An Introduction to Search Engine Advertising Campaigns for Business Executives

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Contents

1 The Anatomy of a Large-scale Hypertextual Web Search Engine

1.1 Citation

Brin, Sergey, and Lawrence Page. "Reprint of: The anatomy of a large-scale hypertextual web search engine." Computer networks 56.18 (2012): 3825-3833.

1.2 Summary

In this paper, Larry Page and Sergey Brin introduce their seminal project: the Google search engine. Despite Google's deep penetration into modern vernacular, it helps to first define what it actually is. In the words of Page and Brin, Google is "a large-scale search engine which makes use of the structure present in hypertext...designed to crawl and index the Web efficiently and produce much more satisfying search results than existing systems." The last part of this statement is probably the defining characteristic of Google: at the time, many search engines were already running in production, but most of them were highly ineffective. In fact, in November 1997, Page and Brin discovered that only one of the top four commercial search engines was able to find itself.

So what was going wrong? Many of the existing search engines in production were not designed to handle the Web of 1997. The number of documents on the Web (and therefore, search indices) was increasing at an astronomical rate, causing search engines to return lots of garbage results that would wash out relevant documents from a search. Diluting relevant results severely impacts a search engine's effectiveness, since a user's ability to read results is relatively static – most of the time a user only browses the first ten results of a search before giving up.

To resolve this issue, Page and Brin introduced PageRank: a citation (hyperlink) graph of the Web. Citations are a great way to measure the subjective importance a page; the more something is referenced online, the more likely it is to be important to a user. The reasoning behind this is simple: citations are created by people.

Along with PageRank, Page and Brin introduced the idea of anchor text, which uses the text associated with a hyperlink to describe the page linked. This helps Google define pages effectively for two reasons. First, anchor text often defines a page better than the page itself. Second, anchor text helps give relevance to pages which cannot be defined otherwise. These are pages containing content such as videos or images.

2 So You Want to Get Involved in E-commerce?

2.1 Citation

Wilson, Susan G., and Ivan Abel. "So you want to get involved in e-commerce." Industrial marketing management 31.2 (2002): 85-94.

2.2 Summary

The advent of the Internet and search engines has fundamentally altered the advertising game. While many papers discuss advertising within the search engine (i.e. sponsored search), businesses can also advertise a brand on their company website. However, that website must stand out from search engine results in order to attract users. How can a business boost the rank of their website in major search engines? The answer may save or sink the entire business.

As discussed in the first paper on PageRank [Brin, Page], search engines crawl the web and rank sites based on multiple factors. Recall also that pages with a low rank (top of page) are significantly more likely to be viewed, and those beyond the top ten are virtually dead. Businesses can craft their web page to earn a high ranking in a few different ways:

1. Register your site with as many search engines as possible. While the crawlers try to find new pages, manually submitting the URL to the engine's index ensures a swift discovery.

2. Use keywords in the Title of your webpage and make it as descriptive as possible. This will increase the likelihood of matching a keyword query.

3. Use META tags to provide extra information about your page. These tags are invisible to the reader.

4. Place important information near the top of the page because search engines assume the top portion is indicative of the entire page.

5. Give reputable sites (i.e. product review sites, news sites) a compelling reason to link to your website. This link will tell the search engine that your website is high quality and thus boost your rank.

If your business site can achieve a high rank in search results, then it will receive more visitors. But that is only half the battle. You must design a compelling website that delights the user and it must change dynamically over time. If your site is a simple static page, users have no reason to visit again. Some successful commerce sites show new products upon each visit or a new sale or review of a product. They also implement digital catalogs where users can browse products from the comfort of home. An interactive website that appears in the top search results will serve as an excellent advertisement for the business.

