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CHECKING IN

HOW ARTIFICIAL INTELLIGENCE WILL TRANSFORM THE TRAVEL INDUSTRY

wayblazer™

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Can a New Kind of Computing Help Customers Make Better Travel Decisions?

From the choice of destination to lodging selection and dining, the travel industry is heavily impacted by recommendations. Before the Internet, most recommendations came from close friends, or recognized travel and dining resources, such as travel writers and guidebooks. For many business and leisure travelers, travel agents served as both booking agents and as an important source of guidance in making travel decisions. Today, online booking has in many cases replaced the travel agent, while online reviewers have become a major influence in buyer decisions. This environment, in providing travelers direct access to such a wide array of information and self-service booking capabilities, can itself become a source of frustration and indecision if consumers become overwhelmed by too much data and too many choices. In addition, online travel booking as it now stands tends to drive purchasing decisions to the lowest price offered, which in turn can negatively impact travel industry profits and may ultimately lower the quality of the traveler's experience.

But what if the travel industry could influence booking decisions by helping customers make more knowledgeable choices with a higher level of confidence? To be effective such a system must be reliable, robust, and scale to meet demand. And most important, it has to be intelligent—combining recent advances in areas such as machine learning (ML) and natural language processing (NLP) to provide the most relevant travel recommendations.

This white paper explores the development of these advanced cognitive computing systems and how they differ from the structured-data systems that came before. We will look at how this new kind of computing is transforming organizations and businesses around the world. And finally, we will look at what better travel recommendations and a more personalized online experience for travelers could mean to the travel business.

Why we need a new kind of computing

Until the recent advent of what is popularly known as artificial intelligence (AI), the way computers compute hadn't changed its underlying structure for nearly 70 years. Since their introduction in the 1940s, computers had required that data conform to strict rules and formats. Likewise, the questions we asked them had to be structured to follow the same well-defined logical path.

These computer algorithms fail with today's fastest growing and most pressing information challenges. They struggle understanding big data and are unable to handle the vast amount of unstructured text and images found in newspaper and magazine articles, blogs, social media and elsewhere—unstructured data accounts for 80 percent of the information humans create and consume today according to IBM Watson.

We have arrived at a point where a new kind of computing is needed. We need computers that are able to process information similar to the human brain.

Cognitive computing understands the problem and knows how to find the answer

The thing that makes cognitive computing really different is that it isn't a pre-programmed answer machine—it's a learning machine with the ability to deduce the answer itself. In an article, "Demystifying artificial intelligence: What business leaders need to know about cognitive technologies," (Deloitte University Press, November 4, 2014), authors David Schatsky, Craig Muraskin and Ragu Gurumurthy look at the business landscape for cognitive computing. They suggest that while the hype around Artificial Intelligence makes it sound "more like science fiction than it does an IT investment," the technology is real and will be critical to business success.

“We distinguish between the field of AI [Artificial Intelligence] and the technologies that emanate from the field. The popular press portrays AI as the advent of computers as smart as—or smarter than—humans. The individual technologies, by contrast, are getting better at performing specific tasks that only humans used to be able to do. We call these cognitive technologies… and it is these that business and public sector leaders should focus their attention on.”

The most famous public demonstration of the cognitive computing capabilities of AI came in a Jeopardy match in 2011, when the game show’s all-time biggest winners—Ken Jennings (the most wins at 74) and Brad Rutter (the most prize money at $3.25 million)—lost to a new kind of computer, IBM’s Watson. Just to keep things fair, Watson wasn’t permitted to be connected to the Internet. Like the human contestants it had to rely strictly on what it had already learned. After three episodes, IBM’s cognitive computer was the champion with $77,147 in winnings, compared to Jennings at $24,000 and Rutter at $21,600.

Since that landmark demonstration, companies big and small have begun adapting AI in general and cognitive computing in particular to their business needs. Their goal is to create machines that augment human intelligence and that can interact with us in a human way. Augmenting human intelligence is at the heart of this new way of computing. Up to this point computers provided tools that let us do things better or faster—they help us with tasks we were already doing. Cognitive computing, on the other hand, can help us do things we hadn’t thought of doing before.

