

## **Web Personalization**

### **Implications and Challenges**

Ahmad Kardan, Amirhossein Roshanzamir  
Department of Computer Engineering and IT  
Amirkabir University of Technology  
Tehran, Iran  
aakardan@aut.ac.ir, amrhssn@aut.ac.ir

**Abstract** — Companies are under the pressure to provide tailor-made products or services that match customers' preferences better. Personalization from web mining is a significant tool to accommodate this trend by extracting patterns of customer's preferences and connecting them directly to production line and supply chain. However, with exception of companies like Amazon, Dell, Toyota and most of Airlines which have solid strategy and large appeal, it is challenging to develop a concrete and cost-effective approach in personalization for many companies. This paper studies dimensions of personalization and addresses business implications and challenges of web personalization. It will further suggest a novel approach for developing web personalization in small and medium sized enterprises by utilizing Frequent Flyer Program of Airlines Industry in order to justify and guide investment.

**Keywords**-web personalization; build-to-order; customer relationship management; recommender system; frequent flyer program.

#### I. INTRODUCTION

Web Personalization is simply defined as the process of gathering and storing data about visitor's interactions and navigation in a website in order to assemble and deliver the tailor-made web experience to a particular user. The delivery can range from making the web site more appealing to anticipating the needs of a user and providing customized and relevant information. The experience can be as simple as browsing a web site up to trading stocks or purchasing a computer. Effective personalization can be achieved by three steps including identifying, retrieving and assembling. The first step starts by collecting all available data. In fact, the user's data is divided into two categories i.e. personal data such as age, gender and demographics as well as behavioral data such as usage, click stream and time [1]. In the next step, the web site forms the visitor's profile and utilizes intelligent algorithms to analyze and mine data in order to extract statistics, and discover correlations between web pages and user's preferences. In the final step, the web site will deliver the right information and/or produce customized products and services to meet each user's requirement or assemble the most preferred page to be displayed to his or her preferences. This paper reviews dimensions of personalization and then addresses business implications and challenges of web personalization. It will further suggest a novel approach for developing web

personalization in small and medium sized enterprises by explaining a mobile portal as a case study. A Frequent Flyer Program of Airlines Industry is used to justify and guide investment in this approach.

#### II. DIMENSIONS OF PERSONALIZATION

In practical applications, we can suggest a model to divide personalization technologies into two dimensions namely horizontal and vertical. Horizontal dimension enables a company to adapt attributes and appearance of products or services according to customer's flavor and taste, whereas vertical dimension enables a company to interact with customers in order to customize the configuration, performance and quality of products or services according to customer's request .

##### A. Solid

This is a kind of personalization which a user has no control to change or modify the product, nor is there any interaction between website and user. The user or customer simply selects the product and then use it. Digital music and video store and most of retail online sites which sell specific and predetermined products are examples of this type .

##### B. Superficial

This is a kind of personalization in which user has only limited control on appearance and presentation of the products. Many portal sites, such as Yahoo, Google and MSN allow users to personalize the page with selected news, local weather forecast, and other features. For instance, web news portal may provide news and articles about education and business school ranking to customers who are avid MBA fan and sport news for sportsmen. Digital Greeting Cards stores are another example where the user can select the type and structure of greeting card and can further customize it by individual messages.

##### C. Evident

This is a kind of personalization which user has no control to modify the product however, he or she can communicate with supplier and inform his or her specific interests while receiving recommendations and reviewing buying patterns of other customers of similar preferences. The customer can further place order for his or her preferred type or version or predetermined price. Amazon is an example of this kind in which users can receive

recommendations and review comments of other customers. They can also request for digital version of a book and once the total requests reach a certain number, Amazon will fulfill this request. It is actually, manifestation of one of Amazon’s strategies titled obsess over customers, to start with the customer and then go backwards to develop product and service solutions [2]. eBay can be considered as another example of evident personalization in which consumers and businesses engage in buying and selling a variety of goods and services worldwide. eBay online portal facilitate these ventures by providing Auction-style listing in which buyers and sellers can set and adjust their specific requirements and predetermined price.

*D. Collaborative*

This is the ultimate level of personalization in which user has control in designing and building the product according to his or her preferences. User usually selects the modules that are literally building blocks in order to customize a product and then assembles various combinations of modules. In electronics examples of modules would include processor, mother boards, memory, disk drives and software. Dell Computers has created a unique process within Industry and pioneered the build-to-order computer business. The process was long and required a great change in the thinking of many firms and many people within Dell and it has taken 20 years to get where it is [3]. Toyota, for example, introduced Buyatoyota.com as the major step in order to integrate its unique Just In Time (JIT) system with personalization and customer's specific requirements. This site guides the customer through the steps of selecting a model, viewing and searching options, assembling the features and specifications, choosing the color and accessories, and finally, locating a local dealer that can provide that choice of car in order to get a quotation and arrange finance. Other car manufacturers may start to use the same approach in building their cars in near future.

