Editorial Preface

How Instant is Instant when it Comes to Crawling the Web?

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I still on occasion find myself having to educate my tech savvy eldest child about the difference between Google and the Internet. He has often confused Google with the Internet itself. I have had to explain that there are other search engines and I think he gets it a little but it will take time.

Most of us oldies understand the basic functionality of a search engine which is basically a program that will search for information in online files and return a list of the documents that contained those keywords. Typically, it works by sending out a "spider" or "web crawler" that returns all the documents it can find. Each returned document is read and indexed based on its word content by a program known as an "indexer". The indices are created using an algorithm so that in most cases only results that are relevant for the query are returned. Now here is a mighty change that has crept in silently over a number of years in Google search. More and more of the results are being served up in real-time. OK, we have had instant with regards tools such as Google news for some time. However there is a real difference now in that Google (and others) are picking out tweets and blog posts from cyberspace in real-time. This would have been a pipe dream not so long ago. Twitter of course also has a real time search feature to show the number of new results since the user started searching. Users can click on this message to display the new results. In fact, one of my favourite sites to visit from time to time is Twittervision. Here you can see tweets in real-time from around the world. It has actually got better in recent times as it now directs you to tweets in your area should you choose to enable location sharing.

Bing offers a similar service with its Bing Social mini-site. The site layout is simpler than Google Realtime. It does not offer a trends service, but the core functionality is similar, with an option to pause the stream of results if they are appearing too quickly. Currently, support for this feature is not widespread, with only some sites supporting it. In addition to Twitter, Google also offers real-time searching for MySpace, Facebook, Yahoo Answers and a number of news sites and blogs. Bing offers support for Facebook and Twitter. Twitter also offers a real-time search index to allow users

to search through tweets submitted by other users, and there are a number of third-party sites and browser extensions which provide similar functionality for Twitter, without being on the Twitter website. Twitter itself has played a large part in the emergence and growth of real-time searching. With tens of millions of status updates being posted to the site each day, information is now being dispersed at a faster rate than previously, and users are often turning to Twitter to ensure they have the first glimpse of any major stories. This is due to both the rapid updating of content and the ease with which users can search, and then re-search when new results have become available. The astronomical growth of Twitter itself has further accelerated the growth of real-time searching.

Bing's page, located at bing.com/social, provides similar functionality with regards to the actual real-time results, but does not show trends like Google does, or allow for the creation of email alerts. Aside from these two addition functions, the interface is largely the same, and the basic framework of the real-time search does not differ much from that offered by Google. Real time search works because Google and Microsoft both pay for access to Twitter's feed of tweets. The searches can be performed in real-time because each tweet received by Twitter is indexed immediately, allowing it to be compared with keywords the user has submitted to a search engine, with the results being returned within seconds of the tweet being indexed. This provides quick access to fully up-to-date search results, which can then be implemented in a search engine to update automatically, rather than when the user refreshes the page, or executes the search query again.

The scale of Twitter's role in spreading news has become more widespread in the last 12 months. In 2007, an average of 400,000 tweets was posted to Twitter per quarter. In June 2010, the site announced that it was averaging around 65 million tweets per day, and around 750 per second.

Real-time searching however has problems with spam results. This results from people using popular keywords in their posts, hoping to get them noticed by people searching for the keywords. In a regular search engine, these results can often lead to malware and virus-infected websites. While the actual real-time results themselves may not be infected, due to them being hosted on a more reputable site like Twitter, any links can be hidden behind link-shortened URLs, hiding the full details of the domain and masking the difference between a link to the BBC's website, and a virus-infected site run by a computer hacker.

Questionable and offensive content has been a problem for some time on search engines. While search engines like Google and Bing have varying levels of parental control to block out certain levels of such material, Twitter's in-built search does not. This can result in tweets containing offensive material being presented to younger users. Google and Bing have managed to avoid this by extending their parental controls to cover the real-time search algorithms. Another problem is one that continues to be prevalent in standard searching, and that is the issue of the relevance of results. For example, searching for Lewis Hamilton may also bring up a number of results about a person named Lewis who lives in Hamilton or the footballer of the same name who plays for Lewes, as well as the Formula 1 driver. In normal searches, this is less of a problem because the number of pages returned that are irrelevant will not necessarily be that high. With real-time searching, however, many billions of results may have been indexed in a short space of time. Twitter alone accounts for around 65 million tweets per day. These problems are many of the same problems that plague regular searching. However, as the problems have been gradually reduced in time, so the same is to be expected with regards to real-time searching.

