

MODELING STRATEGIES OF MOBILE MARKETING FOR ADVERTISING CAMPAIGNS WITH THE MODEL OF CPI PRICE FORMATION ON THE BASIS OF LINEAR APPROXIMATIONS

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Abstract: *this article provides a comparative description of the most popular strategies for the acquisition of users (installations) of a mobile application using one large advertising channel and many small advertising channels. In addition, the main advantages and disadvantages of both strategies for building an advertising campaign are considered. A universal mathematical model based on linear approximations is proposed and explained, which allows us to qualitatively assess the comparative effectiveness of the purchase of advertising for these strategies. Such concepts as RTB (Real-time Bidding), LTV (Lifetime Value), CPA (Cost Per Install), CAC (Customer Acquisition Cost) and ROI (Return on Investment) are also considered. The abbreviation of each concept is explained in the text of the article. Particular attention is paid to the approaches to the construction of an advertising campaign based on Cost Per Install. In addition, the article touches upon the main shortcomings of the approaches.*

Keywords: *mobile marketing; CPI price formation model; RTB advertising; advertising campaign modeling; ROI; LTV; automated solutions for management of advertising campaign.*

МОДЕЛИРОВАНИЕ СТРАТЕГИЙ МОБИЛЬНОГО МАРКЕТИНГА ДЛЯ РЕКЛАМНЫХ КАМПАНИЙ С МОДЕЛЬЮ ЦЕНООБРАЗОВАНИЯ CPI НА ОСНОВЕ ЛИНЕЙНЫХ АППРОКСИМАЦИЙ Рульков В.С. (Российская Федерация)

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Аннотация: *в данной статье приведена сравнительная характеристика наиболее популярных стратегий приобретения пользователей (установок) мобильного приложения с использованием одного крупного рекламного канала и множества небольших рекламных каналов. Дополнительно рассматриваются основные преимущества и недостатки обеих стратегий построения рекламной кампании. Предлагается и объясняется универсальная математическая модель, построенная на основе линейных аппроксимаций, которая позволяет качественно оценить сравнительную эффективность покупки рекламы для этих стратегий. Также рассмотрены такие понятия как: RTB (Real-Time Bidding), LTV (Lifetime Value), CPI (Cost Per Install), CAC (Customer Acquisition Cost) и ROI (Return On Investment). Аббревиатура каждого понятия поясняется в тексте статьи. Особое внимание уделяется подходам к построению рекламной кампании на основе Cost Per Install. Дополнительно в статье затронуты главные недостатки подходов.*

Ключевые слова: *мобильный маркетинг, модель ценообразования CPI, RTB-реклама, моделирование рекламной кампании, ROI, LTV, автоматизированные решения для управления рекламной кампанией.*

In the modern market, marketing is the only channel of personal influence on users, ensuring direct communication at any place and time [6]. Nowadays, mobile advertising networks with the CPI model (paying for installation) are one of the most effective tools for purchasing installations for mobile applications. The main mechanism of demonstration of advertisements in these networks is RTB (Real-time Bidding, bids for demonstration of advertisements in real time). The system creates an auction where advertisers compete for advertisements. At the same time, users are also divided into different target audience depending on geo, age, gender with the help of a heuristic algorithm [2]. The blend of RTB and CPI is aimed at providing the advertiser with installations of an application by interested users.

However, there are factors, reducing the CPI model efficiency [4]. Such factors include irrelevant installations by non-target audience, or motivated installations, specifically performed for obtaining other benefits. These factors reduce the LTV indicator (revenue obtained from a user for the whole period of time spent in an application) and advertising efficiency. An advertising platform, bringing irrelevant or motivated installations, can be called a “bad publisher”.

The main approaches towards building a CPI campaign

For the avoidance of "bad publishers" advertisers prefer proven advertising networks and buy installations with a high LTV indicator. Configuring and maintaining a campaign in one large advertising network is relatively not a not laborious process. However, this approach has a number of disadvantages:

- large advertising networks attract many advertisers, creating increased competition and high CPI;
- using one large advertising network in accordance with the statistics of traffic in mobile networks [1], will not allow the advertiser to obtain even a half of potential users, even by having a condition of a wide reach.
- the rest of the unreached potential users do not interact with the advertising network;
- large publishers often represent multifunctional applications that are full of information, where for advertisement it is difficult to capture the user's attention [5]. This slows down the process of getting the installations, which can cause a negative effect on an application's statistics.

The second widespread strategy for obtaining users is using lots of small advertising channels with little competition. The advertiser gets an access to a wider audience at a lower cost.

Disadvantages of this approach:

- small advertising networks may attract irrelevant installations because of the lack of information for targeting;
- because of the absence of punishments directed by a small advertising network, "bad publishers" appear, who have a goal of generating motivated installations;
- for obtaining an adequate number of installations, it is required to use a large number of small advertising networks, which makes the process of advertising management more difficult.

