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Evaluation Of Web Personalization Techniques

Pardeep

ABSTRACT

There are various personalization techniques and plenty of them have been applied to the services provided on the web. In this paper we suggest the proper method of personalizing the web services and a method for evaluation of the same after applying the personalization.

Introduction:

There are seven stages to implementing an effective personalization effort. The section that follows covers three of the initial steps: Defining online personalization goals, evaluating personalization approaches, and planning for data collection and management. The core value of online personalization lies at delivering businesses the capability of establishing customer relationship and customer value management lifecycles. It may seem obvious; however, no personalization effort is complete without a mechanism for assessing each initiative's effectiveness and a process by which subsequent efforts can be optimized to achieve higher level of success. Companies must first assess the impact of each initiative - whether that is a site based promotion or an e-Mail campaign - and second, they must be diligent in modifying and improving initiatives in an iterative fashion.

To accomplish this in a more general approach, organizations should follow the steps outlined below – the first few of which are the basis of the initial data collection and management effort:

- Identify business objectives for which personalization should have a leveraging effect
- Define personalization goals – some of them could be:
- Visibility & Readability

oMake primary links and actions visible and obvious.
oDesign pages for scanning, using highlighted text, bulleted lists, and short sentences.

•Simplicity

oKeep frequent or critical tasks short and simple.
oTerminology should be based on the user's language. Remember, less is more.

•Performance

oDesign pages to download quickly, for more than half of the user population till accesses the internet at 33.6kb or lower.

•Navigation & Organization

oProvide clear methods of continuing, canceling or going back, and going home on every page. Provide effective page

titling to keep the user informed of location.

oOrganize pages so that related information is grouped together and easily accessed.

•Consistency

oSimilar tasks should be performed similarly. Reduce the need for users to learn multiple behaviors and navigation paths.

•Feedback

oWhen there is a problem, a message should tell the user exactly what's wrong and how to fix it in language they understand.

•Tolerance

oProvide forgiving systems that minimize the cost of user mistakes and allow users to undo their actions.

•Determine the metrics the organization is looking to apply (e.g., customer profit per ad campaign)

•Identify the data the organization needs to determine the data required for the evaluation process (e.g., number of customers, sales volume, gross margin, ad campaign cost, operating overhead, click through rates, conversion rates)

•Develop a solution which is appropriate for the specific personalization goals to analyze the data (e.g., NetGenesis, OLAP tools)

•Identify the location of that data (e.g., Web logs, application logs, event logs)

•Deploy the solution to target the right customer segment

•Produce metrics reports, and.

•Automatically feed the metric results back to the personalization goals and techniques used.

STEPS OF BUILDING A PERSONALIZATION INITIATIVE:

In more detail the steps of building a personalization initiative include:

•PLAN

oDefining Personalization Goals: Before an organization

begins to plan their approach to personalization, they must first define they we are setting out to accomplish, because the organization cannot measure what they cannot define. Personalization initiatives must begin with an understanding of what personalization means to the organization. The type of business they are in, the customers they sell to and even the products they bring to market will all impact the ways in which they will use personalization and the benefits they seek to gain from it. Personalization initiatives should be tied to discrete business goals.

oChoosing Personalization Approaches: After determining the scope and magnitude of the effort, organizations must then match the ends with the means. Having set the benchmarks related to specific desired outcomes, companies must then assess which approach or combination of approaches to personalization will best suit their needs. Earlier in this section we have presented a critical extensive description of various distinct personalization approaches as well as a framework for building online consumer relationships using personalization techniques.

oPlanning for Data Collection and Management: It is a way to deliver to the organizations customers' information, incentives and sales opportunities that are timely and pertinent. In order to do this well, it is necessary to understand who the organizations customers are, what they one of their channels.

