Insurers Can Benefit from Natural Language Processing (NLP)

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1. Natural Language Processing is Here

Voice is one of the most natural ways for humans to communicate – we've been using it since we were children and it leaves our hands free to multi-task. Voice is quickly becoming an option during our daily interactions with machines. Many of us are at ease asking Siri what the weather's going to be like and telling Alexa to play our favorite song. Even the technophobes among us would likely be surprised by how reliant they are becoming on this human-machine dialogue, which is based on **natural language processing (NLP)**.

Through a process of machine learning and artificial intelligence, we've succeeded in instilling the human qualities of speech recognition and speech generation in machines. Analyzing and understanding written text is a big part of NLP and includes deconstructing that text and performing sentiment analysis, etc., to understand the meaning of the text and acting upon it. Using Google Translate to understand an article from a foreign news site is an example of this type of NLP.

Our devices have developed to the point where they can "understand" our language and behaviors, process what we've said, answer us, contextualize our behavior based on the surroundings and take action based on all of the relevant information. Machines can even identify our emotions by voice tone, or deconstruct our sentiment towards a brand, product or service, based on our written words.

The humanization of machines and their ability to converse with us, once widely considered an apocalyptic nightmare (to be fair, many still have *serious* concerns), is today a source of convenience and efficiency for people and organizations around the world. It's also a new and rapidly growing source of revenue that many industries, including insurance, are actively investigating.

2. Defining Natural Language Processing

Natural language processing is the ability of a computer, or other machine, to process language as it is spoken, or written, by a human being. A subset of artificial intelligence (AI), NLP enables computers to process language like humans do, analyzing and understanding what is spoken and then taking action. When you ask Alexa to play a song, the system processes the sounds, acts by retrieving the song you want from your music library and then plays it for you.

The NLP process to create a human-machine conversation is comprised of three stages: first is the **speech-to-text process**. The computer **translates the natural language** from voice to a terminology/language the computer can understand, by breaking down the speech into tiny units via machine learning and AI. It then compares these units to previous units from previous speech it has heard.

The next task is **word-category disambiguation**, which identifies words grammatically (separating nouns, verbs, etc.) using a set of coded lexicon rules. Following the first two stages, the system now likely understands the meaning of the speech.

The final stage is **text-to-speech conversion**, which converts the programming language into an audible or textual format to be used to respond to a user with either spoken words, or text.[1]

2.1 Voice Recognition

Voice recognition technology identifies and analyzes spoken language, converts it into readable data and analyzes the data to discover its meaning. Using a combination of algorithms and previous input from other language processing instances, the technology can ascertain what the speaker is saying and then act within an organization, in areas including voice search, call routing and speech-to-text processing. As with all AI applications, the more language it hears, the better it can "understand" what is being said.

Popular examples of voice recognition technology that is processing spoken user requests on a mass scale include Amazon's Alexa, Apple's Siri, Google's Assistant and Microsoft's Cortana.

[1] "Natural Language Processing (NLP)," Investopedia.

3. From Basic Chatbots to Virtual Assistants & Agents

Customer support chatbots first emerged as one of the most popular NLP user interfaces. Historically, they have performed relatively simple support tasks based on understanding the natural language, categorizing it and then giving answers to users. The earlier chatbots mostly used scripts to answer customer questions and offer a simple response. Today, advanced chatbots help users perform a range of actions online, including booking travel, eCommerce transactions, receiving the right customer support and submitting help desk tickets.

This is a convenient and efficient solution for organizations that find themselves spending a significant amount of time dealing with frequently asked customer questions that tax support departments.

Amtrak, the American railway company, saved $1 million in customer service email costs in a single year when it implemented its Julie chatbot on their website. Travelers book their rail travel by entering their destination and when they'd like to travel. Julie populates the forms on Amtrak's scheduling tool and guides the user through the rest of the booking process. In addition, Julie can upsell, offering hotel and car rental bookings. By answering more than five million questions per year, while upselling additional services, the Amtrak chatbot helped the company increase revenue by 30 percent.[2]

This is just the tip of the iceberg…this basic application of NLP is based on pre-defined scripts derived from frequently asked questions. And still, Julie not only saves costs, but also increases revenues.