Both strategies are used, but in order to determine the most profitable one, we will review the following aspects:

- obtaining installations for a mobile application;
- expenses associated with maintaining an advertising campaign;
- losses due to «bad publishers».

Obtaining users for a mobile application

Let us discuss a case when an advertiser wants to obtain more users (installations) with the predetermined threshold value of CAC (Cost of Acquiring Customers) from Facebook. Since such a strategy is used by many advertisers, RTB-competition and CPI increase. As a result of this, the number of users from a large channel with a given CAC value quickly decreases, in comparison with a small advertising network where competition and CPI are lower. Market research reveals [1] that most of quality installations in large channels are also available through small or medium channels. There are more than 1,000 less competitive advertising networks on the Internet, having a high-quality traffic from millions of applications (f. 1).

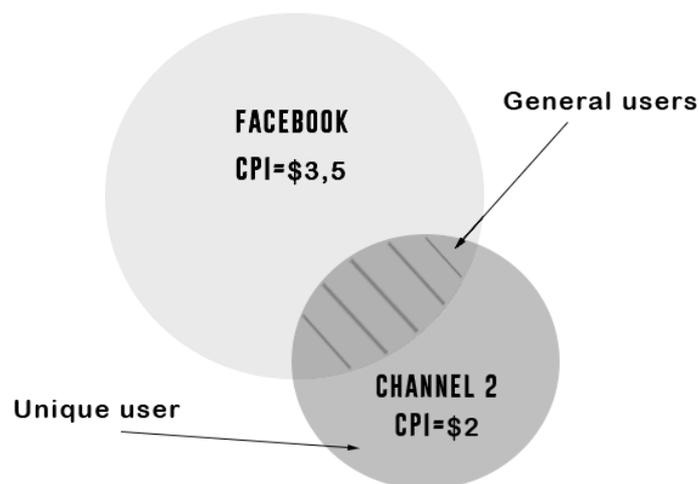


Fig. 1. Intersection of users from a large and medium channel

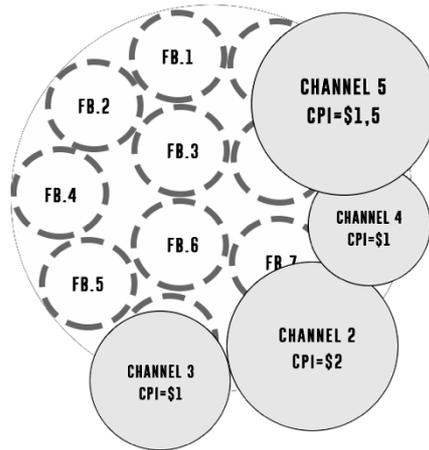


Fig. 2. Using targeting on Facebook for reduction of users intersection from other advertising networks

In order to reduce expenses on advertising in a large channel, it is possible to use several small channels. In order to not pay more for a user, it is needed to divide the target audience with the help of targeting into micro-audience, reducing the probability of intersection with other channels (fig. 2). This strategy is used by many large advertisers, such as the developer and publisher of mobile games “Machine Zone” [7], targeting on Facebook for reduction of intersection of users from other advertising networks.

Expenses on management of an advertising campaign

It is possible to group an advertising campaign manager’s labor costs into several categories:

1. Development of advertising content;
2. Working with advertising networks;
3. The data collection and statistical analysis of advertising campaign;
4. Optimization of an advertising campaign.

Labor costs of the 2nd, 3rd and 4th points are directly proportional to the number of advertising channels used. Let us highlight the individual cost of ICC (Individual Channel Costs) of one advertising channel. Then it is possible to calculate the total expenses on advertising in “n” channels:

$$C_n = \sum_{j=1}^n (CPI_j * V_j + ICC_j), \quad (1)$$

Where C_n – expenses on advertising on “n” channels;

n – the number of advertising channels;

CPI_j – the cost of installation on the j -th channel;

V_j – paid installations on the j -th channel;

ICC_j – the individual cost “ j ” of an advertising channel.

However, for reduction of ICC, it is possible to use automated solutions for simplification of maintaining multiple advertising channels [3]. Then the above-mentioned formula will change:

$$C_{na} = \sum_{j=1}^n (CPI_j * V_j) + (C_a + C_m), \quad (2)$$

Where C – cumulative expenses on advertising in “n” networks;

C_a – the cost of the service, automating management;

C_m – manager’s salary.

Then:

$$ICC = \frac{C_a + C_m}{n}, \quad (3)$$

Where ICC - the individual cost of one advertising channel.

The more advertising channels an advertiser uses with this strategy, the lower the ICC .