•DO

oData Sources for Online Personalization Efforts: The primary means for data collection to support the online effort are research, site behavior and usage, marketing campaigns and enterprise data. Through research, both primary and secondary, companies can gain information that will assist them in building the foundation for initial customer management and messaging strategies. Secondary research is often considered a good starting point.

oCustomer Profiles: The product of these combined efforts will be information about the organizations' customers that can be used to establish customer profiles - centralized sources of information about each customer. Profiles are the collection of attributes that characterize the explicit, implicit, demographic and psychographic elements of each customer's interaction with the organization. These profiles are the product of the entire data collection and management effort and will be the foundation of their personalization strategies.

oData Management: Significant energy will need to be dedicated to determining the best strategies for storing the information that organizations collect. The information that will be relied upon most for generating reports and driving personalization should be stored in such a way that it remains easily accessible. Less frequently used data can be stored elsewhere.

•CHECK: Through this evaluation phase, organizations will be able to compare each initiative's results with the business objectives initially sought and, hopefully, collect the metrics' results to feed the personalization techniques for optimization.

•ACT: As a result, companies must continue to optimize

campaigns, sites and business initiatives over time, always making improvements based on proven success records and the information provided by ongoing data collection and analysis.

Looking at the evaluation of personalized web services through a more e-business perspective the criteria for measuring success and feedback differ. How can we measure success in the design and evolution of personalized interactive services for e-business?

The ability to design, implements, and maintain user interfaces and user navigation in personalized interactive services requires defining meaningful metrics and feedback techniques.

In order to enhance the evaluation methodology of e-business personalized web sites we need to utilize e-business intelligence. E-business intelligence is the analysis and use of information collected about visitors to an e-business Web site.

According to Schonberg (Schonberg et al., 2000) good business practice dictates the use of effectiveness measurements to guide the design of all Web site features.

For Web sites with personalized interactive content, the process must take the highly dynamic nature of the content into account and the outline of a complete process for a design-measure-analyze feedback cycle.

In order to measure and evaluate the successful provision of personalized eservices to the end customer we need to understand what success means. Success of an e-business site usually resides to the answers on a set of questions such as:

What types of visitors does an e-business want to attract, what messages need to be conveyed, what should the visitor be able to accomplish, and what does the e-business want the visitor to do? The metrics required to evaluate success follow directly from the goals.

Particularly, measuring the success of personalization initiatives can now expand the simple customer acquisition metrics that dominated the 1990s. Focus is now on correlating campaign/promotion metrics, such as acquisition and conversion rates, to the primary goal of each initiative (e.g., actual or ongoing sales, registration, data collection, in-store traffic, etc.). In the same manner that the strength of online personalization efforts can be bolstered through the use of enterprise data, their impact can now be better understood, determined and justified by evaluating them, in part, with traditional business metrics (e.g., sales volume, gross profit, ROI, etc.).

By basing evaluation on the same metrics, this approach to measurement enables organizations to align their online and enterprise initiatives and to also learn the most successful tactics for managing profitable customer relationships. At the end, it is a company's ability to effectively fine-tune its personalized approach to customer management with its most profitable segments that will more definitively result in the benefits described earlier. By closely monitoring the effectiveness of certain marketing campaigns or discrete initiatives as well as the behavioral and transaction history of customers, companies will also have the added benefit of being able to track ROI at a much more granular level than in the past.

An interesting question is what metrics are best for evaluating the effectiveness of Web site design features? An interesting and worthy approach for evaluating the effectiveness of Web site design and personalization features can be based on clickthrough and look-to-buy metrics. Using

an example from the online ad-banner industry, click-through data measures the ratio of clicks to impressions, where an impression is simply the display of an ad banner on a Web page. A high clickthrough rate means visitors who see the ad click on it frequently, therefore, the ad is bringing many visitors to the site. Look-to-buy data compares ad banner impressions with sales transactions and revenue directly attributable to the ad banner. It is a better measure of ad banner effectiveness, since the quality of visitors coming from the ad banner is captured and return on investment more accurately measured.

Look-to-buy metrics work well for dynamic, personalized content. In fact, ad banners fall into this category - ads typically are dynamically rotated and may also be personalized. With look-to-buy metrics, each personalized component on a page can be counted and its effectiveness evaluated. Generally, however, if the goal is something other than maximizing sales, the appropriate metric would be look-to-X, where X is the goal. In addition to the metrics mentioned above, additional supportive metrics should be defined in order to provide a more structured and concrete evaluation feedback. Such metrics include: Repeat business, Clickthrough ratio, Time spent, Order Size, Buying frequency, Satisfaction/return rate, Web-influenced purchases.