3 Is Relevance Relevant? Market, Science, and War: Discourses of Search Engine Quality

3.1 Citation

3.2 Summary

The author conducted a study to understand the motivating factors that drive search engine producers (SEP) to make changes to the engine. Between November 2002 and May 2004, the author interviewed eleven SEPs, including senior engineers and technical executives who direct future code development. These interviewees worked at every major and minor search engine on the market: Google, Yahoo!, MSN, Ask Jeeves, AOL, and more. Each individual was interviewed over the phone for 1-2 hours in a semistructured, in-depth format. Questions probed for specific instances of change to the search engine and inquired for the motivation behind that change. The text transcript of each interview was categorized to identify themes, from which the author determined two major schemas that motivate the development of search engine technology:

1) The Market Schema
Throughout these interviews, the most common category of motivator was the market schema, which includes revenues, costs, competition, and other business issues. In explaining this motivation, interviewees regarded their search engine as a commercial service competing for users in the marketplace. Thus, the primary motivator for SEPs is financial profit and that metric is linked to search engine quality via its direct correlation with customer satisfaction. Many of the technical changes were developed to increase profit.

2) The Science/Technology Schema
The second most common category of motivator was the science schema, which includes experimentation, measurement, feasibility, and objectivity. This motivator defined quality as relevance, or the ability to answer a user's question, and was defined by data-driven metrics. Many of the changes were developed to improve search result relevance, recall, or precision.

These interviews also revealed a subjective component of the search engines: blacklists, whitelists, and topic-specific weights. This censoring was often dictated by executives to respond to current events, but it is arbitrary and non-scientific. Still, these practices are accepted by the SEP because they strive to boost relevance.

This paper impacts all modern businesses because it describes the convoluted environment in which they compete for clicks. For many companies, the search engine is the primary portal through which consumers are reached. However, this paper shows that the portal is controlled by employees who seek to maximize profit or relevance for the search engine company, not for the online businesses who depend on the search engine. Thus, an online business must actively monitor and effect their position in the search engine rankings to maintain a steady flow of customers.

4 Beliefs and Biases in Web Search

4.1 Citation

White, Ryen. "Beliefs and biases in web search." Proceedings of the 36th international ACM SIGIR conference on Research and development in information retrieval. ACM, 2013.

4.2 Summary

Bias is a common human trait that occurs when a person's beliefs affect their actions and decisions. It turns out that these biased actions and decisions can manifest themselves through information retrieval systems–it occurs when a user searches for or accepts information that strays significantly from the truth. This paper sheds light on both how humans influence information retrieval systems, and how information retrieval systems influence humans.

To study search-related biases, three approaches were taken: an exploratory retrospective survey, human labeling of captions on a search engine, and a large-scale log analysis of that same search engine.

Search engines themselves can be biased. The results of this study found that search engines were significantly more likely to present captions and results that answered a yes or no question positively. On top of this, positive results were usually ranked above negative results in a search query. This meant that users were significantly more likely to accept positive results than negative results. Across all observed clicks in the data set analyzed, 41.1% were on a positive result, while only 16.3% were on a negative result–which means that positive answers are almost three times as common!

The bias towards positive results was actually irrespective of the actual truth. The researchers obtained a list of answers to medical questions – provided by verified professionals – and cross-referenced that data with answers that were accepted by users on search engines. The results show that if users trusted the top ranked result provided by the search engine, they obtained the correct answer only 45% of the time. Furthermore, even when users referred to multiple sources before accepting an answer, their opinions never changed. As a result, researchers concluded that the primary motivation for pursuing a secondary source of information was to simply validate the first source.

5 The Online Advertising Industry: Economics, Evolution, and Privacy

5.1 Citation

Evans, David S. "The online advertising industry: Economics, evolution, and privacy." Journal of Economic Perspectives (2009).

5.2 Summary

In 2015, media companies around the globe spent $545 billion dollars on advertisements. Historically, these ads have found a home in newspapers and TV commercials, but this model is under attack by the new era of online advertisements. Although Internet ads were born in the 1994, they have grown at an astonishing rate; ZenithOptimedia expects the Internet to account for more than one-third of U.S. ad spending in 2017, representing 400% growth since 2007. Indeed, many major newspaper businesses have gone out of business. But while this revolution has crippled some businesses, it has created new efficiencies and opportunities for the global economy by significantly reducing the transaction cost for merchants to find consumers.

