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FLUCTUATION IN SELECT SEARCH ENGINE RESULTS: A FORECAST ANALYSIS

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ABSTRACT

This paper describes a study on select search engines to generate projected data on collection of 100 days of data series. The search engines select for the study are - Google, Bing, Yahoo, and Baidu to yield data series, using simple keyword ***"Citation"*** from the field of Library and Information Science. The forecasting of search engines was carried out by time series analysis collecting 100 days of sample and latter by trend projecting method, 50 days of forecasted data was generated which was taken into evaluation. On evaluation the results reveal that Yahoo! shows a positive secular trend while Google, Bing and Baidu show a downward or negative secular trend.

KEYWORDS: Fluctuation, Forecast, Result, Citation, Search Engine, Keywords

INTRODUCTION

In the last two decades web has produced itself as an important source of information in the society. The major activity performed on Web is searching information for one's research purposes **(Madden, 2003; Fallows, 2004)** which can be accessed using various search engines **(Sullivan, 2005)**. However the results yielded for a number of queries rank in several thousand or even in millions due to the availability of infinite amount of information. However many studies show that only first few results are browsed by the users or few pages on an average only two pages with a default of 10 results per page, a total of 20 results **(Silverstein, Henzinger, Marais & Moricz, 1999; Spink, Ozmutlu, Ozmutlu & Jansen, 2002; Jansen & Spink, 2004; Jansen, Spink & Pedersen, 2005)** which determines the success of a search engine therefore result ranking holds utmost importance in this regard. Result ranking was merely based on term frequency and the inverse document frequency in case of classical Information Retrieval system **(Baeza-Yates & Ribeiro-Neto, 1999)**.Various parameters are taken into account in Web search results ranking as number of links pointing to a given web page **(Brin & Page, 1998; Google, 2016),** the anchor text of the links pointing to the web page, the placement of the search terms in the document (terms occurring in title or header may get a higher weight), the distance between the search terms, popularity of the page (in terms of the number of times it is visited), the text appearing in metatags **(Yahoo, 2016),** subject specific authority of the web page **(Kleinberg, 1999; Teoma, 2005),** recently in search index and exactness of the hits **(MSN, 2016)**. There is always an ongoing competition between search engines and Web page authors for users and high ranking respectively, which is why the algorithm ranking are kept a secret by the search engine companies as Google states **(Google, 2016),** "Due to the nature of our business and our interest in protecting the integrity of our search results, this is the only information we make available to the public about our ranking system". Apart from this search engines keep on updating and upgrading their algorithm so to improve their ranking of results. Nowadays search engine optimization

industries are present which design and redesign Web pages in order to enhance their rankings within a specific search engine (e.g., search engine optimization Inc., www.seoine.com/). Therefore in the crux it can be concluded that the First ten results retrieved for a query have major chances of being visited by the users. In addition to the examination of changes overtime for the top ten results related to a query of the largest search engine, which at the times of first data collection were Google, yahoo and Tacoma (MSN search came out if beta on Feb 1st 2005 in the midst of data collection for the second round **(Payne, 2005).** However various transformations between the user's "visceral need" (a fuzzy view of the information problem in user's mind) and the "compromised need" (the way the query is phrased taking into account the limitations of the search tool at hand) **(Taylor, 2009).** Above all the fluctuation of a result related to a query can only be judged by the user while some researchers claim that it is impractical due to the presence of a large number of documents related to a query and all of them can't be viewed by the user, hence for checking fluctuation a panel of judges is required **(Gordon & Pathak, 1999; TREC, 2014).**

Problem

Internet in the beginning was simple as basic software's were used to search information on web, software that was usually command driven rather than using a graphical interface. With the proliferation of information, systems such as Archie, Gopher and Veronica became increasingly unable to cope with huge information. The advent of many types of search engines provided solution for literature search using Boolean operators, Proximity searching, Wild cards, Truncation etc. Many search engines developed new versions and techniques to achieve some kind of sophistication but all have not helped to forward the case of access and searching from scholar's perspective. Besides keeping in view different ways of indexing the internet, search engines operate in different ways and retrieve documents in different orders. Further, it does not sift information from scholar's point of view i.e., it retrieves information on a particular topic from different aspects like marketing, advertisement, news and entertainment mixed with some research papers. The academic community attempts to look purely for scholarly information on his topic of interest to have output/ retrieval best in terms of comprehensiveness and devoid of fluctuations etc.

