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MEASURING EFFECTIVENESS OF INTERNET ADVERTISEMENT

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Abstract: The article describes a software package created to measure the return on marketing investment for organizations involved in e-commerce. It is based on web application technology and includes a database system which makes it suitable for use by consultancy companies involved in offering evidence and advice regarding marketing strategies of their customers. A complete solution consisting of the structure for the database, the user friendly interface and the constellation for the network infrastructure is presented. The first tests in a Swedish based company Adonline, showed that it significantly reduces the time necessary for the analysis of return on marketing investment and the effort in creating reports for their customers.

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Introduction

The commercialization of the Internet in the 1990s, as well as the development of methods for authentication and authorization, created opportunities for using the technology for e-commerce, followed by a myriad of techniques for placing commercials and inventing new types of advertisements. Unlike the traditional channels for advertising, such as TV or printed media, where it is very difficult to determine the value they bring to the firm and link the marketing to the revenue, Internet technology offers a possibility to track actions of each individual. When customers' behavior is related to the cost invested in commercials, assessment of the return on marketing investment can be made and the effectiveness of the campaign evaluated. The software called ROMI tool (Return ON Marketing Investment Tool) was created to automate this process. The application builds up upon the current Web analytics applications in order to create enhanced system for the return on marketing investment analysis and help the marketing officer or the business executive to have clearer view on their advertisement strategies. It makes estimate on the effectiveness based on investments in advertisement and evidence for how successful the campaign was. The spending depends on the methods used for advertisements and the pricing models. The web traffic analysis is used to measure the behavior of the customers.

The next section shortly describes the methods for advertising on the Internet and the pricing models followed by the part explaining how web traffic analysis is performed. The artifact, designed and referred to as ROMI tool, is presented after that. Conclusions and directions for possible modifications of the package are given at the end of the article.

Methods for advertising and pricing models

There are several methods on the Internet through which potential customers are informed about certain products. The most commonly used are the following:

- Price comparison services that provide lists with different prices for products from different retailers;

- Mailing lists consisting of special newsletters sent via e-mail to a targeted group of customers. No cost is associated with sending the message. However, designing the content sometimes need to be paid to external party;
- Directory services or places where visitors can find information about products and services. Widely known directory service is the Yellow pages, which provides mainly contact information;
- Advertising networks, also known as banner networks, buy space on many popular websites and sell the time for the commercial to appear on these web pages;
- Social networks are becoming very popular because of the large number of users who visit these sites, as well as for a possibility for targeted advertisement that is usually more effective (Chris and David, 2010);
- Google Adwords and Adsense offer completely new model in advertising and earning from publishing a rich content on the Web. Adsense includes all web sites approved by Google where advertisement for products related to the content on the web pages can be placed. The revenue from the commercials is then shared between Google and the owner of the web pages. Adwords is a complement to Adsense. It offers companies the opportunity to advertise through Google network by creating keywords or phrases related to their businesses. Then the commercial in a form of a link to their sites can appear either on the Google web page, when some relevant search has been performed, or on the sites with content related to the product advertised;
- Search engine optimization is yet another way to attract customers. Good graphical design of the pages is not enough for attracting customers; it is necessary to construct the web site so that it is search engine friendly. The set of keywords should be incorporated in such way that when the visitors search for any of them, it is more likely that the link to the website appears at the top of the list with results.

All these methods of advertising require some investment by the companies. The amount spent for a campaign depends on the choice of the method, and the

pricing model used. The following pricing models are offered:

