

Personalization in E-commerce using profiles similarity

Radu LIXANDROIU¹, Cătălin MAICAN²

Abstract: *Understanding the use needs is one of the key factors of an online project. If these needs are quickly identified, the customer can be offered the best products immediately. Creating profiles allows the identification and communication of needs efficiently and effectively. Basically if these profiles are well established, it remains to identify just which is the closest profile to the online client. Profiling is a useful tool in marketing, increasing the functionality of sales application. These tools fall into customer-oriented tools, together with the analytical techniques ones and those suggesting the desired products.*

Key-words: *web personalization, customer profile, e-commerce.*

1. Introduction

Before the sales process takes place, an important step can be established consisting in understanding the user needs on different levels or purposes. There are many ways to identify user needs, such as interviews, discussions or supervision. However, an increasingly important role has lately been represented by the use of client profiles. (Chen Yi-Shin et al.), (Calabria 2004)

This article aims to make an analysis regarding the methods for creating and analysing client profiles.

Profiles are human archetypes that are characterized by the specific needs of online customers, which may be extended to a group of users based on common goals or personal characteristics. User profiles identify motivations and goals that lead them to a certain behavior. Although profiles are fiction, they identify characteristics of real users. (Schubert), (Sin Liem Gai et al.), (Calabria 2004)

2. The advantages of using profiles in online marketing

New Internet marketing techniques based on customer profiles focus on goal, customizing the information for each user groups.(Trajkova, Joana et al.)

¹ Transilvania University of Braşov, lixi.radu@unitbv.ro

² Transilvania University of Braşov, maican@unitbv.ro

Among the benefits of using customer profiles in Internet marketing, we may identify:

- The users' objectives are grouped, with a focus on client profile;
- Marketing focuses only on the creation and design of a set of representative profiles for a large number of customers, quickly identifying common needs;
- The efforts are concentrated only around client profiles;
- The evaluation can be done only to the user profile, thus lowering costs.

It often happens that products or services do not meet customer needs, which is why the act of purchasing is not completed successfully. This is because customer expectations are not correctly predicted by the sales team the person interacts with.[8]

The analysis focuses on user profiles and their activities. Usually this is done by recording options for certain criteria that the customers provide by means of interviews or observations.

Many believe that customer profiles are similar to market segmentation, but still there are some notable differences, the most important one being that marketing segmentation is not based on needs identified for online applications. For example, marketing segmentation identifies that a 30-35 years person wants to buy a travel insurance online, while the corresponding customer profile tells us that people prefer to pay cheaper for the insurance using a credit card.

Market segmentation is a very important step in profiling, but it is only an intermediate stage, when the data are not refined.(Degemmis et al.)

3. Creating a small number of representative customer profiles

The first question that arises here is: is a small number of profiles enough to cover the needs of a large population? Assuming a large population and analysing each individual's needs, we will reach a wide variety of desires without priorities.

Profiles having more levels of details remove confusion created by market segmentation. They allow users to identify discrete sets and create unique designs that represent each group.

3.1. Data analysis to identify profiles

A very important element is the written information of each user, such as their location, age, gender, hobbies etc. On the other hand, a crucial role is the "wish list" which supplements the information already controlled about the client.

In practice, there is no ideal number of profiles that can represent the population of clients better. However, most applications based on profiles use a relatively small number of profiles (considering that are sufficient 4-5 profiles). Too many profiles can create confusion.

Customer Profiles are designed to react to a product or service. Basically, they help in achieving the best possible customer advisors related to their preferences, as they are closely related to the generation of audience, with focus on different goals and customer scenarios.(Trajkova et al.), (Butler 2013).

For defining the customer profile we believe that an important factor is the purpose and details regarding the act of purchase.

3.2. The main factors when creating a client profile are:

- **Purchases already made by the client** - for example, an application may analyse products ordered by someone and then suggesting that client should buy other products already bought by other people who acquired the original product.
- **Wish lists** - Many e-commerce sites allow you to create wish lists which can then be saved, viewed later or distributed to people you know.
- **Analysing the browsing history** - for example, Amazon stores all browsing data of its customers - what products were added to cart, what products were added in the Wish list or abandoned baskets (not paid)
- **Possibility of creating top members** – these users receive certain discounts or promotions. In this case, it was noticed that, by being granted additional benefits, maybe financial ones, some customers have ordered more than in the period when they were not classified as top customers. Also, they were more willing to provide additional personal information to complete their user profile and thus get better sales advice.
- **Completion of personal data by registering on the site** - in addition to a number of traditional information such as personal identification or address (for delivery for online stores), various online applications may require additional information regarding personal preferences, popular product categories etc.(Schiaffi et al.)
- **Rating and Review** – they bring more value to the customer's personal profile, suggesting exactly what they want. (Butler 2013)

The sale based on customer profile is successful, but has better results when the client's personal profile is completed by the customer himself. This helps the clients get what they want in a shorter time, making the buying decision much easier.

Basically, in online applications, the sales services are oriented towards customer wishes. They become more useful as more clients provide personal data, do more orders or browse online. The worst case-scenario is the lack of any

information about the client, which leads to the inability to offer any suggestions (Bajarin 2011).

The whole process of customizing the online information is based on the idea that it is more useful to suggest specific products or services to the clients and not wait for them to look for these products/services using search engines available in the e-commerce site.

All the data collected should be used in the analysis to describe the customer needs as accurately as possible. Some data are used to attract new customers to the site, while others are used to determine that, once entered in the site, the user will buy a large volume of goods/services.