Vertical Personalization	Evident e.g. Amazon, eBay	Collaborative e.g. Dell, Toyota
	Solid e.g. Online Music	Superficial e.g. E-card, E-News
Horizontal Personalization		

Fig 1. Dimensions of Personalization

**III. PERSONALIZATION-BROADER STRATEGY**

In fact, personalization must be an integral part of a broader strategy and connect to Customer relationship Management (CRM) and Recommender Systems. CRM is

viewed as a strategy to attract, grow and retain customers. Personalization is an approach that can aid in bringing, staying and returning visitors / customers to a website. Since the very nature of the web tools encourage interactivity between people and organizations, the topics of personalization and CRM are, therefore, complementary to each other. They both have the ability of providing the right information or content (e.g. products, services and data) to the customer at the right time and right place [4].

The explosive growth of e-commerce and online environments has overwhelmed users by countless options to consider. They simply neither have time nor knowledge to personally consider and evaluate these options. Recommender systems represent a prominent class of personalization applications that aim to support online users in deciding which products or services meet their requirements. The advanced version of a recommender system, for example the one implemented in Amazon Inc. , would add information about other complementary products (cross selling), in the form other customers that had bought X, also had bought Y and Z. Today, recommender systems have become one of the most powerful and popular tools in electronic commerce, since, they allow to transfer users into customers, increase the cross selling and build loyalty [5].

**IV. FREQUENT-FLYER PROGRAM**

A Frequent Flyer Program (FFP), which is a loyalty program offered by many airlines, was first created by Texas International Airlines in 1979. FFP can be considered as an interesting manifestation of evident personalization which integrates personalization with CRM and recommender system. Passengers can typically enroll in FFP of an airline and accumulate miles based on the distance flown of that airline or its partner. Miles accumulated allow members to redeem tickets, upgrade service class, or obtain free or discounted car rentals, hotel stays, merchandise, or other products and services through partners. The personalization features include but not limited to the possibility of selecting seats through online portal and requesting for special meal. Members can manage their account online by buying tickets and checking online while receiving personalized news and special offers based on their preferences and destination flown. In recent empirical study on FFP, Drèze and Nunes argue that successful redemption of miles fosters reengagement of passengers and motivates them to flying more frequently. Therefore, loyalty programs that offer people multiple redemption opportunities must balance the attractiveness of a reward with an appropriate level of difficulty in attaining success [6]. This research further shows that loyalty can be better accomplished when the reward is not too difficult to achieve, rather it should be inspiring and challenging to cash out and when someone does, he or she feels successful.

## V. IMPLICATIONS AND CHALLENGES

Personalization has gone through different development phases since early 2000. It initially started as a tool to attract and retain visitors by giving them chance to explore more of the site. Advertising and promoting products and services, nevertheless, were part of this phase as well. The next phase attempted to increase turnover of customer's spending by offering more expensive or similar products. Today, personalization is increasingly used as a means to speed up the delivery of the right information to a visitor in order to customize products and services for meeting and exceeding his or her requirements. Those companies that are systematically gathering information about their customers, product attributes, purchase contexts and integrate it with behavioral segmentation such as demographics, attitudes and buying patterns can make more sophisticated offers that identify customers who are most likely to defect [7]. This personalization strategy ultimately increases number of regular customers and amount of each transaction and has made personalization as a required and expected feature of an e-business. For example, Timberland Boot Studio by allowing customer to select different leathers and colors gets three times hits on its customized boots [8].

Without challenging the enormous potential and contribution of personalization technology, the question still remains whether personalization really works? The smart answer is it depends. On one hand the benefits could be significant not only for the website visitor (being offered more interesting, useful and relevant web experience) but also for the provider (allowing one to one relationships and mass customization and improving website performance). On the other hand, personalization requires extensive and precise data that are neither easily obtainable, nor can be mined and analyzed efficiently. As such in many cases the output does not seem so successful in understanding and satisfying user needs and goals.