- CPC (cost per click) specifies the amount paid for each click on the advertisement. However, the price of a single click is not fixed and depends on the bidding among all who want their advertisement shown. The higher the price, the probability of the announcement to appear is higher. CPC can give the website an instant traffic and provide the company with opportunity to test its business model in real time with fastest feedback (Wall, 2006);
- CPM (Cost Per Mile) is the cost of 1000 impressions. Impression is referred to showing the advertisement exactly once. This model is similar to traditional advertising methods. The starting and ending date need to be specified in order the number of times per day the commercial is run to be determined;
- CPL (cost per lead), CPO (cost per order) or CPG (cost per goal) is a model measuring the goals the campaign wants to achieve. The cost is created based on "Lead" or whether the visitor of the page behaved as potential customer meaning that a click on the company's e-mail address occurred or any other link through which the interest in the company is made was selected. CPO refers to paying the cost for the advertisement only when the order of the product is performed. A common name for the two and other similar models is cost per goal because payment is made when certain goal is achieved. The goal can be interpreted differently by various companies. For some of them the goal can be the actual purchase, for others the action taken by the visitors before they leave the web page. These types of pricing models are ideal for advertiser who wants to pay only for potential or actual customers (Plummer, Rappaport, Hall, and Barocci, 2007);
- Fixed cost models can be different by nature. For example, sometimes only a setup fee for a certain campaign in a limited time is required. Some advertising suppliers require a membership with the setup cost at the start and payments in regular time intervals for the rest of the period;
- Mixed model is a blend of the other models. Most often it is a mixture of setup cost with another model or it combines CPG with CPC or CPM.

Web traffic analysis

In parallel with developing the algorithm for searching the Web, Google started working on the software that is capable to collect various data about visitors' behavior on the web sites, known as Google Analytics. A block of code, offered free of charge, is available for the webmasters to install on their sites in order to be tracked by Google server and give it the opportunity to collect data. The statistics gathered contains a myriad of information related to the visitors, such as:

- Source or the page from which the visitor reached the company's website;
- Medium is the type of the site from where the visitor came. It can be organic, if it is Google or any other non-paid search engine, referral if it is any other site, social media if it is Facebook or other social network, direct or none if the visitor directly typed the URL in

the address bar, or Banner if it came from a site used by advertisement network;

- New visit if the visitor browses the pages for the first time;
- Time spent on each page;
- Bouncing or whether the visitor accidentally visits the site and immediately leaves from there;
- Goal conversion or whether the visitor performed an action considered by the company as a goal. A goal can be showing interest in the product by writing an e-mail, or anything else. A single company can have several goals;
- Goal funnel or the action performed before the particular goal is reached;
- Keyword that the visitor used, if the web site was found through a search.

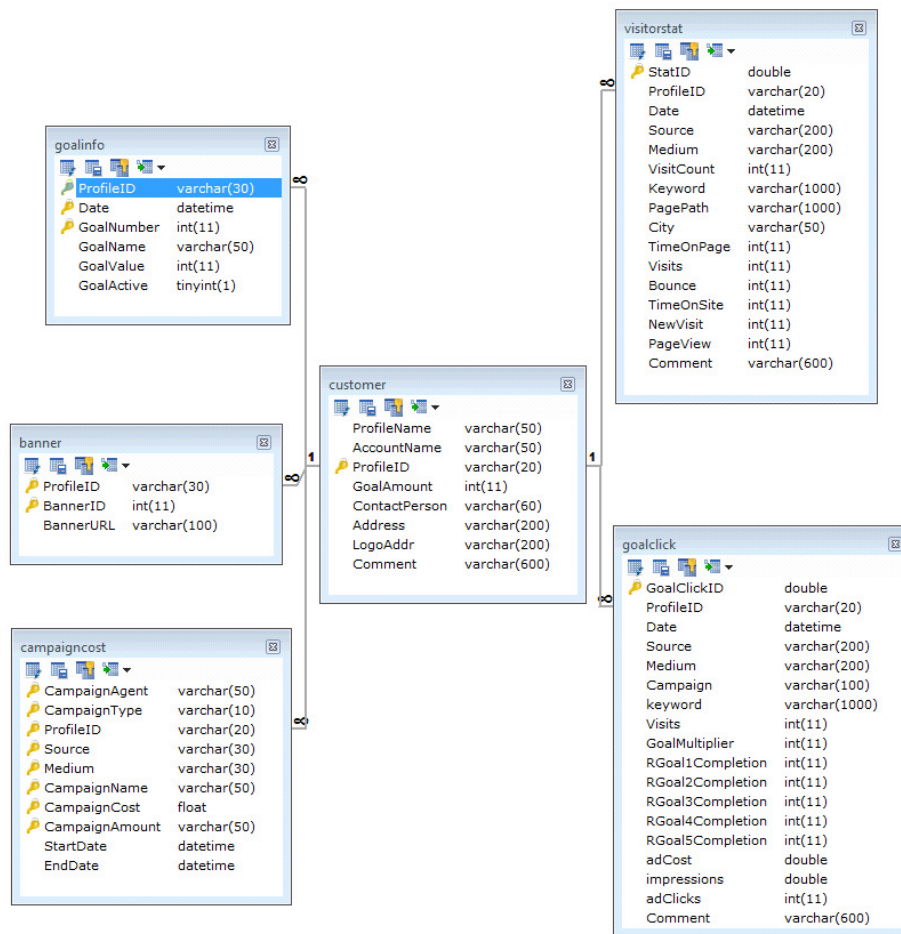
Many reports can be created by Google Analytics web tool (Clifton, 2008) showing various statistical analysis of the Internet traffic. However, there is no appropriate application for estimating the return on marketing investment. Hence, the software package ROMI tool was created, (Tanglertpanya, 2010).

