

ICEIRD2010: Discovering Business Opportunities via Search Trends

Abdul Wahid¹, Asma Rafiq², Farooq Ahmad³, Petko Ruskov⁴

¹Department of Software Engineering, Sofia University, Sofia, Bulgaria, awahid@gmail.com

²Department of Software Engineering, Sofia University, Sofia, Bulgaria, asma.rfq@gmail.com

³Department of Software Engineering, Sofia University, Sofia, Bulgaria, farooq363@gmail.com

⁴Department of Software Engineering, Sofia University, Sofia, Bulgaria, petkor@fmi.uni-sofia.bg

Entrepreneurship is gaining a vital role in the current era of crumbling economy to innovate, disrupt and discover new paradigms of business. People from business and government sector, academics and communities are keen to see the positive outcomes of this increasingly favourite topic. In this regard, web search engines and social media networks are serving as a tool to analyze the market and boost the entrepreneurial process. But the dilemma is that all currently available web search engines and social media websites stick to their specific web traffic trends and do not provide the generic overview of the whole web. There is no single platform which provides the facility to combine the queries from all over the web. In this disintegrated environment, we propose a possible solution, namely, 'ST Tool'. This tool shall collect the most popular queries and information from major search engines and social media websites to represent the results at a single platform. It can facilitate the process of idea generation through assisting the entrepreneurs in the visualization/analysis of the market and gap/opportunity identification. Most commonly posed queries can reveal the customer interests. The goal of the paper is to critically review the currently available tools and their inefficiencies in presenting the overview of the whole web and describe the new proposed solution effectiveness in resolving the problems identified in previously available tools for search trends.

Keywords

Entrepreneurship, opportunity recognition, search trends and tools

1. Introduction

In the digital era everything is moving towards commercialization and everyone want fast access to the desired information. The technology-oriented culture of today has opened doors to the entrepreneurs to identify business opportunities. Searching over the internet is growing exponentially with the passage of time. There are many search engines [21] and over these search engines billions of search queries are run each day. The use of web search engines is the most popular tool used these days to locate the required product and services by a large number of people all over the globe; therefore, making it an essential place for the entrepreneurs to locate customers and their demands to explore new opportunities or disruption possibilities. The search engine market share of the web search engines according to the year 2009 statistics is shown in figure 1:

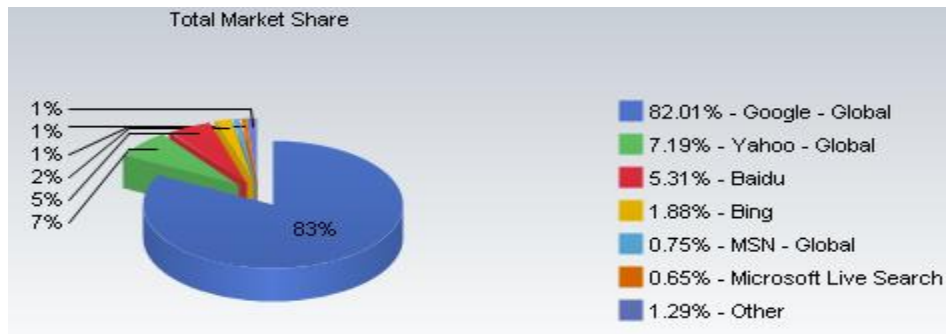


Figure 1 Total market share of search engines in year 2009 [12]

Entrepreneurial opportunity recognition has been viewed in different aspects from more than a decade [4]. The use of cognitive frameworks, to discover the capabilities of the entrepreneurs to identify the hidden opportunity, has revealed that among other factors - the prior knowledge of customer needs plays vital role in the entrepreneurial opportunity recognition process [5, 6]. With widespread focus on user-centric approaches [8], it is extremely important to see the demands of the target customers in order to succeed in the new venture creation.