The present investigation attempts to evaluate the performance of the select search engines in terms of result fluctuation captured in two phases to check the consistency of search engines.

Objectives

The following objectives are laid down for the study:

- To select search engines.
- To select search term for the study.
- To collect data for 100 days.
- To compare trending by forecasting of time series analysis.

Method

As certified by International Standard Organization there are 230 search engines **(Promote3.com, 2016)** available for searching the web. These search engines are of various types like general search engine, robotic search engine, Meta search engine, directories and specialized search engines. Most users prefer robotic search engines as they allow the users

to compose their own quires rather than simply follow pre specified search paths or hierarchy as in case of directories. Moreover, robotic search engines locate data in a similar way i.e., by the use of crawlers or worms. This distinguishing feature differentiates them form web directories like Yahoo! Where collections of links to retrieve URL's are created and maintained by subject experts or by means of some automated indexing process. However some of these services are also include a robot driven search engine facility. But this is not their primary purposes. This due to this feature Yahoo! Was included for the study.

Meta search engine e.g., Dog pile etc don't have their own database. These access the database of many robotic search engines simultaneously. Thus these were excluded for the study.

Still hundreds of robotic general search engines navigate the web, in order to limit the scope of study after preliminary study, following criteria was laid down for selection of general search engines:-

- Availability of automated indexing
- Global coverage to data.
- Quick response time.
- Availability of result counter.

Following two general search engines were selected for the study for meeting all the criteria and being comprehensive in nature.

a) Google.b)Baidu.

Since the study relates to the field of Library and Information Science but there is no specialized search engine in the subject so another specialized search engine which relates to the subject area i.e., Bing was taken for stydy. Thus the search engines undertaken for evaluation of study are:-

- Google (General)
- Bing (Specific)
- Yahoo!(Directory)
- Baidu(Country Specific General Search engine)

Selection of Terms

Selection of terms is not directly possible in development and multidimensional field like Library and Information Science. Therefore, classification schemes like DDC (18^{th}) and DDC (22^{nd}) were consulted to understand Broad/Narrow structure of Library and Information Science. It helped to get five terms/Fields i.e.,

- Information System.
- Digital Library.
- Library Automation.
- Library Services.

- Librarianship.

These terms were then browsed in "LC list of subject Headings" which provided many other related terms (RT) and Narrow terms (NT). Further NT and RT attached to each other preferred or standard terms were also browsed which retrieve a large number of Library and Information Science terms. At first instance 140 Library and Information Science related terms were identified.

Some terms occurred more than once and duplication removed. It reduced the number to 100. Later terms were divided into three broad groups under:

a) Application. b) Transformation. c) Inter-relation.

"Application" denotes utility of Library and Information science in various fields and about 50 terms came under this group. "Transformation" refers to a method of developing or manufacturing library services into practical market and 30 terms fall under this group. "Inter-relation" means transformation/dependence of one subject onto another and 20 terms came under this group.

Further each category is sub-divided into groups.

"Application" into four i.e., "Reference service", "Informatics", "Information Retrieval" & "Information Sources" "Transformation" into two i. e, "Digitization" & "Consortia" "Inter-relation" into two i.e., "Library Network" & "Information System"

The terms in each group were arranged alphabetically and each term was given a tag. Later 19% of the terms were selected from each group using "Systematic Sampling" (i.e., first item selected randomly and next item after specific intervals). It further reduced the number to 19. Finally the selected terms were classified into three groups under "Simple", "Compound" & "Complex Terms" **(Table 1.0)**. This was done in order to investigate how search engines control and handle simple and phrased terms.

"Simple Terms" containing a single word were submitted to the search engine in the natural form i.e., without punctuating marks. "Compound Terms" consisting of two words were submitted to the search engines in the form of phrases as suggested by respective search engines and "Complex Terms" composed of more than two words or phrases, were sent to the search engine with suitable Boolean operator "AND" & "OR" between the terms to perform special searches. From the simple terms the 2nd term ***"Citation"*** was taken for the study.

