The Art of Personalization

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INTRODUCTION

Personalization is more than “my account” customization. Personalization is more than “business rules” or collaborative filtering. Personalization is delivering “individualized” recommendations, advertisements, and content delivered with the touch and timing of a close personal friend — or a savvy salesperson who knows you, your tastes, and interests as well as your close personal friend. Personalization when delivered with this accuracy, skill, and finesse is “the art of personalization.”

Personalization the e-old fashioned way is to ask your Web customers to explicitly state their preferences and to tailor their experiences on your site. This form of personalization has been around for years, and although it is perceived as a feature, it is nevertheless a commodity in today’s e-business environment. Most forms of manual personalization fail because they require Web visitors to identify themselves, configure their individual settings, and maintain their personalized environment over time. This is not personalization — this is customization. It fails because the burden of responsibility falls on the customer. It’s the same as having to write your own birthday wish list and then mail it to your friends and family.

Personalization integrates all customer “touch points” to incorporate customer transactions from “brick and mortar” stores, “click” e-tailers, and “brick and click” e-businesses. Personalization is not myopic with a single-channel viewpoint. Personalization brings together all of a customer’s information — “clicks,” purchases, returns, complaints, ratings, wish lists, and demographics — for a complete 360° view of the customer.

True personalization is automatic. True personalization is realized when it is non-intrusive, timely, and helpful. True personalization delivers “a-hah” when and where it is perceived to be of most value: to the customer and the e-tailer. True personalization delivered with the finesse, timing and helpfulness of a close friend at the mall can be called “The Art of Personalization.”

PERSONALIZATION APPROACHES

Originally, many sites created the “MySite.com” version of their Web site. This allowed registered customers to manually set preferences and configure the Web
site for their interests. The MySite.com approach allowed customers to select the stocks they wanted to watch, the categories of information updates, reports, and articles they wanted to view, and when and how they wanted to be notified.

Manual personalization has been around for many years but has never really taken off. The problem with manual personalization is that it is really just “user configuration” that places the burden of defining the preferences on the customer. True personalization needs to be automatic, non-intrusive, and perceived as offering value to the visitor — whether anonymous or registered.

Business rules are not personalization. Business rules are simply placing the candy in the checkout line at the grocery store or asking the customer to purchase tape cleaner when they’re buying a new VCR player. It is delivered with the thought and intention of the e-tailer — and it’s obvious. Customers perceive this attempt at “personalization” as what it is — an effort by the store to sell you something additional. Some business rules can be helpful. Suggesting that customers buy the extended warranty on an expensive appliance is an example of a helpful business rule. Suggesting to purchase winter socks to go along with the winter boots is another example of how business rules should be employed. But creating an inventory of business rules is resource-intensive and expensive to maintain. And it usually can’t help but appear to be what it is — an effort to sell you something additional.

Business rules can help improve the “personal touch” for your Web visitors, but personalization technology implemented in a simplistic fashion can give the impression of an “automaton” Web site and can appear depersonalized. Personalization delivered through business rules technology tends to be limited to simplistic rules, like suggesting to purchase the extended warranty. Just remember your initial reaction when you enter a department store and you are asked whether you’d like to open a store credit card account: annoying and certainly not personalized. Business rules are only as good as the marketers that conceive and implement them and require significant resources to define and maintain them.

Collaborative filtering is relatively new technology that can deliver better results. Just go to the leading Web sites that offer “recommendations” and you notice the value. After purchasing a book on *Learning to Golf*, you later return to the Web site and find other books on *Greatest Golf Courses* and *Golf Tips from the Pros*. These recommendations seem relevant, timely, and yet sometimes simplistic. Often you’ll see other *Learn to…* books and videos, like *Learn to Ski*, *Learn to Play Tennis*, and *Learn to Sew*. Compared to past manual attempts at personalization and “e-expectations,” this is a breakthrough. But now when you visit your favorite Web sites, you might view suggestions related to every past purchase, regardless of whether it was for you, your wife, or your nephew.