The web today is a major source of information for most people but the interesting thing is that how the web can be used as a useful tool for economics [1]. Web search trends are also changing, now there is more search for travel, health, shopping as opposed previously which was more toward entertainment and fun. The internet is also being widely used to connect people socially through many social media website for example; Facebook, LinkedIn, Twitter, etc. Consumers today are exposed to a wide range of influences that include word-of-mouth communications and social networks. The major social websites data can also help in predicting what people need. The popularity of these social media websites can be envisaged by a simple example, Facebook alone has more than 400 million active visitors [11]. The lack of single platform to give the whole picture of all the queries and discussion topics of people from around the globe is the major obstacle in giving entrepreneurs the whole picture of the global market. Therefore, it is the need of the time to combine queries from all over the web and target the discussion topics in the social media websites that could reveal customer interests.

It is inconvenient for an entrepreneur to invoke multiple search queries on several engines and identify business opportunities from the search. A meta-search engine solution is vital in this regard [2]. This paper compare, analyze and discuss the existing search engines along with social media sites and proposes tool to help entrepreneurs to see the trends and business opportunities for new venture.

2. Related Work

Many researchers are working towards extracting the trends in various search engines and social media websites to facilitate the people with search trends. Mika Kaki and Anne Aula discussed their experiences related to complexity in search engines [23]. Yair Shimshoni, Erin Efron and Yossi Matias introduced many interesting tools which explore what users are searching for; for example, Google Trends and Google Insight [9]. Ioannis Anagnostopoulos proved that when users search behaviour is examined along with the ability of the Internet search services. It results in an effective meta-search [22]. It is observed that the social

connections and mechanisms are the motives behind entrepreneurial activities [10]. A travel related searches study reveals that the social media appear in search engine results [24].

From development point of view, the search engines such as Google (www.Google.com), Yahoo (www.yahoo.com) and AOL (www.AOL.com), have commercialize many specific search trends tools; for example Google Trends, Google Insight and Yahoo Trending. These tools are providing users with information about particular market, region, product and services. Also, Yahoo provides its users with the "Trending Now"- displaying the top 10 topics in the search trends. Social media websites like Twitter (<http://www.twitscoop.com/>), delicious (www.delicious.com), Blogpulse (<http://www.blogpulse.com>) and others also provide the popular keywords of the users. The existing research work on the search trends of search engines and social media website are indicative of the need of an integrated search trends (ST) tool.

3. Research Work

3.1 Review

We continue to study major search engines like Google and Yahoo along with major social networking sites like Facebook and Twitter. After a deep analysis of these search engines and social networking sites we reach on a consensus that each one has different interpretation and visualization of search trends. In order to have a common platform we need to understand how these search engines work and generate the search trends.

3.2 How different search engines query searches

Search engines process millions of queries in seconds. Different search engine have different mechanism for processing user queries and displaying records. Google uses the pagerank algorithm to order pages after each user query. Yahoo, AOL, Ask and other on the other hand use different techniques.

In another research by [12] about Alta Vista search engine which states that Alta vista keeps a query log about queries which is consists of a timestamp, cookie, query term, submission information and the submitter information. So we see that both Google and Alta Vista use different mechanisms for querying searches.

There is another type of queries that can be referred as crawling technique and it is used to pull pages from millions of web servers [3]

3.3 Comparison of search trends

We use SWOT analysis techniques to compare search engine and social network search trends. SWOT analysis is the study of strengths, weaknesses, opportunities and threats about a product or tool.

Comparison of search engine trends

Based upon SWOT analysis of Google [17] and Yahoo [18] SWOT analysis of Google insight and trends was constructed in table 1 and SWOT analysis of yahoo trending was constructed in table 2.

Table 1 Google Insight and Trend SWOT Analysis

Strengths	Weaknesses
Reliable and fast More word of mouth publicity Qualified staff Simple interface Localized/categorized search	Link based ranking did not employ actual traffic analysis. Less known Google localized search sometimes gives errors Contextual search algorithms are not 100% perfect and many a times make mistakes Limited to Google search engine
Opportunities	Threats
Google can start giving fully fledged services on hand held mobile devices to capture market beyond conventional internet State-of-the-art technology	Google partially depends upon some portals like AOL. Getting those contracts terminated, Google would lose considerable share of its revenue Google's confusing Cost Per Click ranking and charging policy could disappoint its advertisers and company would start losing many of them.