3.1 Next Evolution

Swedbank, a Swedish bank, used AI chatbot (the next level of chatbot, not entirely dependent on scripts) Nina to help them shift their agents' focus, from service to sales. The bank's 700 contact center agents were handling 3.6 million annual customer interactions and 60 percent of Swedbank's customer base was banking digitally.

Nina gave customers searching on Swedbank's homepage answers to basic transactional questions asked in free-form, conversational text. Resolution was either achieved by sending the customer to the relevant web page, redirecting him/her to the appropriate contact center agents, or resolving the problem during the interaction. Within three months of deployment, Nina handled over 30,000 conversations monthly, with a 78 percent first-contact resolution. Fifty-five percent of the conversations didn't require further action.[3]

Even more sophisticated virtual agents are on the way. Get ready for next-generation virtual assistants that will expand NLP capabilities and gather data from a wider variety of sources.

3.2 Digital Assistants

Digital assistants – such as Siri, Alexa and Cortana – are taking NLP to the next level. Imbued with all the NLP capabilities of chatbots, they also possess the added capability to process context, such as localization, and to access information from multiple databases. They can put human responses into context and define the meaning of words.

[2] "Helping a Railroad Service Conduct Business," Next It.
[3] "Swedish Bank Uses Natural Language Processing for Virtual Customer Assistance," Daniel Faggella, Emerj, February 3, 2018.

Siri, Alexa and Cortana listen and process users' natural language and offer actions and answers based on their wider access to a range of digital sources and experiences. This means they're not as limited as chatbots to a one-dimensional sphere of operation. They can find you a list of local restaurants, open your phone apps, play your favorite song, set a reminder for you to read up about NLP and even tell you a joke.

3.3 Virtual Agent Amelia

IPsoft's Amelia, a blonde avatar dressed in a stark black business suite and modeled on a human named Lauren Hayes, is perhaps the perfect example of how NLP can be used to create an advanced virtual agent that offers organizations a cost-effective, engaging alterative to repetitive tasks.

Already in use in several industries, including **insurance**, banking and healthcare, Amelia uses NLP and Natural Language Generation (NLG) to understand the intent of the customer and generate conversations with users. "She" is trained to understand the business she's "working in" after she's deployed. Amelia studies the knowledge, industry-specific terminology, industry requirements and regulations she'll need to understand the business.

She learns by observing interactions between users and service agents, and her rate of learning increases with more data. The longer she's in use at an organization, the more "human" she becomes. She's also fluent in 10 languages.

Amelia engages in free-form dialogue with customers, extracting data, scanning her episodic and semantic memories for similar words and phrases, referring back to previous conversations and asking the customer questions so she can solve the issue.

Amelia can judge customer sentiment and respond in kind. Her emotional intelligence allows her to display empathy and she uses specific reassuring phrases and sentences, so a customer feels like interactions are valued. If she can't solve a customer's query, Amelia will escalate the issue to a human agent.

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4. NLP's Revenue Potential

NLP technology goes a long way to improving the lives of users around the globe. It also has massive revenue implications.

It is estimated that the total NLP software, hardware and services market will reach around $22.3 billion (U.S. dollars) by 2025, from $7.63 billion in 2016. NLP software solutions leveraging AI are predicted to grow from a value of $136 million in 2016, to $5.4 billion by 2025.[4]

The speech and voice recognition market was valued at $5.15 billion in 2016 and is expected to reach $18 billion by 2023.[5] With voice-based search identified by Gartner as the fastest growing mobile search, Comscore estimates that by 2020, half of all searches will be performed via voice. Gartner predicts that by 2020 85 percent of customer interactions will be managed without human involvement.[6]