So onto this particular collection of papers. Dingli, Attard, and Mamo in "Turning Homes into Low-Cost Ambient Assisted Living Environments" argue that today motion recognition has become more popular for human computer

interaction in areas, such as health care. In real-time environments, the amount of information and data required to compute the user's activity (motion) is quite substantial, while the time to collect and process this information are crucial parameters in the performance of a motion recognition system. The nature of the data (video, pictures and audio sensing) determines the design of the system. One important aspect of such a system is to reduce the delay between sensing and recognising a motion, while at the same time achieving acceptable levels of accuracy. Here, they present a solution using the Kinect to create an Ambient Assisted Living (AAL) application which monitors a person's position, labels objects around a room, take voice input and raises alerts in case of falls.

In the "The Ambient Digital Library" by O'Grady and O'Hare, the authors describe how conventional digital libraries increasingly support remote access from mobile devices. However, the archetypical mobile user differs from the conventional user in a number of aspects; of these the most important is context. Synonymous with mobile computing is the context concept, and factoring the availability of select contextual elements into the design of digital libraries offers significant opportunities for adapting and personalising services for the mobile computing community. This paper proposes the Ambient Digital Library as a construct for integrating digital content, contextual parameters and user models. In this way, a digital library may be made more accessible to a broader category of mobile user.

O'Shaughnessy and Keane in "Automating the Generation of User Activity Timelines on Microsoft Vista and Windows 7 Operating Systems" describe that for many computer forensics investigations, the discovery of the complete activity history of users is an essential part of the process, however due to the complexity and variety of current modern personal computer operating systems, the availability of useful tools is limited. This limitation is based on the tools ability to retrieve the relevant data and to present it to the investigator in a user friendly format. The current software tools that claim to extract user activity information tend to put the onus on the investigator to construct the timeline from the data which can introduce errors and is time consuming at best. This paper discusses the development, testing and evaluation of a new tool, the User Activity Tracker (UAT), which automates the visual presentation of the timeline process by retrieving and consolidating user activity data into a single source and producing as accurately as possible, the timeline of user activity on that computer.

In "An Experimental Evaluation of IEEE 802.15.4a Ultra Wide Band Technology for Precision Indoor Ranging", Ye, Walsh, Haigh, Barton, Mathewson, O'Flynn, and O'Mathuna discuss how Ultra Wide Band (UWB) wireless transmission has recently been the object of considerable attention in the field of next generation location aware wireless sensor networks (WSNs). This is due to its fine time resolution, energy efficiency and robustness to interference in harsh environments. This paper presents a thorough applied examination of prototype IEEE 802.15.4a impulse UWB transceiver technology to quantify the effect of line of sight (LOS) and non line of sight (NLOS) ranging in real indoor and outdoor environments. The results draw on an extensive array of experiments that fully characterize the 802.15.4a UWB transceiver technology, its reliability and ranging capabilities for the first time. The goal of their work is to validate the technology as a dependable wireless communication mechanism for the subset of sensor network localization applications where reliability and precision positions are key concerns.

Finally, Kort and van Hoof in "Telehomecare in The Netherlands: Barriers to Implementation" discuss a selection of 85 Dutch telehomecare projects which were examined in terms of the barriers to their implementation. Three categories of telehomecare technologies were distinguished: (i) remote telecare, (ii) activity monitoring, and (iii) a category comprising telemedicine and e-health solutions and services. There are numerous barriers to the implementation of telehomecare technologies and in the majority of the Dutch telehomecare

projects, the needs of both care recipients and family carers are addressed. The integration of needs derived from one's health condition and the requirements set to technology are not always a match. Some projects give consideration to how to get commitment of the care professionals and their managers. Only a few projects consider economic aspects, for instance by the development of a social business case. They conclude that in order to lift the barriers to the implementation of telehomecare, a better exchange of knowledge and experiences related to functionalities and user needs, the use of home modifications and assistive technologies, as well as the available care support should be considered.

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