semantic metadata, the system could remix information to provide the best answer for the user. This is likely to be done by extracting information from structured data sources (such as metadata and databases) and incorporating that information into the chatbot's responses. For example, this might be the current status of a planned bug fix, a delivery date for an order, or a football score.

In his post on the Intelligent Information blog, **From UA Reloaded: Amplify the Intelligence of your Users and your Company**, Kai Weber describes in more detail how you could tap into a semantic wiki to access public information in context, based on metadata and tags.

Troubleshooting

What about troubleshooting - helping users when they get stuck? This is another application of intelligent routing of customer queries and call deflection. Chatbots can ask users some initial questions, and then suggest the one or two Help topics most likely to solve their problem. If the chatbot can draw on contextual information (such as the user's purchase history, their previous support calls, and their location), it will be able to give a more targeted response, in comparison to a user searching by keywords.

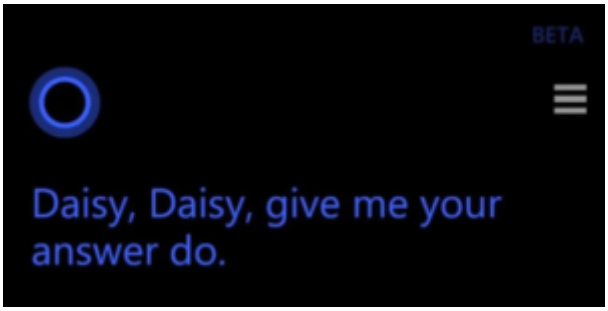
The Guide on the Side

Kristof van Tomme, CEO of the developer portal company Pronovix, argues there is an opportunity to provide an equivalent to Microsoft Clippy - this time, one that works. It could provide "personalized help interventions" whenever it recognizes an opportunity for the user to learn.

This may be ambitious. We know from **John Carroll's research into minimalism** that nearly all users read Help text only to solve their current problem, not to be taught.

Did you know that according on a study by CNN, a person's Facebook likes can also be used to predict their intelligence? ***Read the blog post***

Part 2 – Making a Chatbot



Chatbots are only a part of machine learning, which is only a small part of AI, but they could become a very important applied part in our field. So, for that reason, let's look at how we could build a chatbot.

Chatbots Work on Pattern Recognition and a Set of Algorithms

Most chatbots work on a basic model of:

- **Entities:** The thing the user is talking about.
- **Intents:** The question the user asks the chatbot.
- **Responses:** The answer the chatbot provides. It identifies the appropriate predefined responses from its repository. It then selects the most appropriate answer based on the intent and context. The repository is often confined to linguistic building blocks, but the real value comes from structured information it can mine from elsewhere.

Creating a Chatbot that Uses AI

These systems use machine learning and natural language processing (NLP) to interpret text like a person and find the right answer. They can also use visual information, such as facial recognition and images. Companies such as Amazon, Google, IBM and Microsoft, offer machine learning AI platforms you can use to power your own AI-driven chatbot.

Natural Language Processing

Natural language processing involves breaking down sentences and other parts of language, into components. It processes the semantics of the content to identify things like the entities and intents of the user. This has been a hard problem for computer science to tackle, but recent advances in the field have made this feasible.

Machine Learning

These systems use a corpus (a body of content) to retrieve the correct answer. Machine learning works best with massive repositories. So it will often include open-source repositories, such as structured Wikipedia. It uses algorithms to manipulate the data - particularly, linguistic pattern matching to find and score the information in the corpus. It continues to improve its responses based on its interactions with users. In other words, the machine learns.

Feeding the Bots

To help the machine learn, subject matter experts train it by uploading pairs of questions and answers. This enables the system to check the results of its learning for accuracy against the real world. This is called the ground truth. It can apply this learning to any new information added to the corpus or through user feedback.

You can also use unstructured content to help the system learn, where it contains relevant information. This might be in articles and blog posts. Platforms such as IBM Watson can process a corpus of unstructured content. However, you do need structured content when you're developing the system - as those question and answer key pairs.

Part 3 – What Does This Mean for Technical Communicators and for User Assistance?

Will moving some content into chatbots
provide a threat or an opportunity for technical communicators?

Designing and Training the Chatbot

Building a chatbot is less a technical issue than a user experience issue. So there is an opportunity to be involved in the designing and training of the chatbot. Technical communicators often know the end users and their needs better than most people within the organisation. Unfortunately, this knowledge and experience is often overlooked.

Gathering the Corpus

It makes sense for chatbots to be a channel for our existing content, rather than give us extra work to do. This means you'll need to write content in a way that it can be used in more than one way - as it is today, and by a chatbot. In other words, our content needs to be transformable.

According to **Val Swisher**, CEO of Content Rules Inc., you should already be thinking about gathering your corpus, curating it, and creating structured ground truth pairs to train it. Otherwise, your competition will get there before you. This may involve experimenting with a platform such as Amazon Lex, Google TensorFlow, or IBM Watson. You could also look at schemas such as Artificial Intelligence Markup Language (AIML), Emotion Markup Language (EmotionML), and Schema.org.

Discovery

This process could help technical communicators discover other relevant information, within the company and elsewhere, that has been written by others.

