Artificial Intelligence: Changing the Fabric of Customer Care

Powered by emerging technologies like artificial intelligence (AI), machine learning and natural language processing (NLP), communications service providers (CSPs) can use ‘bots’ as part of an enhanced omni-channel customer care solution.

Interactive bots can provide an ideal interface for customers experiencing common issues that have simple solutions, such as resetting forgotten passwords or checking on the status of a scheduled technician appointment. For many CSPs, it is these simple issues that drive a large volume of help desk calls.

Proactive bots, combined with analytics, can identify service-affecting issues and fix them automatically, without any interaction between the customer and traditional support channels. Interactive bots can be used to power intelligent virtual assistants (IVAs) that provide behind-the-scenes support to customer service representatives (CSRs).

The real value for autonomous care — the generic name assigned to customer care functions that are enhanced by AI, machine learning and NLP technologies — will be found within the extensive library of use cases, known as the knowledge system. More information on the knowledge system and proactive bots can be found in the Nokia technical white paper “Autonomous Care: The Future of Customer Support”.

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Changing expectations in customer care

Intelligent virtual assistants (IVAs) — such as those found in interactive audio hubs, such as Google Home and Amazon Echo — are becoming very popular with consumers. These IVAs use artificial intelligence (AI) and natural language processing (NLP) to make reservations, play music, and turn the lights off. As a part of the Internet of Things (IoT), these devices are always on and can be awakened with a simple one- or two-word greeting, followed by a verbal instruction. For example, “Alexa, what is the weather going to be like today?” or “Okay Google, how much is 100 Euros in American dollars?”

Worldwide, Ovum forecasts that 192 million interactive audio hubs will be in use by 2021. These devices have introduced consumers to three technologies:

• Bots: applications that perform tasks automatically, without the need for human intervention, as found in IVAs and web-based chat or instant messaging tools like the one embedded in Facebook;
• AI: the software algorithms designed to simulate human intelligence by thinking, reasoning, planning, predicting, learning and solving problems; and
• NLP: technology that uses AI to find patterns within large datasets to recognize language, allowing consumers to use voice commands instead of having to physically access an app on a tablet or smartphone.

Customer care solutions of the future will undoubtedly be driven by technologies like these, but the real value for autonomous care will be found within the extensive library of use cases, known as the knowledge system. Think of an interactive audio hub — and the bots found behind the scenes — as a piece of computer hardware. It is an important tool that can be used for the creation of documents, spreadsheets or code, but these tasks cannot be completed without an experienced, qualified user at the keyboard. In fact, it is the user that provides the intelligence and expertise.

Bots provide an additional interface for consumers, but it is the knowledge system — and the ability to match subscribers’ intents to the appropriate remediation procedures — that will allow communications service providers (CSPs) to automate routine transactions and streamline more complex ones, making significant improvements to the customer experience.

Artificial Intelligence (AI): Increasing efficiency and minimizing customer frustration

Artificial Intelligence (AI) has the potential to transform customer care, by making processes more intelligent. AI refers to software algorithms designed to simulate human intelligence by thinking, reasoning, planning, predicting, learning and solving problems.

AI is getting a lot of attention lately owing to a convergence of a few different factors:

• Improvements in computer processing power — a trillion-fold increase in the last 60 years
• Declines in the cost of processing data — thanks to cloud and virtualization technologies
• Increased volumes of data — that needs to be analyzed quickly if it is to provide value

Initial applications of AI include language translation programs (like Google Translate), eCommerce applications (like Amazon, which makes product recommendations) and IVAs (like Google Home and Amazon Echo). With a market size of $100B by 2025 it is clear that AI is not just another fad.²

By combining AI with other technologies — including natural language processing and machine learning, both discussed later in this paper — powerful bots can be created and applied to customer care. Using AI technology, vast repositories of data can be analyzed, creating insights that can be used to deliver personalized services, power proactive care solutions and empower ever-smarter CSRs.

The ability to process huge amounts of information and solve increasingly complex problems is opening the doors for AI to play a more visible and meaningful role in customer care, with the objective of giving customers the best possible experience.

Machine learning: Welcome to the machine

At its core, AI is a series of algorithms that require human programming and, as a result, AI only knows what it is taught. The brains behind AI, and its continued advancement, is machine learning. Machine learning allows algorithms and computers to learn from data. It is the science of giving computers the ability to learn without being explicitly programmed.