Table 2 Yahoo Trending SWOT Analysis

Strengths	Weaknesses
Yahoo! has over 350 million users of its services and solutions. A very powerful marketing company, with a very well known brand.	Differentiation is difficult for Yahoo Almost all of its packaged services are available from other sources like email, NEWS, Search No visualization tool provided for search trends
Opportunities	Threats
The international market is a huge opportunity for Yahoo especially china The Development of the Yahoo! Directory has potential for new business and income streams. Two thirds of organizations in Ohmae's Triad (Europe, Japan and the USA) are Small Medium Enterprises (SME'). SME's are potential directory advertisers Mobile technologies offer another opportunity for Yahoo	The biggest threat for all web-based organization is competition. Huge profits attract investors, innovators and entrepreneurs. Dotcom fever has not gone away; it is now more focused on profit delivery. All of Yahoo's key services have competitors such as AOL, Google and many others. International, culture specific competitors could affect Yahoo in the future, unless strategic alliances are forged. China and India have developed their own search engines.

Comparison of search trends in social media

SWOT analysis Facebook[19] and Twitter [19] are shown in tables 3 and 4 respectively. The top trends of Facebook of 2009 [14] and the top trends of Twitter [20] are healthcare, family, economics, celebrities, fun and sports.

Table 3 Facebook SWOT analysis

Strengths	Weaknesses
400 million active visitors Fan based Photos Videos Wall posts Discussion topics Profile information	Infrequent Updates on Fan Pages Every user is not visible in Facebook Search Results Privacy settings make it hard to extract data
Opportunities	Threats
Expose Blogs and Campaigns to Community Users Engage with Facebook Group Users Work with Others to Build Applications	Privacy concerns Exposure to abusive material

Table 4 Twitter SWOT Analysis

Strengths	Weaknesses
Frequently Updated Tweets Show Link Attachments	Generic (Skin) Reply to Others' Tweets
Opportunities	Threats
Increase "Twitter Ratio" of Followers to Following Allow Tweets to be "Crawled by Spiders"	

3.4 No existing tool

There is no such tool available today which provide search trends in a disciplined and organized way. So this new search trends (ST) tool will help Entrepreneurs and advertisers to look at new opportunities for creating new ventures and new businesses in the digital era.

4. ST Tool Design

We are going to provide a common platform for web search trends in the form of a meta-search engine. The main purpose of our product is to combine the search trends of available major search engines like Google, Yahoo, MSN and some major social networking sites like Facebook, Twitter, and MySpace. These combined search trends will have a good value for bloggers, business personal, and marketers [9] and also for government organizations for collecting statistics about some area of interest. Through this search engine marketers will be able to see specific search trends for a particular product in a particular area and make recommendations to their company about those particular attributes of the product. It will also provide researchers the facility to use the statistics of this search engine for his research.

Our product focus will be to get web trends from other search engines according to emerging needs of the society. We provide common platform to user where they can analyze the search trends from all over the web. Currently the search trends are from major search engines which are Google, yahoo, AOL and Ask.com. Apart from search engine we also include trends of social networks like Facebook and twitter. We have adapted the simple and flexible design which is capable to add more search engine or social media sites.

4.1 ST Tool Architecture

The system is composed of User Interface, ST Agent, Social Media Parser, Search Engine Parser and the data sources from which we will gather the search trends of the people.

