Communications service providers (CSPs) can use ‘bots’ as part of an enhanced omni-channel customer care solution. Powered by emerging technologies like artificial intelligence (AI), machine learning, speech recognition and natural language processing (NLP), proactive bots can identify service-affecting issues and fix them automatically, without any interaction between the customer and a traditional support channel. This is also known as “zero touch” care and it is the desired objective for both CSPs and customers alike.

This proactive approach to customer care also reduces the number of “silent churners”; customers who may not complain but are likely to churn after experiencing poor service. Another application is to use bots as an interface with consumers using web-based chat or instant messaging tools, like the one embedded in Facebook.

This paper builds upon the Nokia strategic white paper “Artificial Intelligence: Changing the Fabric of Customer Care”, providing more detailed information on 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.
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Building great experiences around customer care

In the United States alone, companies spend $112 billion on call centers each year, but only half of all customer service issues get effectively resolved. As discussed in the strategic white paper “Artificial Intelligence: Changing the Fabric of Customer Care”, communications service providers (CSPs) can use ‘bots’ to provide an enhanced omni-channel customer care solution.

Powered by emerging technologies like artificial intelligence (AI), machine learning, speech recognition and natural language processing (NLP), proactive bots can identify service-affecting issues and fix them automatically, without any interaction between the customer and a traditional support channel. This is also known as “zero touch” care and it is the desired objective for both CSPs and customers alike.

This proactive approach to customer care also reduces the number of “silent churners”; customers who many not complain but are likely to churn after experiencing poor service. Another application is to use bots as an interface with consumers using web-based chat or instant messaging tools, like the one embedded in Facebook.

The real value for autonomous care, however, 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 anatomy of autonomous care

Autonomous care is the generic name assigned to customer care functions that are enhanced by a variety of technologies, including:

- **Bots**: applications that perform tasks automatically, without the need for human intervention, as found in intelligent virtual assistants (IVAs) and web-based chat or instant messaging tools like the one embedded in Facebook;
- **Artificial Intelligence (AI)**: the software algorithms designed to simulate human intelligence by thinking, reasoning, planning, predicting, learning and solving problems;
- **Machine Learning**: allows algorithms and computers to learn from data. Sometimes supervised by data scientists, machine learning is the science of giving computers the ability to learn without being explicitly programmed;

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• Speech Recognition: the technology that gives machines (or software programs) the ability to identify words and phrases in a spoken language; and

• Natural Language Processing (NLP): converts spoken words into a machine-readable format, then 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.

Leveraging cutting-edge technology for improved problem resolution

When calling the help desk to report a problem, or to seek assistance, most consumers are hoping to speak with a live person. To start, however, most interactions begin with an interactive voice response (IVR) system.

Most callers are frustrated with existing IVRs because they lack the ability to understand intent. One of the benefits of AI is its ability to sift through large volumes of unstructured data. One of the challenges, however, is for NLP to understand the literal meaning of customer requests. It is essential that NLPs determine customer intent.

In the context of customer care, intent represents the purpose found within a subscribers’ statement, question or request; whether provided with a voice command or via a web-based chat or instant messaging tool. For example, when a subscriber asks “What is my guest Wi-Fi network password?”, the customer care system must be able to interpret the specific intent of that request. To do this, the phrase must be parsed and given structure:

need:guest {intent} / need:Wi-Fi {intent} / password {intent}

Then, the intent must be mapped to an appropriate remediation procedure or proactive action. For reactive customer care, CSRs typically use guided troubleshooting processes – sometimes called workflows. Workflows provide step-by-step instructions that ensure best practices are followed and that all agents have a consistent approach to problem resolution. The same workflows are also used for self-service care applications.

Typically, the steps included in a workflow are fixed, with a pre-defined sequence based upon best practices or processes that are prescribed and programmed by a business analyst. In practice, however, the most appropriate actions will differ from call to call, depending on the customer context. Until recently, workflows were not able to adapt to changing contexts; it was considered too much effort to have a workflow respond to various options because it would require the creation of very complex workflows with many hard-coded options.
Using machine learning — and adapting the sequence for every customer’s unique situation — Dynamic Intelligent Workflows can predict the optimal sequence of tasks that should be taken to resolve specific issues. The effectiveness of these workflows can (and should) also be monitored. Further, this data should be stored and analyzed, contributing to a set of best practices that can be continuously leveraged for future calls.

Algorithms developed by Nokia Bell Labs use all of the information available – workflow history, customer information and network status – to prescribe specific workflows to agents using a recommendation engine that selects the next-best action (NBA) that has the highest probability of resolving a customer issue in the shortest time.

Instead of the fixed sequence that characterized workflows in the past, Dynamic Intelligent Workflows have the flexibility to re-order the sequence of remediation activities to ensure that customer issues are resolved in the most effective and efficient manner possible. The sequence is based on various factors, including data that is collected in near real time.

