Digital Assurance Trends - Search Relevance Testing

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Abstract — There is no doubt that the amount of information on the Internet has increased. Many people have tried to utilize this enormous information either to enhance their knowledge or searching for information which will suffice their needs. But results which are mostly irrelevant are being displayed, especially in the area of Information retrieval. So verification of the Information or search results which are displayed as per the keyword is very important. This paper brings in some of the key business drivers for search relevance, key dimensions of search, verification aspects for search relevance testing, classification of search results, evaluation of search results, tools and best practices.

Keywords — Search Relevance Testing, Relevancy Testing, Search Testing, Search Relevance, Best Practices

I. INTRODUCTION

As per the recent statistics there are 2,749 millions of users worldwide accessing internet [1]. There is lot of usage and lot of information available over internet and getting the relevant information is very essential. According to a recent report published by IDATE titled *"World Internet Usages & Markets",* globally the number of mobile internet users has reached 2.1 billion in 2013 overtaking the number of users of fixed Internet (1.9 billion) [2].Due to the phenomenal growth of web content, there is a pressing need to provide the users with an efficient way of navigating and finding relevant information quickly and easily. As there is rise in new technologies, majority of the users prefer their mobiles in search for information. As per the study by the analytics firm; BIA/Kelsey has predicted that mobile search queries will overtake desktop queries by 2015 and another report from *Global Smartphone User Survey Data* [3] says that mobile search usage has nearly 100 percent penetration among smartphone users. Figure 1 provides the usage of search engines in smartphones across different countries
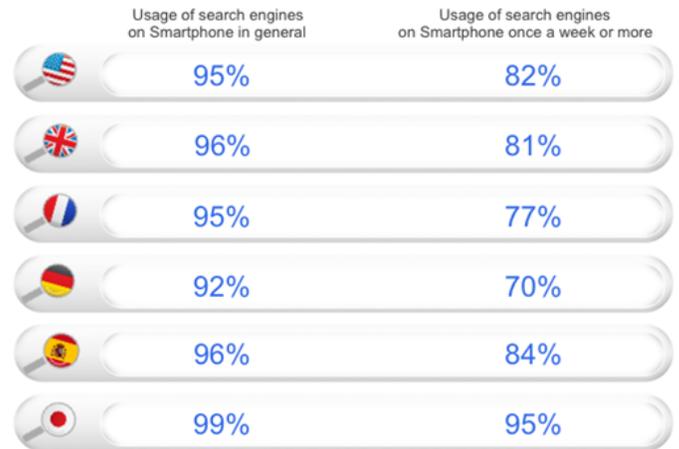

Figure 1: Usage of Search on Smartphone

II. KEY BUSINESS DRIVERS

A. E-Commerce Trends

Good amount of revenue is being generated through Search engine based referrals in the e-Commerce world. As per the statistics, people have spent 1 trillion dollars on online shopping last year [4]

How e-Commerce is related to search??

Before the purchasing of any product online, people are searching for the information on the product. Ex: People search for reviews, ratings, price comparisons etc. So good amount of traffic to e-Commerce sites is coming through search

B. Digital AD-Spending

Enterprises are putting lot of money on Search Advertising. Search Advertising is a method of placing online advertisements on Web pages that show results from search engine queries. As per the statistics - Digital search ad spending will be more than $25 billion in the US by 2017[5]

C. Latest Search Engine Advancements

Usage of voice enabled predictive search engines like Siri, S-Voice, Google Voice etc which help the users by providing the relevant results based on voice commands

III. KEY SEARCH DIMENSIONS

Here are the key search dimensions which will help the user in finding the closely matched results and which are useful. The search results needs to be in line with the user intent, interpretation w.r.t the thinking of the search query by majority of the users, preferred user language and location [6] Figure 2 provides the overview of the search dimensions
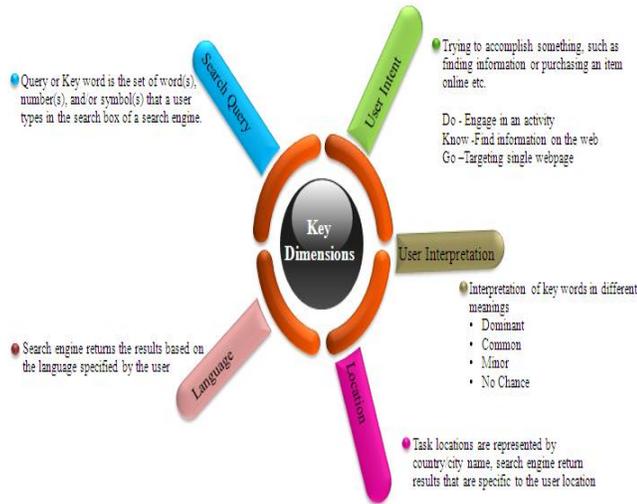

Figure 2: Key Search Dimensions

A. User Intent

Understanding of the user intent is very essential in evaluating the web pages. What was the user trying to accomplish when the query is entered?