By 2021, more than 50% of enterprises will be spending more per year on bots and chatbot creations than traditional mobile app developments. Gartner also believes that by 2020, 55 percent of all large enterprises will be using at least one bot or chatbot.[7]

The image recognition market is expected to grow from $15.95 billion in 2016, to $38.92 billion by 2021.[8]

[4] "Natural Language Processing Market to Reach $22.3 Billion by 2025," Tractica, August 21, 2017.
[5] "Speech and Voice Recognition Market by Technology, Vertical and Geography – Global Forecast to 2023," Markets and Markets, August, 2017.
[6] "Driving Opportunities for Insurers through Artificial Intelligence," Subramani Rajamani, Mindtree, November 28, 2017.
[7] "Gartner's Top 10 Predictions For IT In 2018 And Beyond," Louis Columbus, Forbes, October 3, 2017.
[8] "Image Recognition Market by Technology, Component, Application, Deployment Type, Industry Vertical, and Region – Global Forecast to 2021," Market and Market, February, 2017.

5. NLP for Insurers

An evolution is definitely underway, but many in the insurance industry still heavily rely upon human processing. From onboarding new customers and customer call center inquiries, to processing claims, insurance personnel often get bogged down by basic, repetitive service actions and frequently asked questions. It almost seems like NLP was specifically developed with insurers in mind! The time, effort and cost-savings that can be achieved by freeing up agents to deal with higher value calls and complex issues can translate into significant savings and new revenue opportunities. It's a win-win – natural language processing will empower insurers to reallocate their resources more efficiently and customers will enjoy vastly improved service.

NLP has emerged as a key trend in better engaging and satisfying customers. Quick and accurate resolution is a goal across verticals, including insurance. Introducing NLP technologies, including chatbots and virtual agents/assistants, is the next step in achieving the highest levels of customer service, engagement and retention.

Despite a conservative reputation, insurers are not shying away from NLP's potential. They're investing in AI, with chatbots and virtual agents playing a significant part in this expansion. In fact, **the insurance industry outspent 12 major global industry sectors in AI investments in 2015**. Insurers spent approximately $124 million, compared to a cross-industry average of $70 million, according to the Tata Consultancy Services study, "Getting Smarter by the Sector: How 13 Industries Use Artificial Intelligence."[9] The study surveyed 835 executives across global industry sectors and reported that they all identified AI as increasingly important to their strategic competitiveness by 2020.

Insurers worldwide are excited about AI and NLP's impact on their bottom lines. An insurer that can use technology to chat with its customers, understand what they need, process their requests and quickly resolve calls, sometimes in a matter of minutes, and even detect fraud, will gain a massive competitive advantage.

Customer service representative (CSR) NLP is already quickly gaining in popularity. The next big thing will be using NLP technology for internal processes. For instance, an underwriter could ask about risk ("How many Toyotas were stolen this year in Los Angeles?") and receive a quick answer to his voice query that was retrieved from the database).

5.1 Insurance Chatbots and Virtual Agents

Chatbots and virtual agents are the perfect vehicles for reaping the benefits described above, as they'll enable insurers to focus on constantly improving service, broadening engagement and ensuring retention, while fulfilling the demands of a new generation of customers that has grown up in the digital age.

A mere website, where a handful of insurance sales functions can be performed, isn't enough for consumers today. And they don't want to be left hanging when an online service gets confusing or questions can't be answered. Even worse is being forced to speak with a human agent, or go to the office for a dreaded face-to-face meeting.

As digital transformation become more ubiquitous, insurers are integrating chatbots and virtual agents into their overall ecosystems, leveraging their wealth of big data and finding innovative and engaging ways to efficiently handle customer queries, connect the customer with the right people in the organization and even resolve claims, while significantly increasing efficiency.

[9] "Getting Smarter by the Sector: How 13 Global Industries Use Artificial Intelligence," Tata Consultancy Services, September, 2017; **And** "TCS Global Trend Study on Artificial Intelligence Reveals Industry Wide Investment by 2020," TCS Global, September 12, 2017.