Table 1.0: Keywords

S. No	Simple Terms	Compound Terms	Complex Terms
1	Catchwork	Bibliometric Classification	Digital Library Open Source Software
2	Citation	Citation Analysis	Health Information System
3	Dublincore	Comparative Librarianship	Library Information System
4	Indexing	Digital Preservation	Library Information Network
5	Manuscript	Electronic Repositories	Multimedia Information Retrieval
6	Plagiarism	Library Automation	
7	Reprints	Semantic web	

Fluctuation

Information is growing on the web, as documents being added on routine basis that keep on changing as these documents are removed or modified. These quantitative and qualitative changes are expressed as fluctuations. The

quantitative changes are expressed as “Result Fluctuations” and the qualitative changes are expressed as “Document” and “Indexing Fluctuations”. A fluctuation may show decrease or increase in number of documents. However, growth in size of the database is a continuous and usual routine of the search engines. Thus increase and decrease is taken into account here.

A “Result Fluctuation” appears when a search engine show increase/decrease in total number of results for a query that is searched at two different intervals of time. In other words the total number of results retrieved for a query in second observation may be less as retrieved in the first observation. Thus result fluctuation appears when there is increase/decrease in the number of results for a query tested over time i.e., the number of results in succeeding observation may be more or less than the results of the preceding observation.

A forecast is an estimate of a future event achieved by systematically combining and casting forward in predetermined way from the data about the past. It is simply a statement about the future prediction. Forecasts are possible only when a history of data exists. The study collected 100 days of data samples from four search engine out of seven as result-counter was available with Google, Bing, Yahoo and Baidu. The data collection was carried on 15th May, 2016 and ended on 18th of August, 2016 collecting 100 samples for keyword *“Citation”* in four search engines **Table 1.1.**

For forecasting process few points were taken into consideration as:

- Fluctuation of search results and sustainability
- 100 days of data sampling were taken into consideration **(Table 1.1).**
- As the data is seasonal, Trend Projection Method was taken into consideration.
- Total results were taken from result search counter of search engine.
- A forecast of 50 days was generated (**Table 1.2**).
- The results were evaluated on a scattered graph with regression line

Table 1.1: Time Series Data for Forecasting of Select Search Engines for the keyword "*Citation*"

