Our Best Friend and Worst Enemy

I remember, as a kid growing up in the city of Buenos Aires, being surprised by a particular phenomenon: Right before it started to rain, all of a sudden, street vendors selling umbrellas popped up out of nowhere. Taking into consideration aspects such as the weather, people's habits, location and price, street vendors managed to make a living by being at the right place at the right time. From our research, it seems like search engines will soon reach the same level of convenience. The following paper is mostly based on an interview that we did with Philip Rogan, Senior Design Manager at Bing, early in May 2014. According to Mr. Rogan, in the coming years we will be seeing as much innovation in the efficiency of search engines as in how the user will interact with them.

A Good Conversation

Although Search Engines have been popularized as a web application and Google has built its empire around organizing "the world's information to make it universally accessible and useful," search engines are not limited anymore to the online web realm. On the contrary, everything that is quantifiable, captured and translated into data can be used to feed their algorithms. In addition, due to the exponential growth of microprocessors' capability, transfer rate of information, and sensors and devices with increasingly more contextual applications, search engines are now being directed to a large number of objects, becoming altogether the brains behind how we interact with the world around us.

There is so much content out there that crawling the web like a ninja is not good enough. According to a rough "on the go" estimation by Mr. Rogan, on any given day more content is being generated through social media than in all the history of regular websites combined. Not to mention sensors we carry in our phone, wrist, house, car, etc., which keep track of our location, sleep patterns, heart pulse, etc., then send that information to a server that feeds search engines. How to analyze in real time and deliver to the user such content has become the real challenge. "It's all about the intent", said Mr. Rogan, "so understanding what the user is doing is critical to surfacing the right content. The user is our best friend and our worst enemy."

The latest Spike Jonze science fiction movie “Her” seems to have captured the way we will relate to the machine in the very near future, by having a casual conversation:

> “If the conversation is linked one sentence after another, you can say the word ‘orange’ in a vacuum and the intent of the word will be extracted from the previous things you’ve said; so it is not about taking a single text string converted from voice. It is about taking a series of text strings and hierarchically managing what the intent of the conversation is, so that when you the user get to the word ‘orange,’ the machine filters all the noise down to ‘juice types’.”

Not so long ago, in order to successfully search on the web, users had to be trained to speak like Tarzan. If we wanted to know what the decrease in male population was in Europe by the end of the Black Death, we would type “decrease male population Europe Black Death,” doing our best to think how the machine thinks. Now, it is the machine who is making most of the effort. Jack Menzel, Product Manager at Google Knowledge Graph, said:

> “Wouldn’t it be amazing if Google could understand that the words you use when you're doing a search, well, they aren't just words; they refer to real things in the world. That a building is a building and an animal is an animal and that they're not just random strings of characters. If we could understand that those words are talking about those real world things, then we can do a better job of getting you just the content you want off the web.”[1]

The smartphone inaugurated an era in which we can search for data outside the computer, in our pocket. The ubiquity started there. The conversational interface will become the main way to interact with the machine. As the interaction gets better, it will become less frustrating. Understanding a conversation is no longer limited to the device you have in your pocket but to the bandwidth needed to send the sound file to a device that can process it much more quickly and return the result of that information. As long as there is good bandwidth, you have a supercomputer that can process that for you. In Mr. Rogan’s words:

[1] https://www.youtube.com/watch?v=mmQl6VGvX-c#t=146

> "Our computers today are primitive compared to what quantum computers will be able to do, and these might be arriving by 2020. And at that point the computer will be with you everywhere. And the devices that are going to connect to those computers would be literally wearable, much smaller, since all the processing power would happen very far away from where you are standing. A single device to manage everything."

And mobile seems to mean that talking to the device is better than writing to it. All the fuss about Apple Siri, Google Hummingbird technologies, etc., revolves around this fact. Terms like "latent," "semantic" or "contextual" search are used most of the time in similar ways; how to understand what the user really means or wants based on all possible clues such as his past searches, or in other stores of data that the search tool has access to. Yahoo's recent acquisition of Aviet goes in this direction. Aviet organizes the apps on your phone's screen according to its best guess at what you need to see at any specific moment. Marissa Mayer, CEO of Yahoo, explains it the following way:

> "[Aviet] suggests music apps in your car and fitness apps in the gym, bringing you what you need when you need it. If you have a history of looking up stocks on your phone, you could wake up to a home-screen of stock quotes instead of having to scroll for an app."

Early last century, Spanish philosopher Ortega y Gasset stated: "I cannot be detached from my circumstance." Search engines got the lesson. But this lesson changes things quite substantially. Google is not just a messenger anymore[2]; it's saying things on its own. And the more it knows about us, the better it will speak. Knowing, for example, where we are enormously helps search engines to discard tons of information that we probably don't want. Not to mention it knows our Facebook feed, contact info, calendar, habits, and so on. It is not inconceivable to think that in the near future, search engines will know more about us than we do ourselves.

[2] As an example, a current Google search for "jazz musicians" displays the usual list of websites and also shows a list of jazz musicians (with their pictures and names); clicking on any of them reveals biographical info and a list of that artist's most famous songs and a list of his albums.

Of course, the issues mentioned above raise big concerns about privacy--concerns too numerous to address in this paper. It's not just that new aspects of our lives are being tracked and analyzed--almost every piece of information about us can be held as "intelligence." Credit card companies have always known about our purchases. Hospitals have always known about our diseases. But now, everything about us seems to get passed on to the same corporations. How valuable is the experience provided by search engines, that we would be willing to give up that kind of privacy? Can this technology achieve such power that we will all, like Picasso, find ourselves saying: "I do not search, I find?" By doing so, are we outsourcing fundamental aspects of our freedom?