Advertising is a matching game between merchants and consumers. The old model required merchants to buy a million newspaper ads with the hope that a small fraction of the population is interested. The search engine has changed this game entirely. Merchants are now able to identify individual consumers who are interested in the product by matching their search queries or registered account information. This ability to detect a consumer's interest and intent to purchase a product has transformed advertising campaigns from mass market tools into focused, personalized ads. The search engines are an intelligent intermediary in this lucrative matching game.

So how do these businesses play the game? Typically, a company will start with an objective (like "increase sales of product X" or "make our brand more friendly") and set a budget to achieve this goal. Advertisers will then divide this budget amongst the various forms of media: online, television, radio, magazines, newspapers, etc. based primarily on the expected rate of return for each medium. In a competitive marketplace, modern businesses have no choice but to take advantage the cost-efficient advertising offered by the online intermediary search engines. These online ads further increase their rate of return by directly linking the consumer to the merchants online portal to purchase goods.

In summary, the Internet's share of ad spending has grown over the past decade and will continue to grow because search engines provide a more cost-efficient, targeted method of matching consumers with merchants. Modern businesses must adopt this technology or risk becoming obsolete.

6 Optimal Search Engine Marketing Strategy

6.1 Citation

Sen, Ravi. "Optimal search engine marketing strategy." International Journal of Electronic Commerce 10.1 (2005): 9-25.

6.2 Summary

This study was written in 2005–a time when businesses were still trying to figure out how to leverage search engine technology as a marketing tool. The paper starts by listing several different kinds of search engine marketing (SEM) strategies:

1. Keyword-related banner advertisements

2. Paid submission for regular updates: Businesses can pay a one-time fee to a search engine provider to guarantee that their site is reviewed within a short time frame, so it can show up in search results as soon as possible.

3. Search engine optimization (SEO): Businesses can influence their site's visibility in a search engine's natural results by modifying their site code.

4. Paid placements: Businesses can pay a search engine provider in order to be listed in their "sponsored" section in search result pages.

At the time of publishing, the majority of costs associated with SEM (around 82 percent) went towards paid placement campaigns. Despite this, buyers using search engines to find information generally only followed links that were found in the editorial section of the results page (where the natural results were found). This implies a couple of things. First, that SEO is has potential to be the most effective marketing strategy. If a business can modify its site such that it naturally appears at the top of results, the conversion rate would be significantly higher than what could be achieved from any of the other SEM strategies. Second, it implies that the quality of SEO solutions in 2005 was insufficient for producing quality results.

The study ran an analysis on various SEM strategies, and came to a few conclusions:

Even though SEM was a high-growth part of online marketing at the time, it was not the dominant form. This was due to advertisers having doubts about its effectiveness. The analysis discovered that SEM was worth investing in if a business's market is characterized by: buyers who have low search intensity (e.g., buyers with opportunity cost of time), a product sold by many other providers (e.g., computers), or if the product is of low value (e.g., books). For businesses involved in niche markets (e.g. vintage cars), SEM was not worth investing in. This is because the number of competing businesses online was never high enough for SEM to be worth the cost.

Economically speaking, the analysis found that SEO was never a part of a business's equilibrium strategy. When there were a lot of competing companies, the probability of appearing in top results of a search engine was so low, that SEO couldn't do much to improve the situation. In this case it made more sense to pay for sponsored links, which were guaranteed to appear to users. When there were not many competing companies, investment in SEO was redundant, since the probability of appearing in top results was high enough to begin with.

Concerns were raised about paid placement strategies. Their effectiveness is determined by click-through rates, which can be artificially boosted by either people or software.

7 Modeling Indirect Effects of Paid Search Advertising: Which Keywords Lead to More Future Visits?

7.1 Citation

Rutz, Oliver J., Michael Trusov, and Randolph E. Bucklin. "Modeling indirect effects of paid search advertising: which keywords lead to more future visits?." Marketing Science 30.4 (2011): 646-665.

7.2 Summary

When you advertise your business on search engines, the most profitable metric is conversion rate because that corresponds to revenue for your company. However, there is another more powerful metric: direct type-in visitation. This metric measures the number of users that return to your website directly sometime after seeing your advertisement. This is extremely valuable to a business because it means their brand name stuck in the consumer's head and they later singled out your company for shopping. This is customer loyalty.