First and foremost, the ethical dimension of personalization need to be addressed, since online user's navigations are recorded for building and updating user profiles and this can put privacy of users in jeopardy. At the same time users are becoming more vigilant and have higher expectation. They are not so happy with idea of being stereotyped without their consent. Users also expect to be treated equal and have enough control and choices. The cost of technology initiated from intelligent software and storing hardware as well as the time spent are also critical factors which must be justified in the long run. Schneider and Bowen [9] proposed to explain that customer satisfaction of the service originates with the handling of three basic customer needs: security, justice and self-esteem. Building on their three needs conceptualization, we suggest six major implications and challenges of personalization as follows :

### A. Security and Privacy

There are implications for user's privacy and security of information, since, much of personalization entails

intensive collection and use of personal information. The terms "privacy" and "security" are often used interchangeably, but there is an important distinction between these two. Security refers to the ability of user or site to protect information against unauthorized third parties by preventing them to access, use or modify information whereas privacy is the quality of being secluded from the presence or view of others [10]. It further refers to the ability and the right of the users to decide and control what can happen to their data and profile. Given the importance of data acquisition to personalization approach, it is crucial that sites identify privacy preferences of users and the relationship to their satisfaction with the site. This includes the users' level of acceptance in how the data is acquired, whether the benefits of the approach outweigh the privacy risks, and whether the site will disclose the information to third parties [11]. As such users, at least, must explicitly feel connected to information in order to start benefiting from the service/features. Once users see benefits, they might be willing to surrender additional information and be more transparent, provided they know what is going to be done with it. In addition, the site must take all measures against the factors that could be outside of the knowledge or understanding of the user, such as the sufficiency of security mechanisms to protect any data provided. The user may often be unaware of what data is being given away and how they are stored and secured in the case of passive collection of information. Therefore, the site must encrypt passwords and sensitive data of users and evaluate an external test to ensure about the security and protection of data. A commonly recommended practice is to declare a privacy statement (or disclosure statement) which describes exactly what kind of data are gathered from users and then declare the policies about methods of using and sharing it .

### B. Fair dealing and Integrity

These are critical issues in dealing with customers and visitors of a web-site. In fact, all visitors expect to be treated equally in terms of information, prices and services provided. When it comes to personalization, there are of course many occasions that a company is obliged to act discriminately based on the time, efforts, and money invested by customers as well as level of loyalty and previous transactions. In such cases, the reason for differentiation or privileged treatment must be publicly announced to address user's expectation for equality and avoid misunderstandings.

A good example of implementing this discriminatory practice is in Airline Industry which employs different prices based on booking time and publicly announces it. Passenger might have paid different fair tickets but upon boarding they would receive similar treatment. Today, fair dealing, integrity and justice is becoming critical issues and few other factors such as keeping commitment and flexibility in dealing with unusual requests are also emerged accordingly. Personalization has the capacity to reinforce all these based on the nature of business and

dimensions of personalization. It can also meet reasonable yet abnormal requests by keeping records and commitments .

### C. *Self-esteem and Sense of worth*

Personalization can provide a unique possibility to maintain and enhance self-esteem and sense of worth for visitors by providing a user-friendly platform in which people feel in control, important and comfortable while having enough choices. Maslow claimed that the need for self-esteem can be met through mastery or achievement in a given field or through gaining respect or recognition from others [12]. As users become more vigilant, they might find personalization more pleasant and appealing, if they could exercise more control over it. We can imagine a scenario in which an online bookseller asks a visitor, "Would like us to add this title to our growing knowledge of your interests to lead and direct our future recommendations?" The customer can select "yes" and enjoy receiving recommendation, if he or she is an avid reader fun of the same subject. Alternatively, he or she can say "no" and spare time of receiving and reading these recommendations [13]. Likewise, a website which has personalization capabilities to discover and analyze the patterns in customer's navigations can fulfill their need by saying "We have noticed you frequently check football news, would you like us to update this news on your home page?" In both these scenarios, regardless of visitors response, we are trying to view them as unique people by respecting their interests and self-esteem while giving them some control over displayed contents. Even, a simple greeting message by indicating the name of visitor can enhance customer's feeling of self worth. This approach which is simple yet powerful can address privacy requirements of vigilant users, since, personalization is done after receiving their consent .

### D. *Cost*

Successful companies like Google, Amazon, Dell and most of airlines spent millions on their portal web-site in order to personalize their products and services for their customers. In fact, personalizing online offerings is considered less costly than customizing physical products because of the "digital" nature of information goods. That is, with advanced information technology, online pages can be manipulated easily to suit individual customers' needs. But, it all depends on the number of visitors and customers as well as the nature of business. Each individual need to have a profile with details of their preferences and every time he or she goes online and visits the site, the profile needs to be updated. Moreover, intelligent algorithms must be applied in order to extract the most suitable and customized products or services to be offered. There will be also interrelated links between preferences of users who have similar purchasing behavior. Although the price of using new technology is being reduced day by day, however, developing new algorithms and using thousands of servers to address each and every customer's need is time consuming and costly.