	Google			Bing			Yahoo!			Baidu		
Days (t)	Result (Y_t)	Multiplication of Days and Results (tY_t)	Square of Days $(t)^2$	Result (Y_t)	Multiplication of Days and Results (tY_t)	Square of Days $(t)^2$	Result (Y_t)	Multiplication of Days and Results (tY_t)	Square of Days $(t)^2$	Result (Y_t)	Multiplication of Days and Results (tY_t)	Square of Days $(t)^2$
1	502000000	502000000	1	14700000	14700000	1	121000000	121000000	1	31700000	31700000	1
2	503000000	1006000000	4	14600000	29200000	4	121000000	242000000	4	31800000	63600000	4
3	462000000	1386000000	9	14500000	43500000	9	121000000	363000000	9	31800000	95400000	9
4	503000000	2012000000	16	14500000	58000000	16	120000000	480000000	16	31800000	127200000	16
5	503000000	2515000000	25	14400000	72000000	25	121000000	605000000	25	31800000	159000000	25
6	502000000	3012000000	36	14600000	87600000	36	120000000	720000000	36	32300000	193800000	36
7	501000000	3507000000	49	14600000	102200000	49	121000000	847000000	49	32300000	226100000	49
8	502000000	4016000000	64	14600000	116800000	64	121000000	968000000	64	32300000	258400000	64
9	502000000	4518000000	81	14600000	131400000	81	122000000	1098000000	81	32300000	290700000	81
10	502000000	5020000000	100	14700000	147000000	100	121000000	1210000000	100	31800000	318000000	100
11	502000000	5522000000	121	14700000	161700000	121	121000000	1331000000	121	31800000	349800000	121
12	502000000	6024000000	144	14600000	175200000	144	121000000	1452000000	144	31600000	379200000	144
13	502000000	6526000000	169	14500000	188500000	169	121000000	1573000000	169	31600000	410800000	169
14	501000000	7014000000	196	14700000	205800000	196	121000000	1694000000	196	31900000	446600000	196
15	501000000	7515000000	225	14800000	222000000	225	121000000	1815000000	225	31900000	478500000	225
16	499000000	7984000000	256	15200000	243200000	256	120000000	1920000000	256	31700000	507200000	256
17	499000000	8483000000	289	15200000	258400000	289	120000000	2040000000	289	31700000	538900000	289
18	498000000	8964000000	324	15000000	270000000	324	120000000	2160000000	324	31700000	570600000	324
19	499000000	9481000000	361	14900000	283100000	361	119000000	2261000000	361	31700000	602300000	361
20	499000000	9980000000	400	15200000	304000000	400	120000000	2400000000	400	31700000	634000000	400
21	498000000	10458000000	441	15000000	315000000	441	119000000	2499000000	441	31700000	665700000	441
22	497000000	10934000000	484	15000000	330000000	484	119000000	2618000000	484	31300000	688600000	484
23	502000000	11546000000	529	14500000	333500000	529	121000000	2783000000	529	31600000	726800000	529
24	501000000	12024000000	576	14700000	352800000	576	121000000	2904000000	576	31900000	765600000	576
25	497000000	12425000000	625	15000000	375000000	625	119000000	2975000000	625	31600000	790000000	625
26	497000000	12922000000	676	15200000	395200000	676	119000000	3094000000	676	31000000	806000000	676
27	497000000	13419000000	729	15200000	410400000	729	119000000	3213000000	729	31000000	837000000	729
28	495000000	13860000000	784	15600000	436800000	784	118000000	3304000000	784	31200000	873600000	784
29	495000000	14355000000	841	15600000	452400000	841	120000000	3480000000	841	31200000	904800000	841
30	495000000	14850000000	900	15500000	465000000	900	119000000	3570000000	900	31200000	936000000	900
31	496000000	15376000000	961	14700000	455700000	961	119000000	3689000000	961	31200000	967200000	961
32	497000000	15904000000	1024	15200000	486400000	1024	119000000	3808000000	1024	31000000	992000000	1024
33	497000000	16401000000	1089	15200000	501600000	1089	119000000	3927000000	1089	31000000	1023000000	1089
34	495000000	16830000000	1156	15600000	530400000	1156	118000000	4012000000	1156	31200000	1060800000	1156
35	493000000	17255000000	1225	14500000	507500000	1225	118000000	4130000000	1225	31100000	1088500000	1225
36	494000000	17784000000	1296	14500000	522000000	1296	118000000	4248000000	1296	31100000	1119600000	1296
37	494000000	18278000000	1369	14500000	536500000	1369	118000000	4366000000	1369	31100000	1150700000	1369
38	490000000	18620000000	1444	14500000	551000000	1444	117000000	4446000000	1444	32000000	1216000000	1444
39	491000000	19149000000	1521	14500000	565500000	1521	117000000	4563000000	1521	32000000	1248000000	1521