As mentioned above, Amelia can used in the insurance underwriting process. Customers can converse with Amelia via her conversational interface on any device, and she can connect to the carrier's systems and data sources to gather the customer information she needs, or the customer can upload information, such as medical and physical records, directly to Amelia.

In May, U.S.-based insurance carrier Allstate launched its chatbot, called Allstate Business Insurance Expert (ABIE), to provide real-time answers to questions about small business needs and insurance solutions.[10] And Singapore-based insurer Singapore Life launched its first self-learning chatbot, SingLife, in June. Operating via Facebook Messenger, or the company's website, SingLife uses predictive modelling and helps provide life insurance coverage in simplified steps.[11]

The peer-to-peer insurer Lemonade's claim-bot, A.I. Jim, rose to chatbot fame early last year when it reportedly broke a world record by handling and paying out a straightforward claim within three seconds, with no paperwork required. According to Lemonade, one of their policyholders submitted a theft claim for a $979 lost coat in December 2016. Within seconds, A.I. Jim reviewed the claim, cross-referenced it with the policy, ran 18 anti-fraud algorithms, approved the claim, sent wiring instructions to the bank, updated the policyholder and closed the claim.[12]

5.1.1 APIs and Policy Administration

Once a chatbot such as A.I. Jim obtains the details of a claim, it calls a set of insurance system application program interfaces (APIs) and other supporting systems to log the claim, run anti-fraud algorithms, make the decision to accept and pay, and then execute the payment.

The ability to shift simple claims to a bot that can understand the language of the claim and then automate and shorten the process from months or weeks, to minutes or even seconds, opens the door for massive effort- and cost-savings, plus a significant upgrade in customer satisfaction.

We don't want to over-simplify the issue, though. Chatbots obviously can't exist on their own. To reap the benefits, insurers require a solid policy administration core that can supply the bot with the required information, interface with it in real-time and then run the required processes. The right digital suite will also help insurers ensure that the chatbot is part of the overall effort to achieve peak digital engagement.

5.1.2 5 Key Benefits of Chatbots and Virtual Agents

As the technology becomes more sophisticated, virtual assistants and chatbots will be able to expand their reach and offer greater service to the insurance industry. Both insurers and their customers stand to benefit from the widespread use or chatbots:

1. **Simplifying complex terminology**: chatbots/virtual agents can use simple conversational terms to explain the often-confusing jargon of the insurance industry. They offer customers an easy short-cut through often overwhelming processes, such as onboarding and claims, increasing customer engagement and improving customer satisfaction.

2. **Taking on repetitive tasks**: NLP-powered interfaces are primed to take on the often tedious and inefficient work of agents who are required to answer similar questions time and time again. By programming the chatbots/virtual agents with scripts for answers to frequently asked questions, agents are freed up from more repetitive tasks to focus on more complex and valuable work.

[10] "Allstate Business Insurance Shares an Innovative Resource to Help Small Business Owners & Consumers with Top-Of-Mind Questions," PR Newswire, May 22, 2018.
[11] "Singapore Life Launches Chatbot to Simplify Insurance Needs," Asia Asset Management, June 13, 2018.
[12] "Lemonade Sets a New World Record," Lemonade Blog, Daniel Schreiber, January 1, 2017.

As the technology develops, virtual agents will be able to suggest solutions based on mining the customers for their intent. The faster the virtual agent is able to offer intelligent solutions to customer questions, the quicker the call can be resolved, increasing efficiency and improving resource allocation throughout the organization.

3. **Reducing customer service representative's time**: when a chatbot transfers a customer to a human customer service representative (CSR), after ascertaining that it isn't equipped to resolve the issue, the chatbot transfers all the information to the relevant CSR. This means the customer is not required to start from scratch and explain the issue for a second time. Rather, the CSR can simply continue the handling of the called based on the customer's previous interaction with the chatbot. This increases the CSR's efficiency and the customer's satisfaction.