Collaborative filtering automates the process of personalization by matching visitor profiles with profiles of other customers who exhibit similar behavior, share similar likes and dislikes, and have similar demographics. Collaborative filtering is currently the most common personalization technology. But collaborative filtering
requires extensive computation power, so it is forced to make simplifying assumptions. Collaborative filtering does not scale well. When collaborative filtering technology is applied to high-volume Web sites with large numbers of Web visitors/customers, it fails due to the computational burden it imposes. Consequently, collaborative filtering makes simplifying assumptions to reduce the data complexity and volume and groups individuals into “representative customers” or “mentors.” That’s the problem. An individual’s behavior is assigned to that of a “mentor” to speed up performance, and customer behavior is lumped into aggregate representative customer behavior. An out-of-character purchase of a gift for a friend may skew your recommendations for many subsequent visits. One Web site that uses collaborative filtering complains that one of their “representative customers” (“mentors,” in collaborative filtering terminology) for rating “Action” movies is from India. Consequently, visitors who enjoy action-packed movies starring Arnold Schwarzenegger, Bruce Willis, and Clint Eastwood view recommendations for Indian movies starring Amitabh Bachchan. This is great if you know who he is (India’s equivalent of Arnold Schwarzenegger), but more times than not, it is an example of a typical casualty of collaborative filtering technology.

360° VIEW OF THE CUSTOMER

Data comes from many sources: a customer’s purchase on the Web site, ratings of a customer’s “likes” and “dislikes,” demographic information offered freely by your customer or purchased from external sources. Personalization also integrates all customer “touch points” to incorporate customer transactions from “brick and mortar” stores, “click” e-tailers, and “brick and click” e-businesses. It is this complete 360° view of the customer that is stored in corporate databases and can be tapped to provide insight. Without the proper tools, software, and applications, this stockpile of data can clog corporate disks and cause frustration for customers who expect this information to be fully utilized to better serve them, their needs, and their interests — both explicit and implicit.
GATHER MORE INSIGHT, NOT MORE DATA

Many Web sites believe they need to collect every “click” of every Web visitor. This results in a deluge of generally “informationless” data. Most Web traffic reporting tools summarize this data into aggregate measures such as hits, pages visited, and impressions. Because they fail to recognize individual behavior, they offer little information other than summary Web traffic reports.

Personalization technology handles individual traversing behavior and combines it with registration data and purchase information. Many e-businesses combine registration data with externally purchased demographic information to enhance their knowledge of their customers. Additionally, many Web sites ask customers to provide specific “ratings” about items on their site to capture how much a customer “likes” or “dislikes” the items. This information combined with demographic, transaction, and navigation data can provide great insight into customers’ preferences, wants, and interests — and provides the base data that can enable true personalization.

ENTER THE POWER OF THE DATABASE AND DATA MINING

Companies can collect enough data in one day on the Web site to overflow the Library of Congress. Today, you need to gather and manage information from every customer “touch point” — in real time — and discover each visitor’s and customer’s tastes and interests hidden in their explicit and implicit actions. Explicit actions, such as purchases, shipping addresses, ratings customers provide, and demographic data, can provide immense insight to help e-businesses satisfy their needs. Implicit actions, such as Web pages visited, items “clicked,” and market basket combinations, past and present, can yield greater insights. A customer who visits your Web site and adds turtlenecks and wool socks to his shopping cart but only window shops for fleece jackets and windbreakers might be delighted if the Web site suggests that he consider purchasing a beautiful Norwegian sweater.

The problem, again, lies in the amount of data. Business rules usually only deal with general rules of thumb and strategies on the high-volume products. Making simple recommendations based on business rules can help improve a Web site’s effectiveness but fails to deliver “personalization.” The concept is explained through a phenomenon known as “Zipf’s Law.” Zipf’s Law explains the relationship between popularity and frequency and can be understood best as it applies to Web sites. Few “things” (Web sites or items within a Web site) are universally popular. Actually, many Web sites or items are equally unpopular — or restated, popular only within narrow segments. Everyone competes based on price on the high-volume products. Consequently, they become commodities. It is actually the items that are popular only within narrow market segments that command the highest margins. The highest margins are achieved by selling many niche products to the right customers.
Here’s where personalization built on data mining technology really works. Data mining technology is good at finding complex and subtle patterns hidden in large amounts of data. Personalization built on data mining technology goes beyond basic business rules or simplistic collaborative filtering techniques and allows e-businesses to interact with their visitors and customers in a more “individualized” relationship.