39	491000000	19149000000	1521	14500000	565500000	1521	117000000	4563000000	1521	32000000	1248000000	1521
40	493000000	19720000000	1600	14600000	584000000	1600	117000000	4680000000	1600	30700000	1228000000	1600
41	493000000	20213000000	1681	14500000	594500000	1681	118000000	4838000000	1681	31100000	1275100000	1681
42	494000000	20748000000	1764	14500000	609000000	1764	118000000	4956000000	1764	31100000	1306200000	1764
43	494000000	21242000000	1849	14500000	623500000	1849	118000000	5074000000	1849	31100000	1337300000	1849
44	488000000	21472000000	1936	14600000	642400000	1936	118000000	5192000000	1936	31500000	1386000000	1936
45	446000000	20070000000	2025	14600000	657000000	2025	118000000	5310000000	2025	32100000	1444500000	2025
46	486000000	22356000000	2116	14500000	667000000	2116	119000000	5474000000	2116	32100000	1476600000	2116
47	446000000	20962000000	2209	14600000	686200000	2209	119000000	5593000000	2209	32100000	1508700000	2209
48	484000000	23232000000	2304	14600000	700800000	2304	119000000	5712000000	2304	31800000	1526400000	2304
49	485000000	23765000000	2401	14400000	705600000	2401	120000000	5880000000	2401	31800000	1558200000	2401
50	485000000	24250000000	2500	14400000	720000000	2500	119000000	5950000000	2500	32600000	1630000000	2500
51	483000000	24633000000	2601	14400000	734400000	2601	118000000	6018000000	2601	32600000	1662600000	2601
52	484000000	25168000000	2704	14400000	748800000	2704	118000000	6136000000	2704	31900000	1658800000	2704
53	483000000	25599000000	2809	14400000	763200000	2809	118000000	6254000000	2809	32600000	1727800000	2809
54	483000000	26082000000	2916	14500000	783000000	2916	118000000	6372000000	2916	31600000	1706400000	2916
55	482000000	26510000000	3025	14500000	797500000	3025	119000000	6545000000	3025	31600000	1738000000	3025
56	482000000	26992000000	3136	14600000	817600000	3136	118000000	6608000000	3136	31400000	1758400000	3136
57	481000000	27417000000	3249	14600000	832200000	3249	119000000	6783000000	3249	31400000	1789800000	3249
58	480000000	27840000000	3364	14600000	846800000	3364	118000000	6844000000	3364	31700000	1838600000	3364
59	475000000	28025000000	3481	14600000	861400000	3481	116000000	6844000000	3481	31400000	1852600000	3481
60	455000000	27300000000	3600	14600000	876000000	3600	119000000	7140000000	3600	31400000	1884000000	3600
61	472000000	28792000000	3721	14600000	890600000	3721	119000000	7259000000	3721	31400000	1915400000	3721
62	472000000	29264000000	3844	14600000	905200000	3844	119000000	7378000000	3844	31800000	1971600000	3844
63	470000000	29610000000	3969	14600000	919800000	3969	120000000	7560000000	3969	31800000	2003400000	3969
64	439000000	28096000000	4096	14700000	940800000	4096	122000000	7808000000	4096	31700000	2028800000	4096
65	473000000	30745000000	4225	14700000	955500000	4225	122000000	7930000000	4225	31800000	2067000000	4225
66	471000000	31086000000	4356	14600000	963600000	4356	122000000	8052000000	4356	31800000	2098800000	4356
67	460000000	30820000000	4489	14600000	978200000	4489	122000000	8174000000	4489	31800000	2130600000	4489
68	467000000	31756000000	4624	14600000	992800000	4624	122000000	8296000000	4624	33900000	2305200000	4624
69	469000000	32361000000	4761	14800000	1021200000	4761	123000000	8487000000	4761	31800000	2194200000	4761
70	469000000	32830000000	4900	14700000	1029000000	4900	123000000	8610000000	4900	33900000	2373000000	4900
71	458000000	32518000000	5041	14700000	1043700000	5041	123000000	8733000000	5041	33200000	2357200000	5041
72	469000000	33768000000	5184	14600000	1051200000	5184	122000000	8784000000	5184	33200000	2390400000	5184
73	469000000	34237000000	5329	14600000	1065800000	5329	123000000	8979000000	5329	32100000	2343300000	5329
74	368000000	27232000000	5476	14600000	1080400000	5476	123000000	9102000000	5476	32100000	2375400000	5476
75	470000000	35250000000	5625	14600000	1095000000	5625	123000000	9225000000	5625	31500000	2362500000	5625
76	464000000	35264000000	5776	14700000	1117200000	5776	123000000	9348000000	5776	31500000	2394000000	5776
77	379000000	29183000000	5929	14700000	1131900000	5929	123000000	9471000000	5929	31500000	2425500000	5929
78	399000000	31122000000	6084	14800000	1154400000	6084	123000000	9594000000	6084	29000000	2262000000	6084
79	399000000	31521000000	6241	14800000	1169200000	6241	122000000	9638000000	6241	30100000	2377900000	6241
80	399000000	31920000000	6400	14800000	1184000000	6400	122000000	9760000000	6400	29000000	2320000000	6400
81	399000000	32319000000	6561	14900000	1206900000	6561	123000000	9963000000	6561	30200000	2446200000	6561
82	476000000	39032000000	6724	14800000	1213600000	6724	123000000	10086000000	6724	29200000	2394400000	6724
83	399000000	33117000000	6889	14800000	1228400000	6889	123000000	10209000000	6889	29000000	2407000000	6889
84	399000000	33516000000	7056	14900000	1251600000	7056	123000000	10332000000	7056	30200000	2536800000	7056
85	475000000	40375000000	7225	14500000	1232500000	7225	124000000	10540000000	7225	28500000	2422500000	7225
86	474000000	40764000000	7396	14300000	1229800000	7396	123000000	10578000000	7396	28500000	2451000000	7396
87	473000000	41151000000	7569	14400000	1252800000	7569	122000000	10614000000	7569	28500000	2479500000	7569
88	472000000	41536000000	7744	14400000	1267200000	7744	122000000	10736000000	7744	28900000	2543200000	7744
89	470000000	41830000000	7921	14400000	1281600000	7921	122000000	10858000000	7921	28500000	2536500000	7921
90	470000000	42300000000	8100	14400000	1296000000	8100	122000000	10980000000	8100	27800000	2502000000	8100
91	469000000	42679000000	8281	14400000	1310400000	8281	122000000	11102000000	8281	26500000	2411500000	8281
92	469000000	43148000000	8464	14400000	1288800000	8464	122000000	11224000000	8464	26500000	2438000000	8464
93	469000000	43617000000	8649	14400000	1339200000	8649	122000000	11346000000	8649	26500000	2464500000	8649
94	469000000	44086000000	8836	14400000	1316000000	8836	122000000	11468000000	8836	26500000	2491000000	8836
95	469000000	44555000000	9025	14200000	1349000000	9025	122000000	11590000000	9025	26100000	2479500000	9025
96	468000000	44928000000	9216	14200000	1363200000	9216	122000000	11712000000	9216	29600000	2841600000	9216
97	468000000	45396000000	9409	14400000	1358000000	9409	121000000	11737000000	9409	29600000	2871200000	9409
98	468000000	45864000000	9604	14400000	1372000000	9604	121000000	11858000000	9604	29600000	2900800000	9604
99	468000000	46332000000	9801	14100000	1395900000	9801	121000000	11979000000	9801	30000000	2970000000	9801
100	468000000	46800000000	10000	13800000	1380000000	10000	121000000	12100000000	10000	30800000	3080000000	10000
$\sum t$	$\sum(Y_t)$	$\sum tY_t$	$\sum(t)^2$	$\sum(Y_t)$	$\sum tY_t$	$\sum(t)^2$	$\sum(Y_t)$	$\sum tY_t$	$\sum(t)^2$	$\sum(Y_t)$	$\sum tY_t$	$\sum(t)^2$
5050	476150000000	23616930000000	338350	1464400000	73509500000	338350	120380000000	610332000000	338350	3104100000	154199100000	338350