AI and machine learning are related concepts, but it is important to note that not all AI techniques use machine learning and that machine learning is used for other things besides AI, such as decoding genetic sequences.

Machine learning works with structured data to detect patterns that provide useful insights. Everyday examples are personalized recommendations from services like Netflix. In the context of customer care, machine learning can classify a subscriber’s issue and intelligently present the best solution. Each customer issue that is processed contributes to the knowledge system, resulting in a more robust data set over time. This process of continuous improvement allows the bot to better classify customer issues and to route them more quickly and intelligently with each subsequent transaction. Eventually, machine learning allows the knowledge system to acquire more knowledge than any one human expert could ever possess.

**Natural Language Processing (NLP): Harnessing the power of the spoken word**

Natural Language Processing (NLP) uses AI to find patterns within large datasets to recognize language. One of the applications of NLP is with bots embedded in IVAs, which has introduced consumers to a ‘screenless' user interface. Google recently announced that 20 to 25 percent of queries on its Android devices are voice searches. This is predicted to reach 50 percent — across all platforms — by 2020. Further, about a third of Amazon Echo users use the devices three times (or more) every day.

As the accuracy of speech recognition reaches 95 percent (and beyond), the problem of comprehension evaporates and we begin to interact with bots as if it were a person rather than a device.

Some of the benefits of using voice instead of other interfaces include:

- **convenience:** hands-free, instant access when hands are occupied or when focus is on another task, like driving or cooking;
- **speed:** on average, humans speak 150 words per minute but can type only 40; typing speed decreases further when using mobile devices;
- **novelty:** many consumers find this new interface cool and exciting, but it needs to be accurate and reliable or this level of excitement will not be maintained; and
- **reliability:** according to Google, at the end of 2016, their NLP engine could recognize nearly 10 million words, with 90 percent accuracy.

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This hands-free interface is one of the elements that makes bots applicable to customer care. Instead of having to download, install and access an application on a mobile device, visit a web site, or call a help desk and navigate a maze of structured voice menus using an interactive voice response (IVR) system, bots provide a nimble and consumer-friendly approach.

**Natural language understanding (NLU): Determining intent**

The term natural language understanding (NLU) is often used interchangeably with the term NLP, but NLU is an important subtopic of NLP that deals with language comprehension. While NLP lets people and machines communicate with each other, NLU is used to determine how to best handle unstructured inputs and to convert them into a structured form that a machine can understand and act upon.

When engaged in a conversation, humans are (for the most part) able to handle mispronunciations, contractions, colloquialisms and other idiosyncrasies associated with language. Machines are less capable of dealing with unpredictable inputs and NLU is used to improve a machine’s ability to understand language. In fact, while NLP is reaching 90 percent accuracy, NLU typically struggles to achieve 60 percent accuracy. Understanding intent is more difficult than speech recognition.

NLP is sometimes used as an umbrella term that refers to the systems that work together to handle all interactions between machines and humans. An effective NLP system can process what is said, analyze it, comprehend its meaning and determine the intent, establish the appropriate action, and respond in language the user will understand.

**Expanding customer care with the use of bots**

It’s been more than five years since Apple iPhone 4S introduced the world to Siri. Since 2011, the use of bots has taken off with the launch of intelligent virtual assistants (IVAs) like Google Home, Amazon Echo and others. Designed to make life easier for consumers thanks to a hands-free interface, most IVAs perform tasks that were already possible with existing devices, such as phones and tablets. In addition, bots can interact with customers using web-based chat tools or instant messaging platforms, like the one embedded in Facebook.

One of the benefits of a bot is its ability to sift through large volumes of unstructured data. By quickly accessing customer data, bots can avoid time-consuming questions and, instead, focus on the task at hand. By integrating bots into customer care solutions, consumers will be also able to trigger automated processes that resolve simple problems or get basic information instantly via IVAs using simple commands, like “Alexa, I have forgotten my
Wi-Fi password" or “Okay Google, when will the GlobalComms technician arrive?”. No more navigating through web sites, finding the right app on a mobile device or waiting in call center queues. In fact, bots can be integrated in to the IVR systems that are used to route callers to the right CSR or to provide real-time information.