Adding automated intelligent personalization technology extends the usefulness of a Web site and delivers real, personalized, incremental value to both Web visitors and e-tailers.

**THE ART OF PERSONALIZATION**

To reach the “art of personalization” — where you can suggest “individualized” recommendations, advertisements, and content delivered with the touch and timing of a close personal friend, requires special capabilities of a personalization product offering. The personalization technology must first be able to make “thoughtful” recommendations to anonymous Web visitors. A Web site that claims to provide recommendations needs to be able to offer recommendations that are better than “blind” banner ads or the one-size-fits-all product special offers made to anyone who visits the Web site. Instead, effective personalization takes into consideration all available data — navigational, registration data, demographic data, past purchases, and even ratings data — and uses this information to suggest individually tailored recommendations, navigation, and banner ads.

But in true personalization, good recommendations go beyond simply what science and technology allow. The marketer’s insight, experience, and savvy enter into the process. If you were to simply suggest the most popular items that most people purchase, so what? Good recommendations sometimes take a chance by suggesting the out-of-ordinary item. Rather than suggesting purchasing bananas in a case where the customer is likely to buy the bananas with or without your
recommendation, why not suggest fresh red raspberries, which could increase the order?

Personalization becomes an art when you understand where and when to suggest the “right” things. For example, at the time a Web visitor is searching your site for cameras, you probably want to suggest other types of cameras, 35mm or digital, or possibly digital video rather than suggesting film. When the customer reaches the checkout screen, then you might want to suggest the purchase of film or camera cases. Similarly, when a visitor is searching your site for golf or ski equipment, you may want to display banner ads that offer full vacations to exotic golf or ski destination resorts. Personalization when delivered as an “art” combines the science of data mining technology with the savvy delivery of a seasoned sales executive who makes suggestions because he knows you as your closest friend.

**ORACLE PERSONALIZATION**

Oracle Personalization helps companies provide real-time recommendations over the internet — supplying customers with personalized product recommendations, ratings of the likelihood that the customer will “like” the recommendations, and improved site navigation based on visitor interests and profiles.

Oracle Personalization is part of Oracle Application Server (OracleAS)— the industry’s most complete and integrated application server — providing real-time personalization for e-business sales channels, such as Web Stores, application hosting environments, and call centers. Oracle Personalization provides an integrated real-time recommendation engine that is deployed via Oracle Application Server.

By delivering real-time personalization via the OracleAS and Oracle Database, Oracle Personalization delivers powerful, scalable real-time personalization for customer “touch points.” This enables e-businesses to deliver tailored, 1:1 customer experiences that will turn browsers into buyers.

Oracle Personalization is designed to meet the challenges of vast amounts of Web data and yet enable the personal, 1:1 relationships that e-businesses require in order to compete today. Because it benefits from the scalability of the Oracle Database, Oracle Personalization can analyze large volumes of customer data while preserving the uniqueness of individual customer relationships.

Oracle Personalization uses data mining technology to sift through the mountains of e-business data generated from customers’ “clicks,” transactions, demographics, and ratings data gathered from Web sites.
Oracle Personalization provides real-time recommendations and answers to questions such as:

- Which items is this person most likely to buy or like?
- People that bought or like this item are likely to buy or like which other item?
- How likely is this person to buy or like this particular item?
- Which items is this person most likely to buy or like, given he likes or is buying another item now?

Data mining is acknowledged to be more accurate because it doesn’t make simplifying assumptions to reduce computing complexity. Our results using Oracle Personalization’s Transactional Naïve Bayes and Predictive Association Rules algorithms have shown significant improvement in accuracy over collaborative filtering.