The time-series forecasting method fits a trend line to a series of historical data points and then projects the line into the future for medium- to long range forecasts. The research has described the trend component with a line visually to a set of points on a graph. The graph, however, is subject to slightly different interpretations. There are three types of trend projection viz.,

- Positive Secular Trend or Upward Secular Trend:- it describes the data into a upward or raising trend line.
- Negative Secular Trend or Downward Secular Trend:- it describes the data into lowering trend line
- Neutral Secular Trend or Straight Secular Trend:- no changes the data is consistent.

For the study 400 samples were taken into account to generate 200 results of projected data which are described in graphs.

The formula derived for the study is:-

$t_t=b_0 + b_1t$

b_0 and b_1 can be derived as:

$b_0 = \bar{y} - b_1\bar{t}$

$b_1 = \frac{n\Sigma ty_t - \Sigma t\Sigma y_t}{n\Sigma t^2 - (\Sigma t)^2}$

Where

t = days

y_t = Result of the search query

The projected result **Table 1.2** shows a vast fluctuation both in terms of positive Secular trend and negative secular trend. The estimate is given by a trending line.

Table 1.2: Projected Data using Trend Projection Method for 50 Days for the Keyword "*Citation*"

Days	Google	Bing	Yahoo!	Baidu
1	444110909	14375697	121842424	29490727
2	442724208	14360680	121943900	29411076
3	441331951	14342817	122051514	29330674
4	438995050	14321736	122165608	29247484
5	437461197	14299346	122263513	29161381
6	435895800	14273209	122389412	29072238
7	434273851	14250166	122498566	28992039
8	432590996	14225861	122637515	28910007
9	430893525	14200225	122784692	28826090
10	429157853	14173183	122966624	28740233
11	427382931	14147325	123134216	28639048
12	425567680	14120220	123311677	28534216
13	423710990	14089013	123499576	28419993
14	421811719	14053243	123698515	28301120
15	419839598	14021143	123909133	28186094
16	417819084	13990423	124132110	28066973
17	415688084	13970496	124337864	27937508
18	413498585	13950589	124553927	27802857
19	411216980	13924423	124780868	27662762