For example, in order to attract customers in the online store, automatic email messages are sent, based on certain groups of interests. Similarly, the data can be used in retargeting by promoting products that customers have missed or have added to their wish lists.

4. Using similarity index – the Jaccard index to create customer profiles for online shops

The Jaccard index or coefficient of Jaccard similarity index is a statistic index used to compare the similarity of several sets. The Jaccard index of similarity is defined as the intersection of the sets divided by the sample sets meeting:

$$J(A, B) = \frac{|A \cap B|}{|A \cup B|}.$$

If A and B are empty, we define $J(A, B) = 1$

$$0 \leq J(A, B) \leq 1.$$

The Jaccard distance measures the degree of similarity between sets of items.

This value is complementary to the Jaccard coefficient and it is obtained by subtracting the value of the Jaccard index from 1.

$$d_J(A, B) = 1 - J(A, B) = \frac{|A \cup B| - |A \cap B|}{|A \cup B|}.$$

It is worth noting that a client does not belong entirely to a single profile and therefore that client should be matched with the highest index available. Once we identified the profile channel based on the customer specific products and services, this channel will meet the maximum requirements to that client.

Subsequently applying the model can measure the degree of belonging to the previously identified group by comparing the number of products purchased with the initial situation, or comparing the wish list with the list of products purchased.

For example, one can consider the creation of a representative number of 5 different profiles for an online store. The individual portrait of the client can be achieved using the data filled directly by the client when creating the account on the site, their history site navigation, viewed products, products added to the wish list and the products which are found in abandoned baskets.

This picture of the client is then compared to the representative profiles already identified for our clients. The application calculates which profile is the closest to the real one based on the Jaccard similarity index.

	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Jaccard index	Jaccard distance
Profile A	1	0	1	1	1	1	0.80	0.20
Profile B	1	1	0	1	1	1	0.50	0.50
Profile C	0	0	1	1	1	1	0.60	0.40
Profile D	1	0	1	0	1	0	0.40	0.60
Profile E	0	1	0	0	0	1	0.20	0.80
Client	1	0	1	1	0	1		

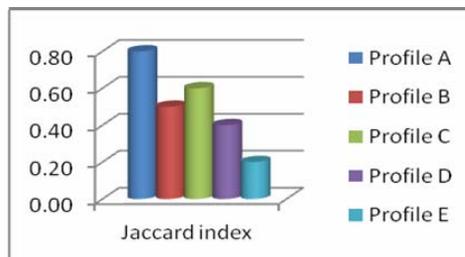


Fig. 1. *The Jaccard index for profiles*

Therefore, for the above example, based on the Jaccard index profile, we can say that the nearest profile to the customer's options is Profile A (0.80).

5. Conclusion

Profiling for online sales must provide information about users and their purchasing decisions, assisting the sales team to focus on the products and services the customer needs and also on their expectations as well.

If a visitor matches a profile, an associated personalization will be offered to serve the personalized content. This way a highly relevant, engaging and enhanced user experience is provided, causing a significant increase in the conversion rates and revenue.

6. References

- Chen Yi-Shin, and Cyrus Shahabi. "Improving User Profiles for E-Commerce by Genetic Algorithms". Available at: <http://infolab.usc.edu/DocsDemos/YodaGA.pdf>, Accessed on: 04.01.2015
- Degemmis, M., P. Lops, S. Ferilli, N. Di Mauro, T.M.A. Basile, and G. Semeraro. "A Relevance Feedback Method for Discovering User Profiles from Text" <http://www.di.uniba.it/~ndm/publications/files/degemmis04sawm.pdf>
- Degemmis M., Lops P., Ferilli S., Di Mauro N., Basile T.M.A., Semeraro G. "Learning User Profiles from Text in e-Commerce". Available at: <http://www.di.uniba.it/~ndm/publications/files/degemmmis05adma.pdf>, accessed on: 04.01.2015
- Schiaffi, Silvia, and Analía Amandi. "Intelligent User Profiling". Available at: <http://www.exa.unicen.edu.ar/catedras/knowmanage/apuntes/56400193.pdf>, accessed on: 04.01.2015
- Schubert, Petra. "A Project Method for the Personalization of E-Commerce applications in SMEs". Available at: [http://www.academia.edu/2829192 A_Project_Method_for_the_Personalization_of_E-Commerce_applications_in_SMEs](http://www.academia.edu/2829192/A_Project_Method_for_the_Personalization_of_E-Commerce_applications_in_SMEs). Accessed on: 04.01.2015
- Sin Liem Gai, and Ria Purnamasari. An. "China E-Commerce Market Analysis: Forecasting and Profiling Internet User". Available at: http://www.researchersworld.com/vol2/issue3/Paper_1.pdf. Accessed on: 04.01.2015
- Trajkova, Joana, and Susan Gauch. "Improving Ontology-Based User Profiles". Available at: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.59.2598&rep=rep1&type=pdf>. Accessed on: 04.01.2015
- http://www.experiencesolutions.co.uk/questions/what_is_customer_profiling.php
- Butler, Christopher. 2013. "Don't make me search". Available at: <https://www.newfangled.com/dont-make-me-search/>, accessed on: 04.01.2015
- Calabria, Tina. 2004. "An introduction to personas and how to create them". Available at: http://www.steptwo.com.au/papers/kmc_personas/, accessed on: April 15, 2015
- Bajarin, Tim. 2012. "Why Tablets are Important to eCommerce". Available at: <https://techpinions.com/why-tablets-are-important-to-ecommerce/5249>. Accessed on: 04.01.2015