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“Through the looking glass: envisioning new library technologies” three emerging technologies that will impact the future of search

Peter Fernandez

Three emerging technologies that will impact the future of search

Libraries exist to store and share information. To identify relevant information, libraries are often dependent on search technologies that index available resources and prioritize relevant sources. In recent decades, libraries have been impacted by search techniques that were first developed by Web search engines, such as Google. Web search operates at a vastly different scale than any individual library, which means that it influences patrons’ expectations of how search should look and what it should be able to do. Moreover, owing to the profitability of search advertising and to the fact that technology companies often utilize a different set of values regarding privacy, Web search providers also have access to more information about their users and to cutting-edge resources that allow them to employ those insights to meet their users’ needs.

This column summarizes three emerging trends in search technology – personalized results, voice search and image search – and explores how they may develop in the near future. These trends are poised to have an impact on all types of search, including those utilized in library databases. Even if that were not the case, information professionals frequently use Web search and guide their users in how to use it. By better understanding these technologies, they will be better able to serve their patrons.

Personalized/localized results

Having access to massive amounts of data about their users allows Web search providers to anticipate many of their needs. If most users who type the phrase “USAIN” end up engaging with sites about the sprinter Usain Bolt and not the US Agricultural Information Network, they can tweak future results. This and other algorithms, such as number of links to a site, usually lead to better overall results for the majority of users, even though some people who have specific interests inevitably get sub-optimal results. To address this, Google began tweaking its algorithms in various ways in 2004 with the aim of delivering search results that are personalized to the person conducting the search. Different patrons, though typing the same words, may get results...
that take into account their past searches, their current location or data gathered from their social media accounts, such as Google+

While the potential implications of these personalized results may be profound and even disturbing, the current reality is often less consequential. In most cases, the top results are typically the same, with custom results being kept to the bottom of the search page (Portent Team, 2014). A recent study of personalized Google results in the context of political searches found that search results were often less than 1 per cent different, although it is important to note that some users had more significant differences (Puschmann, 2017). It is unclear how this technology will evolve, particularly in light of other technologies, such as artificial intelligence, which may enable companies to more effectively harness their data to make guesses about what will be relevant to a particular user.

The area where personalized results are obviously already growing in importance is localization. In October of 2017, Google made the centrality of local results clear in a statement released after meaningful response (Merry, 2017).

Voice

In the early 2000s, Ask Jeeves (or ask.com) was one of the most popular sites on the internet (Bump, 2014). Ask Jeeves was a Web search engine that focused on answering questions posed in natural language. So instead of AOL or Yahoo (or a library database) where users were expected to utilize specific keywords and special vocabulary to get the best results, Ask Jeeves held the promise that users could simply pose a question to “Jeeves” in natural or idiomatic phrasing and get a meaningful response (Merry, 2017).

This conceit allowed Ask.com to highlight functionally what would soon be taken for granted but what still felt novel at the time. Instead of typing “number Bob Dylan songs” or “list of Bob Dylan songs released in the USA,” users were invited to simply ask “How many albums does Bob Dylan have?” Ask.com has since fallen out of popularity, but many databases have incorporated this ability to a greater or lesser extent. Making natural language search functional is harder than it seems and requires different search logic to avoid turning extra words into stopwords that can end a search (although it does – and the results are often less precise as a result). But by doing so and by clearly conveying that users can ask their questions however it feels natural to them, modern Web search (and some research databases) has dramatically lowered barriers to entry.

The most current advance in this technology is voice search, which is now on the cusp of mainstream adoption. We have seen its first iterations in the various personal assistants in phones and home speakers, such as Google’s Assistant, Apple’s Siri, Amazon’s Alexa and Microsoft’s Cortana. They work but they are still slightly cumbersome. Given the speed at which they have been improving, however, that reality is likely to change soon, and when it does, the results could be groundbreaking.

When approached analytically from the point of view of an information professional, it can be easy to underestimate how important the reduction of these barriers may be. We tend to be conversant in database use, prioritizing practices that yield the best results. Even when helping patrons, our user groups can give us a skewed understanding of the typical search activity of the general population. But when high quality, voice-powered search is available in every room and through every mobile device, it will reduce the psychological barrier of having to perform a task (i.e. organizing thoughts and typing them out) that many find onerous enough that they need a compelling reason to do it. Voice search transforms this task into an activity a larger swath of the population performs on a daily basis: speaking aloud. In fact, a person does not even have to stop making dinner to do it.

To ensure a quality user experience that is also financially viable, voice searches must be embedded into a larger ecosystem. Each company listed above has a slightly different strategy, but it is worth noting that they all do more than simply answer questions with Web search; they aim to change how people interact with their ecosystem of products, often using artificial intelligence. For example, when you ask Alexa about a song, the first place it will look by default is in your Amazon music library. If that fails, it will search the Web. There are many reasons for this, but one is that finding a satisfactory answer to any question is difficult enough to begin with. When taking into account the many diverse words and phrases that people use while speaking, the task becomes even more complex. It is easier to provide responses to the most common queries within a more controlled system. Already, however, websites are being advised to change their design and search engine optimization to account not only for changes in vocabulary but also for new
kinds of questions that will become common (Meunier, 2017).