It was found that operating a personalized web site can cost more than four times than operating a "comparative dynamic site" and most sites that deployed personalization have not realized adequate returns on their investments [14]. As such, there must always be a balance between cost spent and potential income which is likely generated by economy of scale and addressing core business strategy. Google for example has almost billion visitors every day using its search engine [15]; therefore, they can easily afford heavy investment on technologies such as collaborative filtering, data mining, and click-stream analysis in order to customize their offerings at the individual level. Amazon, nevertheless, has thousand customers too and personalization is an important part of their sales strategy .

### E. *Timing*

Web personalization enables online websites to customize their contents by capturing real time preferences of individual visitors through web mining techniques. The next step is to adapt the website content in order to meet individual's specific requirements. Yet, there is a trade-off between quality of recommendation and probability of accepting a given recommendation i.e. although the content of web-site will improve during the course of session to meet preference of the visitors, however, the probability of using and enjoying the fresh contents diminishes over the course of session [16]. These effects suggest that online portals have limited time to capture and mine visitors data in order to customize the most tailor-made contents or products. In fact, consumers prefer early presentation that eases their selection process, whereas adaptive systems can make better personalized content if they are allowed to collect more consumers' clicks over time [16].

Therefore, personalization needs to be efficient enough in order to keep the balance between time spent by user and to the extent to which his or her online behavior can be symbolized .

### F. *Agility*

With advances in tracking and database technologies, companies can better understand and evaluate their customer's requirements. However, they need to build up certain capacity in order to rapidly translate this understanding into appealing products and service. Agility or nimbleness is the capability to swiftly adapt to changes and can be achieved in three distinct ways including operational, portfolio and strategic [17]. Operational agility is illustrated as the success of Toyota and Dell through integrating supply chain and directly linking customer to production line. While sharing real-time market data that is detailed and reliable, Dell and buyatoyota.com only assemble the product after receiving the order (build-to-order) and this strategy increases visibility to the demand and flow of goods. The primary advantage is sensitivity to changes in customer demand and possibility of mass-customization.

Toyota, for example, outsources about 70% of components and that is why Toyota Production System (TPS) requires a serious investment in building an agile network of highly capable suppliers of different components that must be truly integrated into supply chain [18]. In this scenario, the user goes through the process of designing a car by selecting features and components online. Once the order is registered and the car dealer and type of finance is arranged, the delivery of parts and components takes place a few times a day from different suppliers to Toyota factory and the car is specifically and solely assembled as per online order of the user .

Although a company's growth is dependent on finding and retaining customers, however, its success is far beyond what is on the web page and depends on internal operations (the back end) and its relationship with suppliers and other business partners [19]. The true power of such operational agility requires solid information technology infrastructure and is based on ingenuity and electronic supply chain management.

VI. GIVE UP OR BUILD UP

Today, companies can extract valuable information by exploiting information hidden in their web site created as a result of visitors interaction and browsing. Facing increasingly sophisticated customers, companies are under the pressure to provide tailor-made products or services that better match customers' preferences .

The major challenge is cost pressure and justification of investment by economy of scale. Except giant companies like Amazon, Facebook, Dell and most of Airlines, which have large appeal and thousands and even millions of customers, it is challenging to seek cost-effective approaches in personalization for small and medium sized enterprises. The appropriate solution for these companies could be to start their portal on Solid personalization basis and gradually develop it horizontally or vertically to Superficial and then Evident personalization based on the nature of business and improvement of the business model .

VII. WEB PERSONALIZATION METHODOLOGY

Commonly used to enhance customer service and e-commerce sales, personalization is sometimes referred to as one-to-one marketing, because the enterprise's web page is tailored to specifically target each individual consumer. The main purpose of every business is to make money either by selling products or services to new customers or selling more to existing ones [21]. Miller [20], in his book, argues that the average value of customers is 8 to 10 times their initial purchase depending on the research he and his colleagues have reviewed. He further argues that the cost to attract a new customer is 5 to 6 times more than your cost to save an existing customer.