The Benefit of Structured Content

The chatbot will perform better if the source content maps well to the chatbot's information structure it is using to process users' questions. By this I mean the entities and the intent. **Mark Baker**, a twenty-five-year veteran of the technical communication industry and author of two books on technical communication, wrote:

> *Structured writing turns content into data that can be verified and processed by algorithms ... By combining well-constrained markup languages containing the right structures for the job with the right set of algorithms, you can generate all kinds of content and do all kind of useful validation.*

According to **Joe Gelb**, President of Suite Solutions:

> *The answers may already exist in your technical product content. That's right: all that structured and intelligent content investment, that has until now been masquerading as PDF and online help, can be transformed into personalized answers. With the right strategy, taxonomy, and semantic delivery mechanism, you can feed those bots efficiently and effectively and serve up those personalized answers, building engagement with your customers in the process.*

Ideally, a lot of the chatbot's underlying semantic structure can be mapped to your existing structured content. For example, if it is structured, has metadata, and uses a taxonomy, these will help the chatbot know which piece of information to serve the user. This includes common metadata such as product, symptom, problem, version, user role and operating system.

Many technical communicators have been doing structured content for a good reason for a long time already. This could mean you're able to reduce the time and effort substantially. For unstructured content, you should expect to spend a large proportion of a machine learning project's time on cleaning up the data.

We can consider AI-powered chatbot requirements when we develop information design models for our Help content. This approach makes it more likely that your documentation will AI and chatbot ready, at the time when it's needed. You can build a taxonomy and mark up some or all of your content. You can check that your content is marked up correctly when you save a page.

Writing at a Granular Level

With chatbots using question and answer key pairs as their ground truth, we could use this as our basis for writing content. We might have Help topics that contain the specific answer to a specific question, with metadata and taxonomies to describe the context for when it applies. We can markup content using *if* and *then* tags to manage content that's specific to certain conditions. The AI system can look at that conditional content to determine the information that meets the user's situation.

At this level of precision, we could see, and deliver, documentation as an API. For example, Twilio plans to create a documentation API for code samples, stored in a github repository. It plans to use the API to create a chatbot in Slack for helping new users. If users type lookup py in the Slack command line, the Twilio bot will reply with a message containing a code sample for the Python development environment. Making documentation available as an API also means users can also create or remix their own versions of the documentation. (Source: **The Cherryleaf blog**)

Using AI to Make Content Creation and Management Easier

Artificial intelligence could make it easier to write content, and it might help us prepare our content for use by a chatbot. **Joe Gollner** has predicted a future where AI automates the linking, formatting, indexing, tagging, coverage checking, terminology consistency checked, and terminology discovery, based on its algorithms. This could be like the *Jenkins* and *Alfred* productivity automation applications, which reduce the number of repetitive manual tasks a user has to do.

Can AI Write Content as Well?

Jason Lawrence and Chelsea Green, students at Southern Connecticut State University, carried out **research on the potential effect of AI on different writing professions.** Based on their research, they believe that robots will be doing some of the more menial writing tasks – such as writing basic, data-driven reports, and obituaries in newspapers. However, they are optimistic that skilled writing jobs will still require humans in 50 years.

One outcome might be that there is less need for online Help, or user manuals. The information is delivered to users via the chatbot or another form of intelligent agent. This would mean technical communicators might write the content, but no longer get involved in the way it is delivered - how it is presented and organised. To avoid this, technical communicators will need to know how to apply their skills in information design to chatbot development.

How does it work? You let me understand the text by helping me to analyze the semantics: the words and their relations. Then I can use what I´ve already learned through analyzing other texts.

Conclusions

The growth of AI-driven chatbots suggests a future of a personalized fluid user experience. It will be one of the most effective ways we'll be able to deliver content that is contextually aware.

When discussing this topic with Kai Weber, he pointed out that the changes by chatbots towards structure, taxonomy and metadata are also upon us due to other developments, such as a corporate content strategy, a content delivery portal, or a cloud application.

Technical communicators can start by making sure their content is in a structured format suited to machine learning. For example, in a Help topic, the machine can easily identify the subject (and map this to an Entity), the problem or goal (and map this to the Intent), and the steps in a task (and map this to the response). In addition, the machine can identify from the Help topic the conditions when it would apply. You can make sure your content will be ready for use by chatbots when it's needed.

There is an opportunity for technical communicators to get involved with the designing and training of the chatbot. This will involve learning some new skills and applying skills already learned.

About the Author

Ellis Pratt is a Director at **Cherryleaf**, a technical writing services and training company based near London. His role here includes teaching an advanced technical writing course.

He has over 20 years of experience working in the field of documentation, has a BA in Business Studies, and is an Associate of the Institution of Engineering and Technology. Ellis is contributor to two books on technical communication. He is also on the management council for the Institute of Scientific and Technical Communicators (ISTC), the professional body for technical communicators in the UK.

More Information

- Blog post on
  Building a Chatbot: analysis & limitations of modern platforms
- In Chatbotsmagazine:
  What Are The Best Intelligent Chatbots or AI Chatbots Available Online?
  The Complete Beginner´s Guide to Chatbots
- Content Rules blog post about
  Computing in the Age of Cognitive Systems
- LinkedIn article about
  6 Trends in the AI-Assisted Chatbot for Service Market
- SlideShare presentations by Information Development World
  Engineering Content for Bots, AI, and Marketing Automation
  Feeding The Bots: Preparing Product Content For The Intelligent Assistance Revolution

- AI Examples:
  Google Cloud Natural Language API
  https://aws.amazon.com/amazon-ai/
  https://aws.amazon.com/lex/

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