Return on marketing investment (ROMI) tool

The artifact was created based on the requirements made available by the Swedish consultancy company Adonline, specialized in providing customers with information about online marketing. Its customers are usually organizations involved in e-commerce. The data about the web traffic for all of them are fetched from Google Analytics server and stored in a local relational database consisting of six tables shown on Figure 1. The central table, called Customer, stores a record with the profile and the total number of goals for each company. This table is linked to other five tables, Goalinfo, Banner, Goalclick, Visitorstat, and CampaignCost table, each created to hold specific data.

Goalinfo table contains information about various goals, while Banner table stores everything that is used as a banner for advertising the particular company. The Visitorstat table is the place where visitors' traffic is kept. It contains data such as date, source, medium, keyword used, time spent on the whole site, as well as on separate pages, whether the visit is new, and others concerning each visit of the company's site. Goalclick table saves more advanced data regarding the visits with goal completion. This table stores not only the source and the medium of the visitor but also the campaign name. Each record of the Goalclick table stores up to five goals, so that clicks on all of them can be quickly fetched from Gogle Analytics server. When more than five goals in the same profile are required, an additional record that is exactly the same is added. The only difference is the number which identifies the goals. Finally, the most important data table used for the return on marketing investment calculation is the Campaign cost table. It stores the cost for each campaign that the customer invested in online advertisement. Campaigns are related to a campaign supplier or the company that sells the advertisement and its cost is based on one or more pricing models, such as CPC, CPL, CPO, CPM, fixed cost or any combination. Each advertisement is characterized by the unique source, medium and the campaign name.

FIGURE 1. STRUCTURE OF THE DATABASE FOR THE ROMI TOOL



If the campaign is a combination of two price models then it consists of two different campaign types represented by two separate records in the table. The field called CampaignType holds the information about the type of the campaign. The fields CampaignCost and CampaignAmount can store different type of information depending on the campaign type. This is because the calculations of the cost for each campaign are performed in different manner depending on the price model used or their combination. If the CampaignType is CPC, then the CampaignCost field is used to store the cost per click value and the CampaignAmount the amount of clicks that the advertiser buys. If the CampaignType is CPL or CPO, which have the same calculation equation, the CampaignCost stores the average cost per lead or order and the CampaignAmount the goal number corresponding to the leads or orders. However, one CPL or CPO campaign can link to several goals at the same time. The

goal number that is stored in the CampaignAmount field will be comma separated. For example, if the campaign corresponds to goal number one and two, the CampaignAmount field will be 1, 2. For the CPM campaign, the CampaignCost field saves the actual cost per 1000 impressions and the CampaignAmount the amount of thousands of impressions. Finally, for the fixed cost campaign type, the CampaignCost saves the cost of the campaign and the CampaignAmount the campaign period type, such as monthly, yearly, onetime or period of time. For the CPM and fixed cost campaign, information about the start date and the end date of the campaign are necessary to compute the amount of days in order to calculate the cost for the campaign. Data for filling in these fields are obtained from the companies and filled in manually with provision to create automatic transfer in the future.