Enhancing the omni-channel customer experience

One of the biggest trends in the modern call center is 'omni-channel' customer care. More than just a proliferation of ways that customers have to seek information or assistance — such as visiting a web site, using instant messaging/chat, sending email, engaging via social media, using custom mobile applications or calling the help desk — a true ‘omni-channel’ customer experience requires that each of the available channels be integrated. If one channel doesn't lead to resolution, the customer must be able to access another channel without having to duplicate actions or re-enter information. An omni-channel experience eliminates the time needed to recapture lost information when moving between channels.

By integrating bots, existing omni-channel customer care solutions are enhanced, providing further improvements to the customer experience. Interactive bots can provide an ideal interface for customers experiencing common issues that have simple solutions, such as resetting forgotten passwords or checking on the status of a technician appointment. For many CSPs, it is these simple issues that drive a large volume of help desk calls.

Unlike a CSR, a bot can analyze real-time and historical data before initiating a response. Proactive bots, combined with analytics, can identify service-affecting issues and fix them automatically, without any interaction between the customer and traditional support channels. The ability to deflect calls away from the help desk will be one of the defining benefits of what is known as 'augmented customer care', which can also include interactive bots that provide behind-the-scenes support to CSRs.

The real value for autonomous care — the generic name assigned to customer care functions that are enhanced by AI, machine learning and NLP technologies — will be found within the extensive library of use cases, known as the knowledge system. It will be the ability to match subscribers' intents to the appropriate remediation procedures (found in the knowledge system) that will provide the key to unlocking the evolution toward autonomous care. The result is a reduction in the number of help desk calls that require human intervention. This will free up highly-trained CSRs to handle more complex tasks or to provide premium technical support.
As the knowledge system continues to improve with each subsequent transaction, it will eventually acquire more knowledge than any one human expert could ever possess. It will also acquire the ability to perform complex inferences on that knowledge (reasoning), to the point where it approaches human-like intelligence.

The time is coming fast when customer care systems, leveraging bots, become so advanced that we enter the era of autonomous, zero-touch care.

**Figure 1.** The evolution of customer care, moving from assisted and self care, to autonomous care, leveraging new technologies and the power of the knowledge system.

**Use cases**

Below are four use cases that illustrate the use of bots to resolve customer issues more quickly and efficiently.

**Wi-Fi Network Password**

One of the biggest call drivers for many CSPs are when subscribers forget their Wi-Fi network passwords. As they are often set once and forgotten, this information is not always readily available. This is especially true for subscribers that set up sub-networks, typically for guests. This is a great use case to automate with your IVA.

- Subscriber: “Alexa, what is my guest Wi-Fi network password?”
- Bot: “I can send that to you. Do you want me to send it via e-mail or text message?”
- Subscriber: “By text message, please.”
- Bot: “Okay, a text message with your guest Wi-Fi network password has just been sent.”
Technician Locator

Another common call driver for many CSPs is when subscribers are awaiting the arrival of a technician at their home to either install new equipment or troubleshoot a technical problem. This is another great use case that can be automated with your IVA.

- Subscriber: “Okay Google, when will the GlobalComms technician arrive?”
- Bot: “Your GlobalComms technician, Lauren, is en route. She will arrive at your home no later than 1:15pm.”

Fixing customer issues automatically

Bots are well suited to completing tedious tasks and for finding patterns that deliver insights from the vast quantities of data. A proactive care solution would use bots to identify service-affecting issues. Then, action can be taken proactively, without any interaction between the customer and a traditional support channel.

Providing CSRs with an ‘extra set of hands’

It can be difficult for CSRs to multi-task when speaking with a customer. An augmented care solution would utilize a bot in the background, to review network and device information, access a library of use cases, pinpoint customer issues, and presenting CSRs with resolution options – all in real time.

Summary

Contact centers are playing an increasingly important role in the context of the overall customer experience. When done right, customer care can be a unique differentiator that delivers great value. Ineffective customer care, on the other hand, is very expensive and can turn loyal customers into detractors.

Customer care solutions that leverage bots, AI, machine learning and NLP can enable the kind of efficient interaction that consumers are demanding. Tolerance for legacy customer care solutions is waning. There is an appetite for change and emerging technologies are generating substantial interest with consumers.

Making customers more self-sufficient, providing CSRs with tools that result in faster, more accurate customer care and ultimately resolving issues automatically not only makes customers happier, but it also generates a number of significant business benefits.