As a result, not only do all workflows get continuously optimized (thanks to machine learning), but each individual workflow has the highest probability of resolving a customer issue in the shortest time. This enables faster response times, reduced support costs and a better customer experience. It also simplifies the workflow design since special cases based on context do not need to be hard-coded into the workflows.

Figure 1. Using technology to harness the power of the human word.
Setting a new standard for proactive care

By effectively mining and analyzing the vast quantities of network and subscriber data, CSPs can gain valuable insights about customers’ experiences, preferences and predicted behaviors. These analytics provide real-time business intelligence that can be applied at every customer touch point.

The first step is to determine the types of data that should be collected based on what the data is going to be used for. The data needs to be very specific to the customer care business; not just collecting data and storing it in data warehouses for its own sake. Ideally, the objective is to collect data that is connected to the network and mapped to various key performance and key quality indicators.

Once collected, this data can be used by various AI technologies to automate different tasks. For example, data can be collected from all managed customer premises equipment (CPE). An examination of that data might highlight an issue with a specific brand of CPE, for example. Then, rather than waiting for subscribers to seek technical support using traditional channels, action can be taken proactively. Customer issues will be resolved automatically, without the need for any interaction between the customer and the help desk.

This data can also be used to create the “self-healing network”, which allows CSPs to accumulate a list of known issues, map them to available solutions (found in the knowledge system), then allow for the automatic remediation of common issues that affect a significant number of customers.

By automating certain types of transactions, highly-trained CSRs are free to handle more complex tasks or to provide premium technical support. Further, although these common transactions drive a large volume of help desk calls, they typically only include a small number of issues. They fall in to what some CSPs call the 80:20 rule; 80 percent of the calls are related to 20 percent of the troubleshooting use cases.

With these assets in place, a customer care system can respond automatically or assign interactions to appropriately-skilled CSRs. The system also allows customers to escalate to a live agent at any time. Gartner predicts that, by 2020, 10 percent of initial engagement requests will be taken by bots, up from less than one percent today.2

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Predicting service disruptions using predictive analytics algorithms

Most CSPs rely on customer complaints (usually calls to the help desk) to learn about service disruptions because existing systems, like network operations support systems (OSSs), cannot easily identify issues with the access network, CPE or applications. According to industry analysts, around 70 percent of the service problems that residential customers report to operator help desks originate from the access and home network. Digital subscriber line (DSL) technology, for example, causes an average of three trouble calls per year per subscriber, at least half of which come from the customer premises. Up to 50 percent of all trouble calls are related to Wi-Fi; a vital element of the connected home experience.

It’s also important to note that 96 percent of customers don’t complain after a poor customer experience, but 91 percent of them will switch providers. These customers are referred to as “silent churners” and they represent a major challenge for CSPs. If a customer doesn’t call to complain, how do you know they even have a problem? What is required is another way to identify and diagnose issues; without the customer having to contact the help desk. That would present a tremendous opportunity.

Analytics provide the means to move toward proactive care, by capturing and storing data from the network, CPE, trouble tickets and more. Through analysis of this historical data, algorithms can be developed to better predict service disruptions and take proactive actions to address issues before the customer notices or calls in.

Although it would be ideal for the network to always know when service degradations occur, it’s often the spike in customer calls that is the first indication of a problem. Based on this reality, the researchers at Nokia Bell Labs have developed an algorithm that tracks incoming calls to the help desk, correlates the rate of calls to each network element or service to the expected level of calls. The algorithm then detects (in real time) when outage spikes are starting to happen and identifies the offending network entity or service without needing to look at customer ticket records or check on past service disruptions. This is called a “call anomaly detection” algorithm.

The process starts with an examination of all calls received by CSRs. When a sudden burst of calls (a spike) is identified, the algorithm correlates the calls with the network and service topologies. Using real-time statistical signal processing algorithms, calls concerning possible service disruptions affecting multiple subscribers are categorized and separated from other calls being received. This call anomaly detection can detect the outage within minutes and update IVR systems to play the appropriate message, thereby ensuring the call centers are not overwhelmed and can stay focused on solving the real issues.
The algorithms are constantly tested, updated and refined using real-time data from the network and customer calls. Implementing actions automatically also provides the CSP with the flexibility to adapt the action according to the CSP’s desired business processes. This is also known as “zero touch” care and it is the desired objective for both CSPs and customers alike.

Summary

Tolerance for legacy customer care solutions is waning. There is an appetite for change and emerging solutions are generating substantial interest with consumers.

CSPs can use ‘bots’ to provide an enhanced omni-channel customer care solution. Powered by technologies like AI, machine learning, speech recognition and NLP, proactive bots can identify service-affecting issues and fix them automatically, without any interaction between the customer and traditional support channels. This proactive approach to customer care also reduces the number of “silent churners”; customers who many not complain but are likely to churn after experiencing poor service.

The real value for autonomous care, however, 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.