**ORACLE PERSONALIZATION KEY FEATURES**

**Real-Time Recommendation Engine Deployed on OracleAS**

Oracle Personalization dynamically serves personalized recommendations (such as products, page content, banner ads, and navigational links) in real time based on a registered customer’s or anonymous visitor’s explicit (transactions, purchases, ratings, and demographic data) and implicit information (mouse clicks, pages visited, and banners viewed).

DBAs and Webmasters use Oracle Personalization’s Recommendation Engine API to instrument a Web site to tag or capture a visitor’s “clicks” and to request real-time recommendations. This API eliminates the need to sift through mountains of noisy “clickstream” Web log data. Oracle Personalization’s “click” data are combined with historical data, if available within the Oracle Personalization schema, and are passed to the Oracle Personalization Recommendation Engine. The Recommendation Engine searches for “rules” or recommendations that best fit the current session and historical data scenario and passes the recommendations to the Web application in a fraction of a second.

**Model Building Embedded in the Oracle Database**

Oracle Personalization is completely embedded within the Oracle infrastructure, for power, scalability, and minimization of data redundancy. Rather than extracting the data to an external data mining server, Oracle Personalization collects the data, stores the data, and builds predictive models — all within the Oracle Database — and then deploys real-time recommendations on the OracleAS.
Data Mining Technology

Powerful data mining technology embedded in the Oracle Database automatically discovers individualized behavior patterns to generate highly accurate personalized recommendations in real time. Data mining is acknowledged to be a more sophisticated and accurate recommendation engine than collaborative filtering because it takes into consideration individual behavior and data. Collaborative filtering works by using a similarity metric, a subgroup of people whose preferences are similar to the preferences of the person who seeks advice. If the similarity metric has indeed selected people with similar tastes, the chances are great that the options that are highly evaluated by that group will also be appreciated by the advice-seeker. But collaborative filtering fails to offer sufficient granularity of customer types and makes many simplifying assumptions. OracleAS Personalization’s usage of data mining technology enables it to provide more accurate and sophisticated recommendations.

Personalization Index

OracleAS Personalization’s “personalization index” allows e-tailers to specify the amount of “individuality” desired. Recommendations can either be widely applicable, but perhaps perceived to be of lesser value, or more “individualized” and hence of higher perceived value. For example, it is easy to make suggestions of books and videos that many people enjoy, such as a Harry Potter novel or a Michael Crichton thriller. However, customers usually perceive personalized recommendations rather than a broad list of possibilities as having higher value. Also, because most stores compete based on price for popular items, it is often the unpopular products that produce the largest margin. The personalization index is adjustable on a “per recommendation” (API call) basis.

History vs. Current Session

Sometimes you want to emphasize past purchases and sometimes you want your transactions and “click” behavior to reflect only the very current history. A home furnishings and decorations Web site should have a long “memory” of past customer behavior, while a music or teenage fashion e-tailer would be better served by recommendations that employ a very short “memory.” For instance, a Britney Spears CD purchased during the holiday season may not reflect the customer’s usual behavior; it may have been a one-time gift for a niece. OracleAS Personalization allows Web sites to set the “history vs. current session ratio” on a “per API call” basis for just this reason.
Taxonomy and “Contextual Filtering” to Refine Recommendations

OracleAS Personalization supports the concept of taxonomy to provide context. The Web site’s taxonomy or structure tells OracleAS Personalization how things are organized. For example:

Oracle Personalization
Taxonomy Example

OracleAS Personalization takes advantage of this taxonomy information to create “filters” to constrain OracleAS Personalization’s recommendations to a subset (or multiple subsets) of categories. For example, when a customer is in the “sneakers” section of the Web site and asks for recommendations, OracleAS Personalization can suggest only other sneakers rather than suggesting tennis racquets, volleyballs, etc. This feature can be used to keep a customer focused and increase their likelihood of making a purchase.