Modeling strategies of mobile marketing by applying the CPI model on the basis of linear approximations

Let us assume that an advertising campaign budget is 6,000 dollars. During the process of modeling, the following strategies were reviewed:

1. Using one large advertising network

Nowadays, Facebook is the largest network for obtaining mobile installations [8], thanks to its huge database and targeting technologies. This model is characterized by the following indicators:

- purchasing 15,000 installations every month on Facebook at a price of \$3.82 [8];
- irrelevance of “bad publishers” problem;
- advertising is managed by one manager with an average salary of 8000 dollars per month;
- the channel provides with quality installations with the high LTV.

Table 1. Results of modeling one large advertising network

Indicator	Facebook channel
Paid installations	15000
CPI	\$ 3,82
Budget for obtaining users	\$ 57300
Management expenses	\$ 8000
Total Expenses	\$ 65300
Quality installations	15000
LTV	\$ 4,50
Revenue from an installation	\$ 0,68
Revenue from users	\$67500
Total revenue from a campaign	\$ 2200
ROI of an advertising campaign	3,37 %

The return on investment (ROI) of this model is small, which is explained by expensive CPI due to the popularity and advantages of a large advertising network.

2. Using a variety of small advertising networks

Model parameter:

- for purchasing of the required volume of installations, it is necessary to work with ten small channels;
- CPI is lower due to less competition;
- for maintaining advertisements, the advertiser is forced to additionally hire a manager;
- the lack of information for targeting has a negative impact on the LTV indicator of new users;
- the problem of "bad publishers" is relevant.

Table 2. Results of modeling small advertising networks

	Channel 1	Channel 2	Channel 3	...	Channel 10
Paid installations	3000	3000	3000	...	3000
CPI	\$ 2,00	\$ 2,00	\$2,00	...	\$ 2,00
Poor-quality installations	0%	5%	10%	...	40%
AU budget	\$ 6000	\$ 6000	\$ 6000	...	\$ 6000
Management expenses	\$ 1600	\$ 1600	\$ 1600	...	\$ 1600
Total expenses	\$ 7600	\$ 7600	\$ 7600	...	\$ 7600
Quality installations	3000	2850	2700	...	1800
LTV	\$ 3,50	\$ 3,50	\$ 3,50	...	\$ 3,50
Revenue from an installation	\$ 1,50	\$ 1,50	\$ 1,50	...	\$ 1,50
Revenue from users	\$ 10500	\$ 9975	\$ 9450	...	\$ 6300
Revenue from a channel	\$ 2900	\$ 2375	\$ 1850	...	-\$ 1300
Total revenue	\$ 10625				
ROI of an advertising campaign	13,98 %				

The indicator of return on investment (ROI) for this model is higher, which is explained by the low CPI, even at a lower LTV. The strategy can be considered successful, since the ROI increased by 10.6%.

3. Using a variety of channels and automation services

The parameters are similar to the previous model with some exceptions:

- advertising can be maintained by one manager through automation;

- the price of automation service is \$3000;
- the service automatically filters out the “bad publishers”.

Table 3. Results of modeling automation services

	Channel 1	Channel 2	Channel 3	...	Channel 10
Paid installations	3000	3000	3000	...	3000
CPI	\$ 2,00	\$ 2,00	\$ 2,00	...	\$ 2,00
Poor-quality installations	0%	0%	5%	...	20%
AU budget	\$ 6000	\$ 6000	\$ 6000	...	\$ 6000
Management expenses	\$ 800	\$ 800	\$ 800	...	\$ 800
Total expenses	\$ 7100	\$ 7100	\$ 7100	...	\$ 7100
Quality installations	3000	3000	2850	...	2400
LTV	\$ 3,50	\$ 3,50	\$ 3,50	...	\$ 3,50
Revenue from an installation	\$ 1,50	\$ 1,50	\$ 1,50	...	\$ 1,50
Revenue from users	\$ 10500	\$ 10500	\$ 9975	...	\$ 8400
Revenue from a channel	\$ 3400	\$ 3400	\$ 2875	...	\$ 1300
Total revenue	\$ 23500				
ROI of a campaign	33,10 %				

With application of the automation service, the return on investment (ROI) of advertising increased by 19.12%. This allows us to conclude that when using a variety of advertising networks, automation is pretty effective.

Conclusion

As a result of the study of mobile marketing strategies with CPI pricing model and modeling of advertising campaigns based on linear approximations, data was obtained indicating a greater efficiency of campaigns using a variety of advertising channels to promote mobile applications and purchases of users. When using this strategy, it is recommended to use the system of automation of advertising management and statistics collection, since it significantly increases the return on investment (ROI).

The strategy of purchasing installations from one large channel with high-quality targeting is viable, but less effective due to high competition and, as a result, high CPI, as well as the lack of the possibility of obtaining a part of the target audience that does not interact with this channel.

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