Classification of the user intent is divided into 3 categories [6]

Table 1.1-1.3 gives the overview of 1. Action Query (Do)

2. Information Query (Know) 3. Navigation Query (Go)

o *Action Query (Do):* User tries to engage in an activity

Ex: Downloading a software, playing online games, viewing pictures etc

Table 1.1
Classification of User Intent - Do

Search Query	User Intent	Description
[Download iTunes], English (US)	Download software	Official free download page on the Apple website
[online personality test], English (US)	Take an online personality test	Page with a working online personality test.
[cute kitten pics], English US)	View photos of cute kittens	Page of cute kitten photos to look at.

o *Information Query (Know):* User wants to find information on the web

Table 1.2
Classification of User Intent - Know

Search Query	User Intent	Description
[India],English (US)	Find travel and tourism information for planning a vacation or holiday	Page about India on a well-known travel guide.
[Nikon digital cameras],English (US)	Find the latest cameras and there features	Researching the cameras from Nikon brand
[cryptology use in WWII],English (US)	Find information about how cryptology was used in World War II	United States Air Force Museum article about cryptology use during WWII

o *Navigation Query (Go):* Users have a single webpage or website in mind and want to go to the target webpage

Table 1.3
Classification of User Intent - Go

Search Query	User Intent	Description
[Youtube], English (US)	Go to the YouTube homepage.	Official homepage of YouTube. http://www.youtube.com/
[ebay], Italian (IT)	Go to the Italian eBay homepage.	Official homepage of eBay Italy. http://www.ebay.it/
[facebook login], English (US)	Go to the login page on the Facebook website	Login page on the official Facebook website http://www.facebook.com/login.php

B. User Interpretation

Many queries have more than one meaning, for example the query [apple] might refer to the computer brand or the fruit, we call these possible meanings as Query Interpretations. Verification of the search results can be based on these interpretations as well.

Interpretations are divided into 4 categories [6]
1. Dominant 2. Common 3. Minor 4. No Chance as mentioned in Table 2

Table 2
Examples of User Interpretations

User Interpretation	Example	Description
Dominant	[windows]	Majority of the users think of MS Operating System
Common	[Mercury]	Some users want results on Planet or the Chemical Element
Minor	[Ada]	Very few users want information about Atlanta Development Authority
No Chance	[Benihana]	Extremely unlikely the users can interpret the results of a restaurant in US

IV. ADDITIONAL VERIFICATION ASPECTS

Apart from the key dimensions which were discussed earlier, there are few more additional verification aspects which are important for the verification of search relevance [6, 7]

Figure 3 gives the overview of additional search verifications.

Figure 3: Additional Verification Aspects

Table 3 provides the detail description of each verification aspect with examples

Table 3
Details of Key verification Aspects

Key Verification Aspect	Description
Search Analytics	This includes the searching habits of the user and capturing them for future analysis. The search habit comprise of the following items • Frequency of Search Term: It accounts for the number of times a particular search term searched on the web • Time Spent on Pages: It identifies the time a user spent on a particular page
Phishing Websites	Evaluating the website which asks for the sensitive information from the internet users **Ex** : Users Banking Account Number, Passwords and Pin numbers etc
Rich Content	It's not only the URL for search results that we need to verify, we should also verify the rich content like snippet information, video file, images, news items, relevant Ads etc

Copied Content	Verifying whether the information available over the website is copied from some other sources like Wikipedia, Open directories etc
Time Based Trends	Verification of search results based on time of day/year **Ex 1**: Search performed against restaurants during afternoon hours bring back different results as compared to same query during evening hours **Ex 2**: Search performed on the shopping deals displayed during the normal season is different when compared to the holiday season like Christmas, Thanks Giving etc
Personalized Search	Verification of the search results based on the users privacy settings. Many websites are aware of the settings selected by the user and the search results are displayed according to the user settings, past purchase history or browsing behavior of the user etc
Social Signals	Verification of search results based on the users interactions with the social networking platforms like facebook, twitter etc **Ex** : When a user searching for a particular restaurant the results are displayed based on the posts, opinions, ratings etc which are provided by the user's friends in the social networking sites. Microsoft Bing takes into consideration a user's Facebook activity to present the most relevant results

V. SEARCH RELEVANCE EVALUATION

Right Information means more business and better return on investment, in other words relevancy can be defined as simplicity and usefulness. So in order to provide a good user experience, evaluating the search results is essential. Here we discuss on the two major evaluation criteria's for the search results i.e. Rating Considerations and Assigning flags [6]

A. Rating Considerations

Once the search results are displayed, evaluation of the results can be done according to the rating. The rating scale offers five rating options that are based on user intent and the utility of the landing page

Figure 4 provides few key rating considerations and details of each rating is shown in Table 4

Figure 4: Key Rating Considerations

Table 4
Details of Key Rating Considerations

Key Rating Considerations	Description
Vital	• We rate the page as vital which has an Official website • Page has a dominant interpretation like Majority of the users have it in mind
Useful	• Web pages with high quality • Well Organized • Reliable
Relevant	• Relevant is assigned to pages that are helpful for many or some users • Covers only one important aspect of the query • Pages which are not in low quality
Slightly Relevant	• Contains less information • Boring Content • Low quality
Useless or Unratable	• Page with loading error • No actual content • Display of Ads and links

B. Assigning Flags

While designing the web page, webmaster would have used the deceptive web design techniques (Having hidden text, misleading content etc). So as the process of verification, web pages need to be evaluated by assigning flags.