Images

Have you ever considered how much information is embedded in an image? Most of the major technology companies have, and this fact carries significant implications for the future of search. It is part of the reason Google currently offers unlimited storage of personal photographs — so that it can use them as a testbed as it builds better artificial intelligence to scan and understand their content. Google also recently released an app called Storyboard that scans videos on phones and attempts to identify frames that would work in a storyboard format to help summarize highlights of the video (Gartenberg, 2017b). Similarly, Facebook’s photo recognition has gotten sophisticated enough that it can now frequently identify people in photos shared on the site without aid from users. When someone uploads a photo, Facebook will notify persons recognized by the system, regardless of the names included by the person who uploaded the photo (Vincent, 2017). These kinds of technologies have obvious uses on their own terms, but they also have vital nonintuitive uses. For example, Facebook is working to help fight the spread of revenge porn through identifying photos (Statt, 2017). There are ways, too, of testing technology that, when fully developed, will transform search.

The same artificial intelligence that Google is using to power Storyboard and to identify pictures of cats in photos also recently helped NASA identify a new planet in the Kepler-90 solar system. The AI was able to scan images faster and better than humans and produce new information as a result. This points toward one important area where images can be vital in making connections. As Google AI senior software engineer Christopher Shallue said, “Machine learning really shines in situations where there is so much data that humans can’t search it for themselves” (Kooser, 2017). Any given image contains vast amounts of information, and there are tremendous numbers of images out there. Yet it is tedious or impossible for humans to locate images that may be helpful to them, and even if they do, they are not always equipped to extract the information they need from the photos.

The first barrier to incorporating this kind of data into search is simple: too often it is not obvious what useful data an image contains. The same picture could answer hundreds of different questions. Take the example, already a reality, of image search in criminal investigations. Law enforcement agencies occasionally use images taken at public events (like baseball games) to verify the whereabouts of a person of interest. What makes this type of inquiry work easier is that the location and time are fixed, and if whatever agencies are looking for occurred at a popular public event, they can be assured that there are some images available to search. Yet there are publically available images that have answers to millions of other questions, and it is not obvious which photographs need to be viewed or where to start finding them. Even library databases containing historical photos frequently have this problem, leaving researchers to spend hours scouring photographs by year or region.

Further complicating matters is whether a user knows how to structure the search, first and then how to determine what it meaningful. There is quite a bit of information that humans can readily glean from an image but that current search technologies rarely take into account. Whenever I am researching to find a hotel in a new area, for example, I go to Google Maps and use its Streetview to see images of the area. This provides me with vital information I use to determine answers to a whole host of questions: is this in a safe area? Does the coffee shop I want to visit appear to truly be within walking distance or is that road a highway? Conceivably, I could search and read user reviews to discover this, but it is much easier and faster for me to simply look at it.

Information conveyed in this manner can be extremely helpful, but it is not a common technique. As explored above, even minor barriers reduce the usefulness of search for a large number of people, and minor improvements can have a dramatic impact. To be truly effective, the search engine has to make the connections easy. As companies continue to refine their ability to index and search the vast repositories of images that can be accessed on the Web, new troves of information will be released.

Conclusion: Mobile

The thread that unites all of these trends is the growth of mobile devices, although the technologies developed in its wake will impact search on a wide range of devices. Location searching is more ubiquitous, as people are able to search from a wider range of places because they carry devices that track location. Voice searching, too, is important in devices that frequently do not have large keyboards but include microphones. Finally, images have proliferated as mobile devices spread high quality cameras to new audiences.

Since 2015, the majority of searches to Google in many countries (including the USA and Japan) have been from mobile devices rather than traditional laptops or desktop computers (Dischler, 2015). As this trend has grown, it has, in turn, driven a wide array of tweaks to search results overall that may not be obvious. In 2017, Google removed its instant search feature. Instant search dynamically loaded results based on the first words that were typed into Google, a powerful tool that was rendered less meaningful by smaller screens (Whitwam, 2017). At the end of the year, Google started testing and rolling out mobile-first page indexing, meaning that rankings of pages would be determined by looking at the mobile version of sites first, as that is where most users would be going (Perez, 2017b).

These slight tweaks highlight both the importance of mobile and the ways that our search technology is frequently impacted by developments that we may not be aware of or that may not affect us directly. Looking forward, the changes created by increased personalization, better voice recognition and more robust integration of images may occur slowly or rapidly, but their cumulative effect will be dramatic. They will allow search that takes into account who is searching, enables users to pose questions in the easiest ways imaginable and in finding answers, draws on potential information sources that were previously opaque. By being aware of these changes, both in Web search and in their incorporation into other types of search, information...
professionals will be better able to perform one of their core tasks: locating relevant information for users.

REFERENCES


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