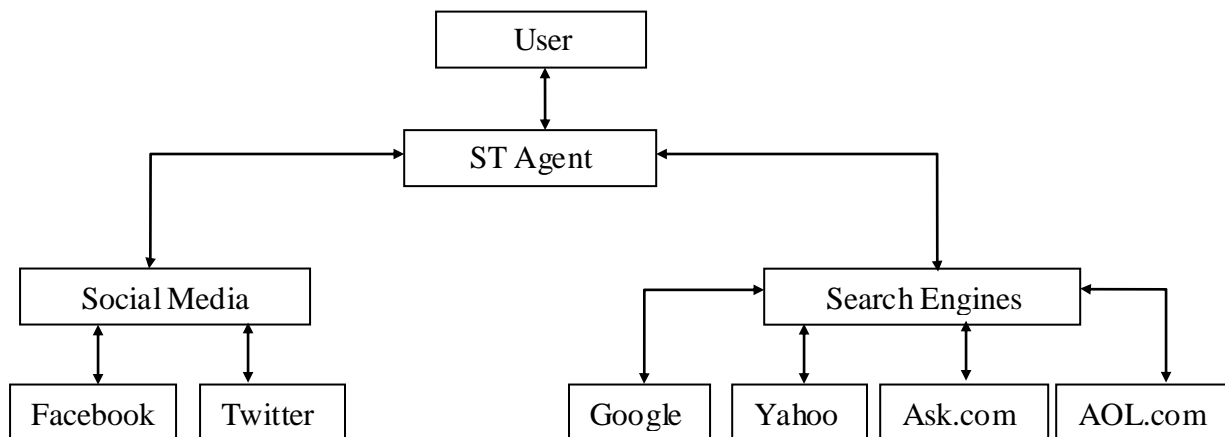


Figure 2 ST Tool Architecture

Figure 2 shows the component of the system. UI facilitates the user to interact with the system, send queries and see the overall search trends of the web. User can also search for specific product or keyword and can see the trends of that particular keyword. Comparative trend analysis is also supported which means user can provide two or more keywords and see the comparative trends. This feature can help entrepreneurs to compare the trends of their competitor's product with their own product.

ST agent is the heart of the system. It handles the requests from the user, generates the queries for different sources, combines the results and sends it to UI. UI is then presents the result to the user.

The search engine parser and social media parser parse the data from various sources into a XML format so that ST agent can combine and process the data easily. Any web source which provides their search trends in xml format can be easily merged to the system, otherwise we would need a parser for them.

New opportunities can be found by looking at the trends from different angles. The regional statistics of trends can help in exploiting regional markets. Relevant keywords and their trends would suggest some new opportunities. Trends would be filtered feature wise which can be helpful to identify customer interest in product features. Also analyzing two or more products trends at same time, would definitely provide the competitive edge.

4.2 Features of ST Tool

- *Displaying Search trends from various sources which include social media and search trends.*

The results are displayed in the form of charts and graphics. It would give a better understanding and visualization of the trend. The search trends provided by Google, yahoo or any other search engines are limited because they do not include the trends from other sources. That's why the complete picture of search trends can't be seen properly. This feature would use the data from major search engines and the results would be covering all the search trends of the web.

- *Comparative search trends by providing the two or more keywords.*

The purpose of this feature is to facilitate users to compare and see the trends of two or more keywords. The entrepreneurs can use it to compare the trends of their product with their competitors. This will help them in understanding where they stand now.

- *Future trends and prediction*

The more data you have the more accurate your prediction can be. Google forecasting is based on searches in Google only [9]. We would take the predicted data from Google and by examining the data from other sources we can refine the prediction.

- *Relevant keyword suggestion and trends*

It provides the list of relevant searches and their trend. I can be helpful to understand if the people are searching for some specific feature of the product.

- *Advance search options which include filtering on the basis of time, region, product, features etc*

The advance search option facilitates user to see the trends from various perspective. It helps in understanding and analyzing the trend from various dimensions. User can see the trends of specified time spans. Search trends are shown according to regions in form of charts and graphics to have a better understanding of the data. By knowing the regional trends entrepreneurs can discover new opportunities. The better you know about customer behavior the more chances you have to discover new opportunities

- *Business Specific trends*

This feature includes the trends in various business example search trends of IT, furniture, telecom, construction, real-estate etc.

4.3 Sample views of ST tool

Sample of how ST tool will represent the laptop trends are shown in figure 3,4,5 and 6. The figure 3 shows simple trend of laptop from 2004 to 2010. This shows the how many searches have been done for the keyword “laptop” in a given time frame. The figure 4 shows the laptop trends according to various regions. The dark region means that the number of user at that region searched more as compared to lighter region. The detail textual information can also be seen for the detail analysis of regional market. Figure 5 is the representation of the search prediction which means the expected searches of the users. Figure 6 shows the comparison chart of hp laptop and dell laptop. We can see that people were searching more about dell laptops in past few years but now hp laptops are becoming more popular in people. There was a time between 2006 and 2007 when people searches about the dell laptop was on the peak. New features in the product or market campaign can increase the interest level of the customers in a product.