There are 4 different flags [6]

1. Spam 2. Not Spam 3. May Be Spam 4. Malicious

Table 5
Assigning Flags

Flags	Description
Spam	Page has been designed using deceptive web design techniques; assign the page as Spam flag
Not Spam	Page has not been designed using deceptive web design techniques; assign the page as Not Spam flag
Maybe Spam	Not sure whether the page is designed using deceptive web design technique; assign the page as Maybe Spam flag
Malicious	User encounters a page with a warning message, such as • Warning-visiting this web site may harm your computer • Warning from the Antivirus Software

When evaluating a page for spam, we need to check for "technical signals like Hidden Text, Keyword Stuffing, Sneaky Redirect and Cloaking [6]. Table 6 gives the insight of different technical signals and how to find those while testing the web pages

Table 6
Technical Signals

Flags	Description	How to Reveal Technical Signals
Hidden Text and Links	• Completely invisible to human eye • Same color as the background color on the page • Text with very small font size (e.g. 1-point) • Text placed outside the normal viewing area	• Applying Ctrl-A • Disabling CSS. • Disabling JavaScript.
Keyword Stuffing	• Repetition of keywords • Repetition of words that are related to keywords • Multiple misspellings of keywords	• Viewing the source code. • Looking outside the normal viewing area.
Sneaky Redirect	• Redirection of page to different URL • Taking user to several rotating domains • Redirecting the user to the merchant websites (e.g. Amazon, eBay etc)	• Compare the two URLS • Look at the domain registrants
Cloaking	• Showing different web page to the search engine and the user • Dividing the page into frames • Showing only one frame as 100%	• Get a Web Host that Supports Domain Name Hosting • Enable Path Forwarding

VI. SEARCH RELEVANCE TOOLS

Here are the tools and their benefits, which are commonly used for search relevance [8][9][10]
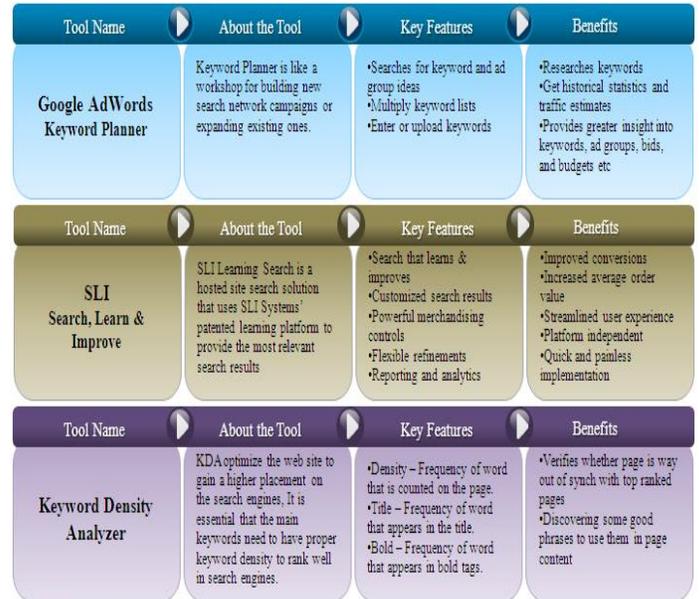

Figure 5: Search Relevance Tools

VII. BEST PRACTICES

S.No	Best Practices
1	Use keywords that are relevant to the items in the site and avoid using stop words like "the", "an" and "a" etc as keywords
2	Well-constructed, unique and fresh content is vital for providing good search relevance rating
3	Key words in the title should be bolded for easy recognition of search relevance
4	Snippet with better description will help in identifying the relevant page
5	Write text which is easy-to-read and easy-to-follow for identifying the relevant content
6	Avoiding misspelled or mistyped queries
7	Create unique title tags for each page Ex: Finance, Travel etc
8	Avoid accessing the sites with popup warning messages Ex: "Warning-visiting this web site may harm your computer"
9	Always visit the landing or home page to verify the correct search relevance
10	Landing pages with vital content but created using deceptive technique should be rated with Spam flag

VIII. CONCLUSION

Search relevance is key feature, which is often ignored resulting in loss of time, money and effort. In this paper we have presented different few key verification aspects, rating considerations, tools and best practices for search relevance testing. The central idea behind this is to have quality search results which should have enough information provided to the user which will intern saves time, the user can check for first two or three results instead of searching the whole results pages for finding the relevant information.

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