20	408901062	13894385	124987174	27516951
21	406519893	13873111	125234612	27365139
22	404037735	13845206	125461333	27207020
23	401447614	13816594	125697536	27028696
24	398949368	13769981	126012799	26852199
25	396351680	13727657	126346510	26678429
26	393540530	13693960	126628273	26486910
27	390640023	13666551	126922572	26264959
28	387646378	13638955	127230083	26031417
29	384480459	13626222	127513951	25793119
30	381204575	13615073	127884568	25542688
31	377813649	13601779	128236052	25279414
32	374341700	13558422	128603911	25002541
33	370788167	13533039	128989069	24703260
34	367111948	13507814	129392514	24387791
35	363224919	13499282	129774082	24063387
36	359110342	13446907	130171364	23717518
37	354877520	13391594	130585198	23352825
38	350480623	13333156	131016477	22968143
39	345736646	13271397	131422516	22601497
40	340835205	13206106	131842922	22216817
41	335815732	13141540	132278390	21754720
42	330587432	13068948	132775112	21283781
43	325184907	12992128	133293693	20786168
44	319555219	12910804	133835379	20260157
45	313402091	12829406	134401502	19722811
46	304951667	12743441	134993487	19184171
47	297902254	12647764	135661343	18616915
48	288540872	12551244	136363892	18019215
49	280467757	12449160	137103338	17374200
50	272025021	12331081	137932344	16692922

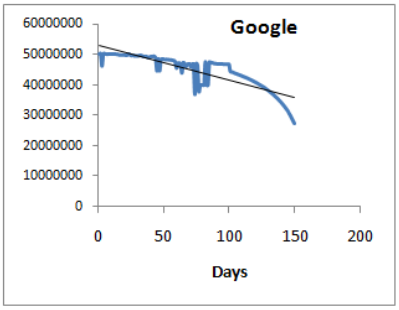

Figure 1.3: Negative Secular Trend of Google for the Keyword "*Citation*"

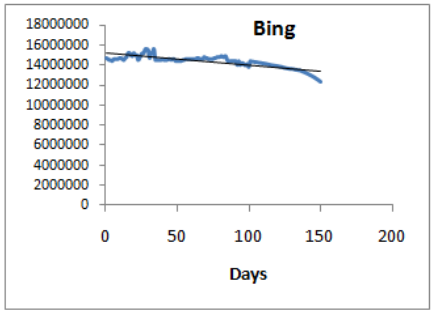

Figure 1.4: Negative Secular Trend of Bing for the Keyword "*Citation*"

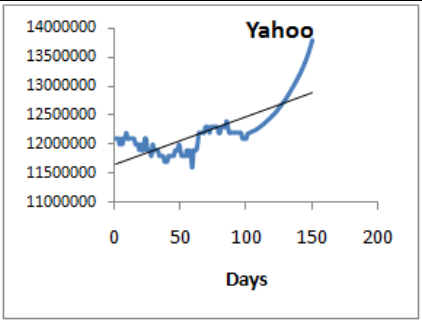

Figure 1.5: Straight Secular Trend of Yahoo! for the Keyword "*Citation*"

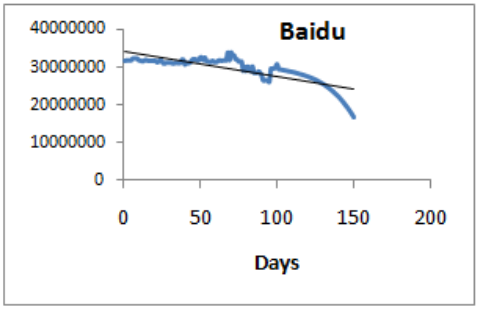

Figure 1.6: Positive Secular Trend of Baidu for the Keyword "*Citation*"

CONCLUSIONS

The trending of the search engines reveal that Google shows negative secular trend while Bing also shows negative secular trend. Yahoo! Shows an upward or positive secular trend, Baidu on the other hand shows a negative secular trend. The data forecasted show a consistent growth in the database of Yahoo! in terms of result fluctuation. Google and Baidu drops down showing down secular trending resulting in loss in database.

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