The authors attempt to quantify this indirect benefit of online advertising so that business owners can more accurately calculate the return on their advertising investment. The study begins with a dataset from an e-commerce website in the automotive industry. This dataset was chosen because the indirect effects will be especially pronounced over the month-long research period that a typical car-shopper endures. The researches employ a Bayesian elastic net to calculate indirect effects at a keyword-level for thousands of keywords. They also designed an original text-classifier based on their knowledge of the business domain and web design.

Of the 3,186 keywords, 599 were successfully linked to fluctuations in direct type-in traffic. The insignificant keywords include very specific searches like "Toyota Avalon specs". These significant keywords include the company's brand name (i.e. Toyota) and broad words like "buy car", all resulting in more direct type-in visits to the automotive website. But how much this worth to the automotive company? First, the additional visits to their website generates marginal ad revenue of approximately $0.26 per direct type-in visitor. This yields $90,385 which is half of the entire annual paid search budget. Quite valuable indeed. Still, this profit estimation is far too conservative (likely by tens of thousands of dollars) because it neglects the additional car sales that result from these direct type-in visits.

This all goes to show that while search engine dashboard metrics like conversion rates and click-through rates are valuable, they are not holistic. Your online advertising efforts produce additional, indirect benefits when the consumer initiates direct type-in visits to your site long after seeing your search advertisement.

8 An Empirical Analysis of Sponsored Search Performance in Search Engine Advertising

8.1 Citation

Ghose, Anindya, and Sha Yang. "An empirical analysis of sponsored search performance in search engine advertising." Proceedings of the 2008 International Conference on Web Search and Data Mining. ACM, 2008.

8.2 Summary

Businesses have many choices for online advertising. In search engines, the predominant ad form is "sponsored searches" in which the advertiser pays a fee to appear next to organic search results. For example, a consumer who searches "digital camera" is likely to see advertisements from Kodak in the search results because the company paid for ad space next to the "digital camera" keyword. A company can purchase any number of different keywords, so choosing which keywords to purchase and how much to pay for them will dramatically impact the success of a marketing campaign.

This paper empirically models the relationship between keywords, click-through rates, and conversion rates by analyzing a real world dataset from a large retail company. The data is fit into a hierarchical Bayesian framework and then run through Markov Chain Monte Carlo methods to estimate the results. The goal is to examine how click-through rates and conversion rates are affected by the following three characteristics of a keyword:

1. **Brand:** does the keyword contain a brand name? (i.e. Kodak, Nikon)

2. **Retailer:** does the keyword contain a retailer name? (i.e. Best Buy, Amazon)

3. **Length:** how many words are in this keyword? (i.e. "camera" vs. "black dslr HD camera")

Impact on Click-Through Rates

The first interesting result is that keyword advertisements with retailer-specific terms cause a 28.31% increase in click-through rates. This confirms the belief that users actually enjoy advertisements when they search for a specific retailer. In a surprising contrast, keywords containing a specific brand have no statistically significant effect on click-through rates. Finally, the length of the keyword is inversely related to click-through rates; an increase in length by one word decreases the click-through rates by 6.6%.

Impact on Conversion Rates

Keywords containing a brand-specific term experience an increase in conversion rates by 21.35%. This finding is important to businesses because it confirms that branded keywords are extremely valuable to the advertiser. Conversion rates are also impact by click-through rates. If the click-through rate is increased from the minimum (0.0) to the maximum (1.0), the conversion rate increases by 63.31%. However, this increase is dwarfed by the impact of rank: an ad that moves from the worst rank (bottom of page) to the best rank (top of page) yields an increased conversion rate of 99.97%. Finally, the quality of a business's landing page (as scored by Google on a 1-10 point scale) corresponds with the conversion rate. Using this metric, the authors found that a one point increase in landing page quality corresponded to a 22.5% increase in conversion rate.

Businesses can use these statistics to choose the optimal budget for keywords based on brand, retailer, and length.