Since success can only be implicitly inferred from the user actions, evaluating the success of personalized propositions is unavoidably based on assumptions. For example a newspaper filtering and personalization system that .Re-orders each major index session (e.g. international news), including the front page, according to the user preferences., assumes that .since the user followed a link to the articles body they must have found the lead relevant, even if the actual body proved not to be interesting upon further reading. (Kolcz, 1999).

According to Schonberg (Schonberg et al., 2000), the ability to collect and combine customer data from multiple sources enables richer analysis. Click - stream data, which captures the sequence of Web pages seen by each visitor to a Web site, is the standard data source for tracking visitors browsing behavior.

However, voluminous as this data is, it is low level and contains limited information. Many useful metrics cannot be calculated with click - stream data alone. Integrating click - stream data with other sources considerably expands the quality of information. Furthermore, newer technologies and services make large-scale collection and sharing of data possible. Once goals, metrics, and data sources are identified, the Web site must be designed to collect and correlate data, extract information, and calculate metrics. When considering metrics and building user profiles from the visitor's perspective, it is imperative to consider the entire user experience at the Web site. In addition to personalization features, the user experience includes the tasks, services provided, navigation, design, and the overall value the visitor gains by visiting the site. To the extent that metrics gathered can be interpreted to enhance the user experience in these areas the more satisfied the visitor would be with the site, which will encourage future returns to the site.

The solution proposed by this section, takes into account the state-of-the-art critical review in personalization techniques conducted in this chapter as well as the evaluation methodologies e-metrics as the have been described above. Already existing personalization architectures should be extended to include an evaluation layer. For example, an

extension of an information architecture based framework for a personalization system by Instone (Instone, 2000) is provided in figure 1, including an extra layer for measuring a personalization initiative's success. In a similar manner, all personalization frameworks should be extended to accommodate the optimization / self-adaptivity stage. Otherwise, the personalization initiative's success cannot be improved. To achieve optimized results, the personalization techniques are fed with the results of the evaluation metrics, and, thus, any personalization architecture and / or framework has to reflect the plan-do-check-act cycle explained previously. The feedback input to the personalization techniques is an open research issue that we are currently working on.

Within the context of personalization, attributes and attribute values provide the "glue" which links together the users and the content and forms the personalized user interface. Attributes of the content are matched up with attributes of users. Specific attribute values about a user are paired with content meta-information to determine which content to display and how to present it at any given time. In this framework, we have users and the content meeting at the user interface through the process of personalization.

In more detail:

- Users:** Users have profiles that represent their interests and behaviors. Specific values for a profile are determined by the set of defined attributes and the possible values for each attribute.
- Content:** Likewise, content is profiled, based on a set of attributes and assigned specific values.
- Underneath the user interface is the profile layer, where specific values for the attributes are used to determine what content to present to which user under what conditions. A user's profile exists here and can be changed explicitly by user actions (such as filling out a form that requests particular profile information), or implicitly by certain actions (such as buying certain products).**

Likewise, a profile of the content exists and is matched with user profiles through a set of rules.

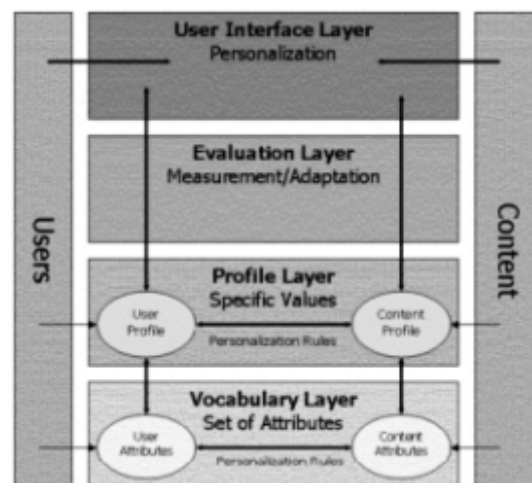


Figure 1: An Information architecture - based framework for evaluative personalization systems (Adapted from Instone)

- Beneath the profile layer are the vocabularies which regulate the assignment of attribute values. At the vocabulary**

layer, the attributes themselves are defined and the set of acceptable values (preferred terms) are specified. The relationships between attributes are defined, such as child and parent attributes.