Ratings Data

Oracle Personalization handles “ratings” data, or the measure of how much a customer “likes” or “dislikes” something. Ratings data can be used both to collect detailed information from customers and to make predictions of how much they might enjoy a recommendation. Asking a visitor to rate how he liked past movies, music CDs, or restaurants or hotels allows Oracle Personalization to make recommendations that also provide a degree of anticipated customer satisfaction. Why simply suggest a list of items when you can also predict which ones will really satisfy the customer and which ones will simply fill the bill? Suggesting a premium or luxury hotel at much higher prices might be favored over a standard hotel at standard prices when you also display the degree of enjoyment predicted for the customer.
BUSINESS BENEFITS OF REAL-TIME PERSONALIZATION

More Accurate, Real-time Recommendations

Some e-tailors have identified a problem they encounter when a customer purchases something from the Web store at 8 AM and later returns at 4 PM and views recommendations that include the item just purchased. This makes the e-tailer look bad, because their recommendations appear not “current” or real-time. Because Oracle Personalization’s Java-based Recommendation Engine API (REAPI) feeds current-session “click,” transaction, and ratings data into Oracle Personalization’s Mining Table Repository (MTR), this problem is eliminated. Oracle Personalization does not need to wait for the nightly updates from the data warehouse to make recommendations that reflect the most current customer status.

Improved “Blind” Recommendations for First-time and Anonymous Visitors

New visitors to most Web sites have been unable to receive personalized recommendations unless they register. Oracle Personalization uses a 360-degree view of a customer to build personalization models that it uses to make recommendations. This includes a visitor’s current session navigational data along with data about past purchases, demographics, ratings, and navigational data. If the visitor is anonymous, Oracle Personalization can still make thoughtful recommendations using the data that is available — current-session navigational data. By using visitor navigational “click” data, Oracle Personalization can make recommendations that should be more personalized than a naïve guess or merely suggesting the most popular products. For example, if the Web visitor clicks on books about GOLF and travel videos about HAWAII and PHOENIX, Amazon could offer recommendations about the best golf courses in Hawaii and Arizona.

Increased Web “Stickiness”

By delivering better “value” to Web visitors, Oracle Personalization helps increase a Web site’s “stickiness” — the amount of time visitors spend surfing the site. This helps to increase the likelihood of purchases and thus your Web site’s ROI. It is also important for advertisers who want to know there will be customers there to view their ads.

Increased # of Registered Users

Because Oracle Personalization can offer recommendations to anonymous Web visitors, Web visitors should notice a significant improvement in the quality and real-time nature of the recommendations. Since these recommendations will not be as individualized as they could be if the visitor were to register, the Web site could provide pop-up messages encouraging customers to register, such as:

“Like our recommendations but want them more personalized? Click here to register so we can provide individualized real-time recommendations!”
Once registered, Oracle Personalization could tap into past purchase, demographic, and ratings data (in addition to navigational “click” data) to provide better recommendations.

**Increased Average Purchase Online Order**

Oracle Personalization allows an e-tailer to make recommendations selected from a “Hot Picks” List. While the recommendations match the Web visitor’s interests, Oracle Personalization suggests the recommendations the e-tailer has identified as “Hot Picks.” Multiple “Hot Picks” lists can be used for different customer types or situations. Pushing “Hot Picks” can increase sales of more profitable products or simply help to sell off unwanted inventories.
Personalized, Movie Recommendations at Swisscom

With net revenues for the year 2000 of CHF 14.1 billion and a workforce of around 20,600, the Swisscom Group is Switzerland's leading telecom provider. Around a third of the company's revenues are generated outside Switzerland, with its international subsidiary Debitel accounting for a major share of CHF 4 billion. In Switzerland Swisscom offers a comprehensive range of telecom products and services and is clearly positioned as the leading provider of mobile and networked-based voice and data communication services as well as Internet-based services. The Corporate Technology (CT) department is responsible for innovation within the company, and is lead by the CTO. Swisscom Corporate Technology looks into new technologies and tries to find new business opportunities for the company.