As small and medium enterprises have serious challenge to create traffic on their site and increase the number of visitors, the best strategy would be to focus on

existing customers by encouraging them to repeat the orders on similar or different products and services and/or cross selling. Frequent Flyer Program is a gifted tool which can be duplicated and applied in any online shop in order to grant points to the customer based on the value of their purchase. These points can be rewarded later in terms of free offering or discount scheme as incentives for repeated orders. By exploiting such a policy, a company can increase market share and improve profitability. Saving time and reducing costs of sales and marketing as well as economic use of resources are other indirect benefits of what can be called point plus program. All these will ultimately justify investment in web personalization. Business owner, Rosalind Resnick also insists on rewarding program by saying "It's nice to know that every dollar we spend to grow our business can also be a point or air mile we can use to celebrate our independence" [22].

In order to increase customer satisfaction and the likelihood of repeat visits, there must be a reason like membership. When people are members rather than shoppers, they feel connected and privileged. Therefore, the first step in formulating a solid personalization model is to encourage users to become members in order access special contents and/or perform special functions on the site while enjoying superficial personalization. Once a closer relationship with the users are developed, the company can gradually address the other challenges of personalization as indicated in Fig 2 and move to evident level and build interactive relationship to meet and exceed user's requirements. The collaborative requires ingenious infrastructure and agile supply chain, which certainly goes beyond information technology.

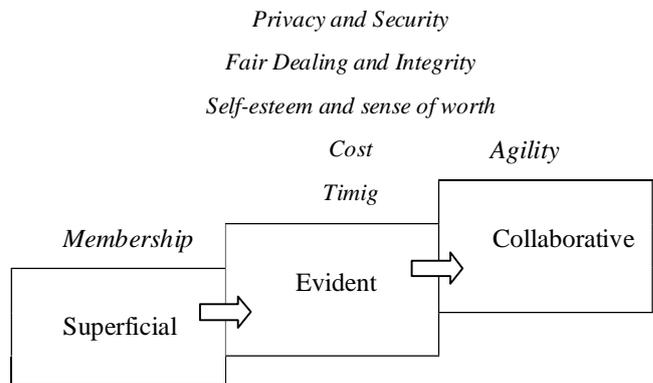


Fig 2. Web Personalization model

A mobile portal, which aggregates and provides contents and services for mobile users, is a good example for explaining how the above model works. These portals are specifically designed for m-commerce with short menu of popular topics like news, sports, email, travel information and finance as well as very few graphics. They recently

started to provide downloads, health, dating and job information as well [23]. In fact, a mobile portal provides an intimate one-to-one experience for a user who is visiting the portal for specific purpose like checking sports scores or looking to buy specific item in nearby shops [24]. Users frequently can become a member by paying a monthly membership to access basic information. This is superficial personalization in the above model. As users started to seek specific services and information, the portal need to address 5 challenges of web personalization in the same order to meet user's requirements for evident personalization. First and foremost, privacy and security are critical, since mobile systems tie highly personal information to location and contacts. We normally do not share our mobile device with anybody; therefore, anything that we do with our mobile is traceable to us. This may be helpful for marketing; yet, mobile advertisement is nowadays pursued with caution while getting the customer's consent. This can be done by offering long-distance in exchange for viewing the ads offered by mobile portals. Furthermore, mobile portals can customize advertising message for specific group of customers based on their location while knowing their preferences and buying habits. The integrity, fair dealing and self growth should be the essential cornerstones of these offers to convince for quick decision and it must be support by loyalty program to reward customers with points. The cost and timing are also hot topics for mobile portals. In addition to basic monthly fees, most mobile portals charge per-service fee for premium and customized contents such as download and weather forecast. The nature of m-commerce, in which users have little time to navigate the contents and wait for page to load, also demands that the content to be produced in much shorter time. We can imagine in the not so far future, Toyota and few other car manufacturers allow their customers to assemble and buy their favorite car through mobile portals.

### VIII. CONCLUSION

Personalization from web mining has been received lots of interests in business as a gifted tool to improve sales and retain customers, since, it can increase customer's satisfaction by providing them with tailor-made products and services. Web Personalization can also help the company to implement build-to-order policy by connecting customer's requirements and preferences directly to production line and supply chain. As a result the company can benefit from cost saving and efficient utilization of resources. Therefore, collaborative personalization can be considered as a vision of any small and medium sized enterprise to incorporate its online portal with built-to-order strategy for sales and marketing. This of course a long term plan which must be supported by integrating personalization into loyalty program in order to reward customers with points for a wide range of daily interactions with the company.

The reward scheme should be smartly designed to provide users with both mental and financial benefits in order to encourage them for repeated order and/or cross selling. The power and benefits of these two can create a solid momentum to justify and guide investment in personalization.

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