TABLE 1. EXECUTIVE REPORT

Medium	Visits	%	Cost	Leads	Cost per visit	Cost per lead
None	10000	40	0	0	0	Green
Organic	5000	20	5000	1	100	Green
Catalog	5000	20	7000	1.4	700	Red
Banner	2000	8	3000	1.5	600	Red
Social media	3000	12	4000	1.33	200	Yellow
Total	25000	100	12000	0.76	65	

Once, the information about the campaigns in specific period of time is obtained from a particular company and the traffic data are fetched, various types of reports can be generated using the ROMI tool. For the company executives the report showing calculated cost for each type of campaign is essential. This cost combined with the amount of visits, goals completion or leads/orders completion produces the cost per visit, cost per lead and other parameters for each campaign calculated automatically through the calculation engine. The numbers obtained can be presented in various forms of reports. Table 1 presents a sample executive report.

Each row in the table corresponds to one type of visitor's medium. The columns present the data obtained from Google Analytics (medium, total number of visits and leads), and those that are calculated (percentages, costs, cost/visit, cost/lead and trend). More extensive report might have columns for other types of leads or goals. The column labeled as "Trend" contains notification of the health status of the advertising campaign. If the trend is green, then the campaign is running very well. In that case, the cost per visit and the cost per lead are not too high and the number of visits, as well as the number of leads has a reasonable value. The red trend means that the advertising campaign needs special attention. Then, the cost per visit and/or cost per lead are too high and the amount of visits and the leads may not be so reasonable. The yellow trend should raise the consideration for the campaign. It might be running very well in the previous period of time, but starts behaving badly during the observed period. It means that the cost is neither very low nor too high. This might be an indication that the probability for this campaign obtaining red trend in the future is considerable. There is no fixed range of costs for identifying which campaign is red, yellow or green. The product price determines the trend. For example, if the product gain is SEK 100 000, then SEK 1000 for the cost per order is acceptable, but if the product benefit is very low, then the cost per visit and cost per order should be low, too.

Other reports showing different aspects on the advertisements made are available, too. The interface for obtaining reports is composed of menus. The main menu offers the overall summarized report with the goal completions and the cost analysis of the advertising campaign grouped by the medium of the visitor. The visits menu starts with the summarized information about visitors, such as amount of visits, amount of new visits, and amount of bounces. The analyst can filter the visitor statistics with respect to every medium, source, keyword, page path, and city and sort records according to any field. The next menu shows information about goal completions. It presents the goal completion information with filtering and sorting option. The last menu is the campaign calculation menu. In this section, the detailed calculation of each campaign will appear including total visits and the average cost per visit.

Conclusion

This ROMI tool is using server-based infrastructure for local data storage and performing calculations. The web analytics data are acquired from the company that do the Internet advertisement and use Google Analytics to help analyzing the visitors' traffic. Google Analytics itself supports the visitor tracking from various sources. The

raw analytic data allow creation of the detailed reports on the visitors behaviour and attitude towards company's goals. The data obtained from the company about the types of Internet advertising campaigns used, and their costs serve as input when calculating the cost per visit for every campaign. Cost per visit is one of the key information for the advertiser to see the effectiveness of the campaign.

Very simple queries can be used to produce a myriad of output data. This makes the tool user-friendly and with a fast response. The analytic script installed into the advertising website provides traceability of visitors through Google Analytics. The data fetching module fetches the data from Google Analytics services in regular time intervals and saves them in the local database. The manual data input module allows data about the campaign to be entered manually, with a provision to be automated in the future. The tool was implemented with the role based access control to provide the necessary security to the system. It can be installed on any Linux system running apache tomcat and MySQL database. The tests performed on data obtained from Adonline show that the time spent to create reports for their customers was reduced by half with the ROMI tool. It is expected this reduction to go up to seventy percent in the later versions when the input from their customers will be obtained through automatic updates.

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