MovieGuide is an application being developed by CT’s “Service Design and Media” team. The application uses Oracle Personalization (OP) to provide the users with information about movies currently being shown in Swiss cinemas - in a personalized way. Swisscom’s application uses OP to give recommendations based on the user's demographic data and rating data from themselves and other users so that individuals or groups of people can decide on a good movie to see. Users may access Swisscom’s MovieGuide application on the Internet either from a mobile wireless personal digital assistant (PDA) or from their desktop PCs. After providing some initial feedback information, rating movies they’ve seen in the past, OP displays its personalized movie recommendations. Users can select a movie, watch a movie trailer and view movie times in local theatres.
Personalized Internet Portal Game from GIP

The GIP Research Institute analyzes and validates emerging technology trends and developments in Computer Science and eBusiness. New IT core technologies are developed and transformed into innovations for GIP AG and their customers. The K1010 is an Internet Gaming Platform developed for a customer. The project is an Internet gaming portal.

Players can connect their browsers to the K1010 internet sites www.k1010.de and www.k1010.com and choose from a number of online games. In addition to the games themselves the players can qualify for prize draws where they can win cars, TVs, or holidays. If the player wants to win prizes he has to register and give a small amount of personal information such as first name, email address, birthday and ZIP code. Apart from the games this site includes features like horoscopes and a weather forecast. This information is already personalized, that is parameterized, in a very simple way by birthday and ZIP code.

The participation in the games is free of charge for the player. Advertising finances the site. The form of advertising is, at least for web sites, unusual: the games are periodically interrupted for advertising breaks. The advertising spots are called e-Mercials and contain fully animated movies that are streamed to the browser and are shown full screen. The schedule of e-Mercials is created on the fly for each session and is controlled by a rather complicated mechanism, taking into account spot priorities and rough segmentation of players into target groups. The Smiley Show is a trivia game. The player has to answer 10 questions. Nine of the ten questions have to be correct to qualify the player for the prize draw. Nine of the ten questions come from a large static question pool and one is a special question, asking for answers of special interest only for that current day. These questions of relevance for the current situation are updated daily.

GIP has applied Oracle Personalization to personalize the Smiley Show game. GIP adds new elements to the application server behind Smiley Show to control the selection and ordering of questions, according to the current player. OP analyzes his answers to each of the questions as well as his navigational path of the user. By that they get data that can be associated with the OP scheme of purchase data, navigational data and ranking data. Sometimes GIP uses Hotpicks for questions of special interest. GIP is building a taxonomy to express the structure of questions belonging to segments and categories of content as well as to identified groups of players.
The Oracle Personalization K1010 application server consists of a PC with one GByte of RAM running Linux, the application server, and an Oracle Database containing the all the data belonging to the server and the game itself. Additionally a SUN Enterprise E450 server with 4 processors, 4 GBytes of RAM and a couple of disks powers the Recommendation Engine Farms and the underlying Oracle Database.
CONCLUSION

Personalization is much more than simple Web site preference or user configuration settings. Personalization goes beyond business rules that need to be manually defined, created, and maintained and are often static and limited in scope. Collaborative filtering has been able to provide better “individualized” suggestions, but because it fails to scale to high-volume Web sites, makes simplifying assumptions and lumps customers into groups or categories. Collaborative filtering gives e-tailers the promise of personalization, but because of its limitations, it often leaves their customers frustrated and wishing their e-businesses knew them better.

True personalization delivers real-time recommendations that are “individualized” for each customer, at the right time and in the right context to deliver maximum value to the customer. To provide true personalization, personalization products must use data mining technology to find and track more individualized behavior patterns. By embedding data mining within the database, it eliminates data movement and redundancy, provides a scalable platform, and delivers real-time performance.

Oracle Personalization, an option to Oracle Application Server, provides the technology, functionality, and features that allow skilled marketers to gain customer insight and deliver real-time suggestions and recommendations with the savvy and touch of your closest friend. Oracle Personalization’s recommendations increase average order size, increase Web stickiness, and keep customers returning to your Web site for more.