4. **Streamlining processes**: chatbots can already resolve many straightforward processes, such as settling simple claims. By cutting this time down from weeks or months, to hours and even minutes, costly labor is preserved and customer satisfaction experiences a jump.

5. **Reducing mistakes**: when programmed properly and paired with the right core policy system and digital suite, chatbots act consistently, without variance (unlike human beings, who unfortunately can be prone to errors and inconsistencies between agents).

5.2 Voice Recognition

Chatbots and virtual assistants are shaking up the service sphere. By 2022, Gartner predicts that 30 percent of web browsing will occur without a screen. Google research reveals that over 55 percent of American teenagers use speech recognition on a daily basis.[13]

Our younger generation of consumers is as impatient as always and (believe it or not), pressing buttons has become seen as too much of an inconvenience. Customer satisfaction will soon rely not on placing keyboards and buttons in the way of customers looking for instant, accurate and efficient service, but on a simple chat with a device.

This is the dawn of the age of Alexa and Siri. Insurers see where we are headed and are turning to voice recognition to raise the bar on their service levels and add another layer of efficiency to their organizations.

5.2.1 Alexa for Insurers

Alexa, Amazon's virtual assistant that powers Amazon's Echo, is a tool insurance companies are using to leverage voice recognition and increase their value to their customers. Liberty Mutual offers its customers the option to use Alexa to get an auto insurance quote estimate through voice interaction with Liberty Mutual's Guestimator tool.

It also offers actionable advice on common home and auto queries. Insurance carrier Aviva uses Alexa to answer questions about insurance and regards Alexa as the future of their customer interactions. Safeco introduced an insurance advisor skill for Alexa, allowing customers to simply ask Alexa around 100 common customer questions about insurance policies. Safeco is also looking to offer customized insurance products directly via Alexa.[14]

Simple queries may be answered directly from the "client." But for more complex questions, and especially those requiring calculations (like premiums) or personal information retrieval, the machine will receive the requested information via APIs that are connected to the insurance policy

[13] "Speech Technology Increases Client Satisfaction," Keylane, Jan Lindeboom, November 15, 2017.
[14] "Amazon Alexa and Echo – Embodiment of the go to AI," The Digital Insurer, Hugh Terry, 2017.

administration system (directly or indirectly) and only afterwards will be able to answer the customer.

5.2.2 Specific Benefits of Voice Recognition Technology

The use of voice recognition technology is an effective tool for increasing customer satisfaction, while at the same time implementing efficiencies in the organization. These benefits include:

Improved customer service: voice recognition offers quicker and more automatic responses to customers calls and ensures more relevant rerouting and provisioning of information about rates, claims, statuses and other customer information, resulting in increased customer satisfaction and engagement.

Quicker workflows: the high reliability of voice recognition (Google is now able to understand human language with 95 percent accuracy, which is the same level as human comprehension accuracy)[15] is enabling insurers to speed up claim processes. This gives the agent a head-start on the claims process, saving time and resources.

Higher efficiency: the use of voice recognition enables insurers to automate calls and interactions that would normally require a human agent. Via advanced voice-recognition and call routing technologies, insurers can improve call automation rates, free up employees to handle more complex and high value tasks, and increase customer engagement and satisfaction.

Fraud detection: insurers can check a caller's voiceprint against known fraudsters and can detect and identify fraud in real time, enabling staff to act quickly to prevent fraud. This saves the organization from significant losses.

[15] "Internet Trends Report 2018," Kleiner Perkins, May 30, 2018.

6. Sapiens Can Help!

6.1 Core and Digital Suites

We offer core suites for life, pension & annuities; and property & casualty. These suites can effectively integrate the chatbot into the policy admin ecosystem.

The Sapiens DigitalSuite provides built-in integration with a set of digital, customer-engagement tools – such as **chatbots**, **virtual agents**, **personalized video**, **digital forms management** and so much more – that are embedded into the digital lifecycle of the new insurance era.