The ability for a computer system to understand natural language—the unstructured written information that accounts for the bulk of information produced and consumed by humans—is a significant breakthrough. For the first time, machines can comprehend and extract semantic knowledge from any unstructured data resource, including:

- Research papers
- Technical, business and news articles
- Books and essays
- Personal blog articles, reviews, tweets and social media posts
- Images and photos

To interpret information like a person, the cognitive computer breaks down each sentence into its syntactic structure. It looks at the relationships of words and phrases and their context within the whole document. It then looks for relationships with other words and phrases from other documents available to it. This ability to absorb knowledge like a human helps the computer answer human questions, posed in natural language, with truly human-sounding answers. The objective is to understand the intent of the user's question and use that understanding to develop logical responses, draw inferences, generate potential answers, and settle on the best response backed up with source information.

Learning the language unique to each industry

When someone begins working in a new industry, the first job is to learn the language specific to that industry. In specialized fields, practitioners even have to learn the thought patterns that are unique to it. In medicine, for example, there are multiple domains, each with its specialized language and knowledge base.

When IBM Watson was enlisted in the battle against cancer, it needed to learn about the many different types of cancer, their symptoms and treatments. It also had to learn to distinguish various cancers from other diseases with similar symptoms. Before suggesting a course of treatment, Watson had to be able to take into account side effects that can vary from one patient to another.

All this learning requires the guidance of human experts. They are key in developing a corpus of knowledge. Assembling the corpora starts with digesting masses of information from every available and relevant source. The real building then begins with domain experts assisting in evaluating the information and discarding any items that are out of date, irrelevant to the problems that are to be addressed, or held in poor regard by the domain's peers.

Next comes the training phase, in which the computer learns how to interpret information in a process known as machine learning. With supervised cognitive systems like Watson, experts will upload training data in the form of questions and answers. The purpose isn't for the system to memorize answers but to uncover the underlying patterns of thought that lead to answers. These patterns tend to be unique to a particular domain or industry.

The system continues to learn once it begins interacting with end users. There are regular updates of information and periodic reviews by experts. Over time, cognitive computing systems grow more capable of responding to complex situations. Users receive quick answers with an array of recommended choices backed by evidence. They even get help uncovering new insights and patterns that had been hidden in the mass of information the cognitive system has been fed.

A smoother road to customer engagement

Rob High, an IBM Fellow who is vice president and chief technology officer for IBM Watson, describes in a recent blog article how Internet searchers too often end up going down a tortuous path when trying to engage with a company. As High sees it, "the onus is on you [the customer] to discover your own answers, and that experience can be very disengaging."

It's a simple matter now for advertisers to use a browser's search process to discover specific interests and target their advertising accordingly. But the path from detecting interest to consummating the sale is littered with failures to engage. At the very point when customers want answers or need assurance from an experienced advisor, they end up lost on the company's website. Or they go wading through hundreds of reviews looking for someone whose opinion they can trust. Or worse, they get caught in 800-number purgatory, pressing phone keys in the hope of getting a real person on the line.

High sees customer engagement as one of the next big areas where AI and cognitive computing will make a difference. Whether it's financial products, insurance, telecommunications or travel, this new type of computing can help potential buyers in their quest to know more about a company's goods and services.

Cognitive conversion and engagement applied to travel

It is now possible to take what we've learned about cognitive computing to deliver fast, accurate, personal recommendations and apply it to the travel industry. With these new intelligent engagement capabilities, customers can now interact with hotel or travel company websites and apps in more meaningful ways.

Travel marketers can use this technology to help travelers fashion a more personalized travel plan and allow them to book with greater confidence. By combining NLP and ML, travelers can request specific trip characteristics and be presented with a set of results that best match. For example, showing insights and images that are relevant to families when searching for a room with 2 adults/2 children. Providing increased accuracy in the results leads to the increase in likelihood of the traveler completing that booking; improving both conversion and brand loyalty.

This personalized conversion and engagement capability can be extended through the traveler's entire journey. From pre-arrival communications to an in-destination app or kiosk, travelers can experience any destination like a local. As customers engage and use the technology, their experience and commitment to a brand grows deeper. For travel marketers, that means:

- Increases in direct bookings
- More website stickiness / engagement
- More social shares
- Greater customer trust
- Higher perceived value
- Increased brand loyalty

Gain deeper customer insight

In addition to enhancing customer interaction, companies can also capture the buyer-focused intelligence they need to make better marketing and operational decisions. By integrating cognitive computing into their CRM, marketers can reap deep insights from their customers' declared, observed, and inferred inputs.