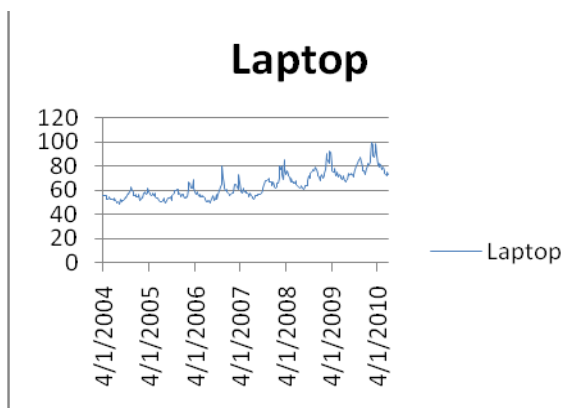


Figure 3 Overall trend of laptop



Figure 4 Graphical representation of the trend of

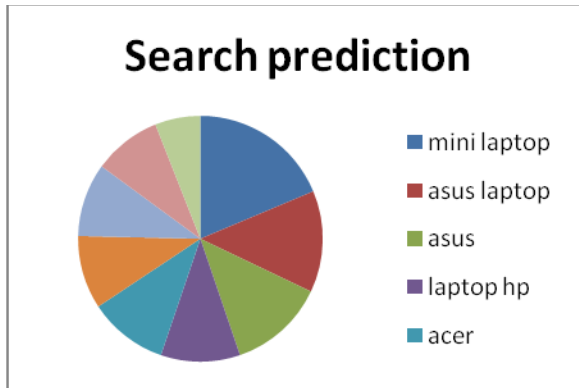


Figure 5 Prediction about what people will be searching in future.

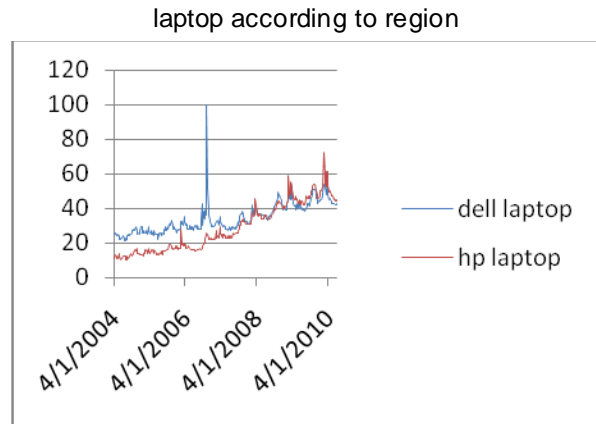


Figure 6 Comparison between hp and dell laptops search trends

5. Future work

We intend to create a new venture with ST tool as our product. The ST tool is considered as an entrepreneurial idea for which we intend to formalize a business plan in order to attract customers, investors and human capital. There are still some open issues in front of us for the proposed tool, which are, as follows:

- Semantic aspect of the search trends need to be addressed in near future in order to help entrepreneurs analyzing the opportunities in a more meaningful manner.
- Normalization and Scaling of data from different sources
- Visualization of the results improvements for better presentation of the data.
- Decision support system to discover search trends patterns.
- Value co-creation facilities can be added.

6. Conclusions

The role of search engines and social media is becoming vital in knowing the needs and demand of the customers. Opportunity recognition is recognized as an integral part of the entrepreneurial process. The widely spread queries by users on several search engines, discussions on public forums and social media websites can facilitate the entrepreneurs to identify the hidden opportunities or disruption possibilities that lie in the search trends.

The existing tools for the web search trends are mainly based on the particular search engine or social media website. They mainly provide search trend information pertaining to their own queries or discussions specific to their own platform. There is no existing tool that combines data from several search engines and social websites and present it on a single platform. Therefore, our proposed ST tool shall facilitate the entrepreneurial activity of opportunity recognition through combination of web search trends from major social media websites and search engines. ST tool is provided to the entrepreneurs for identification of business opportunities and disruption possibilities.

There are several advantages of ST tool as an integrated and independent platform. It shall provide the entrepreneurs with a broader spectrum of information over the web. The visualization of web search trends can also facilitate in better decision making. As the architecture of the tool is flexible, we can add more search engines and social media search

trends according to their popularity and need. ST tool can be improved by introducing semantics, decision support system and better visualization techniques.