- The personalization rules are what leverage the profiles, attributes and values in order to make the personalized user experience. The most powerful rules operate on the set of attributes as a whole, at the vocabulary Layer. When user and content profiles share the same attributes, then we can make rules that work for all values of those attributes.

- The evaluation layer filters the interactivity of the end user through its personalized interface and collects results based on the predefined e-metrics defined at design level and the feedback provided by the end user/customer. The data collected in conjunction with Web server log files are analyzed using Web Usage Mining techniques and the results obtain are filtered back into the personalization rules that were described above.

In general, this architecture defines a personalization system as any piece of software that applies business rules to profiles of users and content to provide a variable set of user interfaces. Nevertheless, one should always bare in mind that certain issues might affect the evaluation procedure such as the sequence of sessions used by a user to contact a site, the fact that ECRM should observe the individual sessions of a user as well as the whole life cycle of the user and the web-structure usually affects the behavior and navigation of a user.

METHODOLOGICAL FRAMEWORK FOR EVALUATING AND GUIDING PERSONALIZATION PROCESS:

In general, during the personalization evaluation process we can be interested to answer questions of two types; (1) whether a personalization technique has positive effect, i.e. a performance metric should reflect that personalizing is better than not personalizing, and (2) whether this personalization technique is better than some other alternative approach for personalization. These questions can be answered with classic controlled experiments called AB and multivariable tests. In the AB type of experimental design, users are randomly allocated into a treatment group that assumes personalization and a control group with no personalization. In both groups, the desired metric is observed before and after the treatment group intervention. For example, using this method to evaluate personalization technique used in the CHIP project would mean randomly selecting two groups of users (see Figure 2), then measuring the number of browsed artworks (or some other metrics) in the first period characterized by no personalization for both groups, followed by measuring the number of browsed artworks in the second period where one of the groups has a personalized content. Following such scenario, the analysis of performance estimates in the two periods for both groups indicates whether personalization was successful or not. The results of such guided personalization can be stored for further analysis and the application of inferencing (meta-learning) techniques. This leads to discovery of knowledge that can be used for further improvement of personalization strategies and directing the continuation of the controlled experiments.

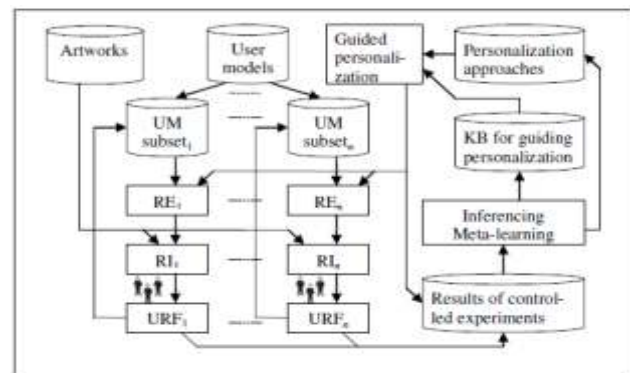


Figure 2: Evaluation framework of 'controlled experiment'-based guided personalization (RE – recommendation engine, RI – recommended items, URF – user relevance feedback).

Such experimental design in e-commerce applications in the natural settings is less acceptable, since having a period without personalization implies the risk of losing customers. In educational and entertainment applications, however, it can be more freely used, especially if the visitors are aware of such procedures and can treat them as a natural part of the personalization process during which the recommendation system learns to improve a personalization technique or to select the most appropriate personalization techniques among available.

CONCLUSION:

All the aforementioned techniques have their respective advantages and disadvantages. They can be applied to various different aspects of web personalization, but this should be done after analyzing the requirements of personalization of a particular business type or purpose of a particular website.

Further work in this direction is required to be done to make distinction between the available techniques and tools, so that one is able to choose a web personalization technique that suits the requirements of a specific business type.

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