9 Travel Queries on Cities in the United States: Implications for Search Engine Marketing for Tourist Destinations

9.1 Citation

Xiang, Zheng, and Bing Pan. "Travel queries on cities in the United States: Implications for search engine marketing for tourist destinations." Tourism Management 32.1 (2011): 88-97.

9.2 Summary

One very common use for search engines is travel planning. Studies have shown that search engines are the number one information source for American families who are planning a vacation. This paper analyzes search data from all around the United States to provide some insights on the tourism industry. Here are the conclusions they reached:

A couple of tourism-related metrics can be derived through search data. First, the "touristic" level of a city can be evaluated by observing the ratio of tourism-related queries to total queries performed in a city. Second, the overall popularity of a tourist destination can be determined simply through measuring the pure volume of tourism-related queries about the destination. This provides a strong link between the search economy online, and the tourism industry.

Search sessions containing travel queries are relatively short, usually consisting of one to three queries in total. This is important to marketers, as it means that there are not too many opportunities to make an impression on a user. These travel queries usually make reference to both "core" keywords, most of which relate to transportation and accommodation, and context-dependent "specialty" keywords. In this case, the context is contingent on both the size of the destination, and the "touristic" level of the city. For large metropolitan cities, searches for maps, parks, and attractions dominated the specialty keywords. For middle to small sized destinations, the specialty keywords were found to focus significantly more on specific tourist attractions. This means that search engine marketing strategies will vary significantly depending on the destination.

The study shows that destination marketing organizations (DMOs) can benefit significantly from monitoring search data. Despite the fact that accommodation related keywords are the most commonly searched online by potential tourists, promoting accommodation is not of the highest priority to DMOs. Along with this, DMOs can use search data to look for trends that vary based off of specific variables, for example, weather or season.

10 The Impact of Search Engine Optimization on Online Advertising Market

10.1 Citation

Xing, Bo, and Zhangxi Lin. "The impact of search engine optimization on online advertising market." Proceedings of the 8th international conference on Electronic commerce: The new e-commerce: innovations for conquering current barriers, obstacles and limitations to conducting successful business on the internet. ACM, 2006.

10.2 Summary

In the past decade, search engine advertising has grown into a multibillion dollar industry. This money stems from two distinct forms of advertisement: paid placement and Search Engine Optimization (SEO). Paid placement is implemented by the search engines themselves (i.e. Google sponsored searches) and are discussed at length in other papers. This paper examines the industry of Search Engine Optimization. A multitude of SEO firms have cropped up around the search industry to harness its economic prosperity. Businesses around the world contract these SEO firms to optimize their business website and boost its ranking in search engine results.

This is considered an alternate form of advertising because businesses spend money to increase their brand visibility to consumers. While paid placement has its own advantages, the unique advantage of SEO is that it attracts the user by listing the website as an organic search result. Multiple studies have reported that users significantly prefer clicking on an organic link rather than an advertisement.

The overall impact of SEO firms on the consumer and businesses is examined in this paper. Overall, SEO introduces additional noise in the ranking algorithm. SEO's artificial inflation of web page ranking sometimes promotes genuinely useful sites, but other times it spams search results with undesirable web pages that have an inflated ranking. The authors define "algorithm robustness" as a search engine's ability to exclude this noise. A highly robust search engine will improve customer satisfaction with search results, but decrease the effectiveness of SEO advertising efforts.

The authors combine algorithm robustness with algorithm effectiveness (approximated as user satisfaction) to create a model that estimates the impact of SEOs on the advertising market. The study makes a few interesting observations. First, SEO firms depend on advertisers' willingness to pay for online advertisements. If global businesses shifted to a new form of advertising (i.e. augmented reality posters on the streets of New York) then SEOs would be left destitute. Second, search engines can and do combat the manipulation of SEO firms by investing in algorithm robustness. This increases search engine profits and diminishes the effect of SEO, but SEO firms still provide an impactful advertising strategy for business owners. These findings correspond with those in other papers; business owners should pay money to earn a high ranking in search results because it dramatically increases click-throughs and conversions on their business website.