Digital engagement includes a Journey Builder and API configuration tool for insurance business journeys – insurers can quickly and easily add new journeys and configure existing customer journey paths. Sapiens also offers out-of-the-box templates and visual components for client and agent portals, as well as service providers that are well-designed for modern usage by our digital product owners and UX experts.

Insurers can utilize NLP technology and interact with customers via their preferred channels during a consistent journey, expose only the relevant data and offer new products and services that are the right fit.

6.2 Importance of APIs

Sapiens DigitalHub (API Layer and Digital Studio) facilitates an open-communication, API-based platform that enables carriers to interact with insuretech companies, ecosystem technology providers and business partners. By enabling seamless interaction with any service under any technology, Sapiens' open architecture ensures that providers will easily choose the building blocks they need. They'll be able to seamlessly integrate all elements within their insurance ecosystem, to succeed today and prepare for the future.

The API layer simplifies the complexity of the integration with different parties, including the PAS and exposes consumable APIs that can be easily used by the different channels and the carriers' partners. **Sapiens can provide the right API needed for any client interaction, including natural language (voice or text).**

6.3 Partnerships

Sapiens has partnered (via the Sapiens PartnerHub) with LogMeIn and its Bold360 solution, which is tightly integrated AI chatbot and live-agent software. It facilitates a simple customer engagement solution. Bold360 continuously captures key insights on where optimizations are needed and opportunities to improve customer outcomes – through content, or other resources.

We are also aligned with IBM Watson and its Watson Assistant, which is an offering for building conversational interfaces into any application, device or channel.

Most chatbots try to mimic human interactions, which can frustrate users when a misunderstanding arises. Watson Assistant knows when to search for an answer from a knowledge base, when to ask for clarity and when to direct you to a human.

7. Looking Ahead

Insurers have embraced NLP and are implementing it to increase automation capabilities, become more efficient and create a more sophisticated, engaging customer interface.

It's just the beginning…today's break-throughs are tomorrow's inevitability and NLP adoption is no different. Nearly all insurers will eventually be using chatbots and virtual agents, it's just a question of whether they want to be leaders or followers. Chatbots and digital agents for CSR are all the rage today, but internal processes for insurers will likely be next.

Lemonade is a good example of the pressure insurers will soon feel from competitors in their ultra-competitive industry. In addition to their A.I. Jim claims bot, which closes claims in as little as a few seconds, Lemonade's chatbot, Maya, sells inexpensive homeowners' and renters' insurance. Customers can use the Lemonade app to do everything, from buying insurance to making a claim in minutes. Customers can record a video testimonial via the company's app, instead of filling in forms.

This hands-off, high-tech approach, which relies heavily on NLP to communicate with customers without having to bring them through the door, appeals to young consumers who aren't used to the traditional process of sitting in an office and filling out paperwork. In fact, 81 percent of Lemonade's customers are between 25 and 44 years old; and 87 percent have never previously bought home insurance.[16]

There will be a fundamental change in the way insurers interact with their customers. The ability of organizations to offer efficient, automatic communications via natural language processing is fast becoming a pressing need.

To attract and retain today's consumers and maintain a competitive advantage, the adoption of NLP services throughout the insurance lifecycle, from onboarding, to claims and customer service, is no longer a nice-to-have, it's essential.

[16] "Case Study: Lemonade – A Refreshing New Approach to Insurance," Mark Prince.com.

8. About Sapiens

Sapiens International Corporation empowers insurers to succeed in an evolving industry. The company offers digital software platforms, solutions and services for the property and casualty, life, pension and annuity, reinsurance, financial and compliance, workers' compensation and financial markets. With more than 35 years of experience delivering to over 450 organizations globally, Sapiens has a proven ability to satisfy customers' core, data and digital requirements. For more information: www.sapiens.com.

9. About the Authors

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