For example, if a hotel notices an increase in "Where can I find live music?" queries, they can target those specific customers with music related marketing and messaging. Discovering these sorts of opportunities to promote targeted personalization increases the likelihood of repeat business and long-term loyalty.

More intelligent travel developments

The services being developed for AI's cognitive computing platforms are growing at an exponential rate. Following are some services currently available that can be applied to the travel industry.

Natural Language Classifier (NLC): This service applies cognitive computing techniques to predict the best matching, predefined class for any given input query. Depending on the output class, the cognitive travel platform is able to return more accurate results, or recognize if the query lacks specific relevant information. For example, if a user searches for "Where can I crash in Austin tonight," the NLC understands that the query is actually asking for suggestions on places to stay or lodging options in Austin—not a car crash—even though it wasn't explicitly specified in the question.

Relationship Extraction: To help analytics engines more easily understand the meaning of a sentence, this service first extracts all entities that were mentioned in the sentence, followed by the specific relationships between those entities. Based on a user's blogs, emails or tweets, the cognitive travel engine is able to identify all the places and events that he or she wrote about and thus provide more personalized recommendations in the future. For example, a user's blog can easily be analyzed to pull out key themes. If every time the user mentions lodging in the blog, the focus is on small boutique hotels, a travel company would know to show boutique hotels at the top of the search results for this user.

Concept Expansion: This service analyzes a body of text for words or phrases that are contextually related. For example, it knows that "The Big Apple" refers to New York City, "honeymoon" indicates a romantic type trip or that "wanting to go off the beaten path" is asking for a unique getaway travel experience.

Personality Insights: Understanding a user can be enhanced by looking at that individual's posts, tweets, or online reviews. This service uses that information to identify a user's intent and behavioral traits. These insights in turn can lead to showing the most relevant content to that specific user. Users could connect via social media and the travel company could begin to create a persona unique to each one of them. For example, for an outdoors person (visible through their hiking, biking and fishing photos and content), the travel company could suggest outdoor style accommodations or packages.

Learn more about WayBlazer's cognitive travel solutions

WayBlazer is a cognitive travel company leveraging Artificial Intelligence and IBM Watson to help every traveler find the perfect hotel. This is accomplished by analyzing cues and triggers from the traveler and personalizing the search results.

Beyond just finding the best hotels, the cognitive technology dynamically merchandises the images and reviews to present the hotel in the most relevant way for that particular traveler. The combination of the best hotels and the personalized presentation and content leads to increased traveler engagement and improved conversion rates. WayBlazer delivers this technology to travel companies already selling hotels and to travel related companies that want to add additional revenue streams from hotel bookings via API or rapidly deployable, hosted platform.

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Felix Laboy, CEO

Felix was formerly President & GM at Sabre Hospitality Solutions, CEO & Co-Founder at E-site Marketing, Executive VP at the Puerto Rico Convention Bureau, and Executive positions at Ritz-Carlton, Westin, and Four Seasons.

Felix is a Cornell University School of Hotel Administration graduate and member of the Stanford University Parent's Advisory Board. He also enjoys participating in triathlons and has traveled to all seven continents including Antarctica and a recent climb to the top of Mt. Kilimanjaro. His favorite travel destination is Madrid.

Contributing Experts:

Ricky Stillwell, Lead Engineer

At WayBlazer, Ricky focuses on the intersection of data and technology, having developed the initial graph, NLP, and backend frameworks. Most recently, he was a member on the IBM Watson core development team and helped mature Watson from a Jeopardy competitor to a doctor and research analyst. Previous to Watson, he was on IBM's emerging technology team which focused on bringing new technology to market in a fast paced development environment.

Ricky holds a B.S. in Computer Science from Texas Tech University. His professional interest lies in applying new technology to markets that have not yet been transformed. He likes to spend his free time restoring vintage computers from the 1970's.

Melanie Tosik, Research Engineer

Bringing her linguistic expertise to WayBlazer, Melanie leads a research team focused on developing complex, real-world applications of NLP and ML.

Melanie holds a B.S. in Computational Linguistics from the University of Potsdam. Her main research interest is in computational semantics — the computation and representation of meaning in natural language.

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