References

1. Jansen, B. J. and Spink, A. How are we searching the World Wide Web? A comparison of nine search engine transaction logs. *Information Processing & Management*. 42, 1, 248-263, 2005.
2. W. Meng, C. Yu, K.-L. Liu. Building efficient and effective metasearch engines. *ACM Computing Surveys*, 34(1):48–89, 2002.
3. Sergey Brin, Lawrence. The Anatomy of a Large-Scale Hypertextual Web Search Engine. Page Computer Science Department, Stanford University, Stanford, CA 94305, USA
4. Robert Paul Singh. Entrepreneurial opportunity recognition through social networks [Ph.D. dissertation]. United States -- Illinois: University of Illinois at Chicago; In: Dissertations & Theses: A&I [database on the Internet] [cited 2010 Apr 10]. Publication Number: AAT 9915009. Pg.18. 1998. Available from: <http://www.proquest.com/>
5. Robert A Baron. Opportunity Recognition as Pattern Recognition: How Entrepreneurs “Connect the Dots” to Identify New Business Opportunities. Available from: <http://pcbfaculty.ou.edu/>
6. Scott A. Shane. Prior knowledge and the discovery of entrepreneurial opportunities, *Organization Science*, 2000: Vol. 11 Issue 4. Pp. 448–469.
7. Scott A. Shane, Jonathan T. Eckardt. Entrepreneurship and Opportunity, *Journal of Management* June 2003, Vol. 29, Issue 3, Pp 340-349.
8. Hsing Kenneth Cheng, Kutsal Dogan. Customer-centric marketing with Internet coupons, *Decision Support Systems* 2008 Vol.44. Pp. 606–620
9. Yair Shimshni, Erin Efron, Yossi Matias. On the Predictability of Search Trends, August 2009. Available at: <http://static.Googleusercontent.com/> [Cited 2010 Apr 7]
10. J.P. Olhui. The social dimensions of entrepreneurship. *Journal of Technovation*, 2005 Vol. 25. Pp. 939–946
11. Erin Joyce. 6 Career-Killing Facebook Mistakes, 7 April 2010. Available at: <http://finance.yahoo.com/> [Cited 2010 Apr 7]
12. Net Market Share SM, Available at: <http://marketshare.hitslink.com/>
13. Craig Silverstein. Analysis of a very large web search engine query log. Google Inc, 2400 Bayshore, Mountain View, CA 94043
14. Facebook Top trends of 2009, Available at: <http://www.briansolis.com/2009/12/Facebook-top-trends-of-2009/>
15. Search engine usage statistics, Available at: http://seo.zunch.com/search_engine_usage_statistics.htm [Cited 2010 Apr 6]
16. Search Enigne Rankings, Available at: http://www.comscore.com/Press_Events/Press_Releases/2010/2/comScore_Releases_January_2010_U.S._Search_Engine_Rankings [Cited 2010 Apr 6]
17. Google SWOT analysis, Available at: <http://www.soopertutorials.com/business/strategic-management/1369-Google-swot-analysis.html> [Cited 2010 Apr 6]
18. Yahoo SWOT analysis, Available at: http://marketingteacher.com/SWOT/yahoo_swot.htm [Cited 2010 Apr 7]
19. Vishal Jhaveri. Social Media Marketing Strategy, Available at: http://youthnoise.com/karoline/YNstrategy_SAMPLE.pdf [Cited 2010 Apr 6]
20. Abdur. Twitter 2009 trends available at: <http://blog.twitter.com/2009/12/top-twitter-trends-of-2009.html> [Cited 2010 Apr 11]
21. Steve Lawrence, C. Lee Giles. Searching the World Wide Web Computer Science, NEC Research Institute, 4 Independence Way, Princeton, NJ 08540, USA.
22. Ioannis Anagnostopoulos, A capture–recapture sampling standardization for improving Internet meta-search Computer Standards & Interfaces 32 (2010) 61–70
23. Mika Kaki, Anne Aula, Controlling the complexity in comparing search user interfaces via user studies, *Information Processing and Management* 44 (2008) 82–91.
24. Zheng Xiang, Ulrike Gretzel, Role of social media in online travel information search, *Tourism Management* 31 (2010) 179–188