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PERSONALIZATION IN WEB SERVICES

A thesis submitted to the College of Computer at AL-Anbar University in partial fulfillment of the requirements for the degree of Master of Science in Computer Science.

BY

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Abstract

The Internet was originally static web sites consisted of HTML pages linked together. As corporations began going online and the amount of content grew, sites became more difficult and expensive to manage.

With the advent of personalized sites where business rules and matching agents simulated interactions between customers and organization agents, that all changed. Just as real-life customer service and sales representatives automatically filter information that is relevant to the customer, make recommendations, and alert the customer about opportunities, personalization techniques know the customer, remember the customer, and adjust their personal memory of the customer according to the customer's changing needs. Because users' experiences with a personalized site are ultimately more satisfying, they are more likely to become loyal customers, which explain why so many organizations are now investing in personalization.

Furthermore, personalized web sites need not be at first design but they must be adjusted to be comfortable with the growing needs of customers and with the development of technologies of web design which needs continuous process of development.

This study is an attempt to trace the function of personalization in web site services, give a definition of personalization and giving the most ten used techniques combined with push and pop strategies to influence best user five behaviors and give attention to organization's site in mind of customer.

Discuss a suitable general architecture as frame work for personal web sites, after that a continuous process planning cycle steps, this follows with proposal application (personal publishing library), as web site performs some of personalization techniques and strategies basing on the discussed frame work.

Also the site has page with metrics and statistical information to be useful for the maintenance team, and links to help them to add, remove or change the content, and to update the web site.

Personalization is strong technology in web sites, it put web site in place of intelligence web, but it require a lot of work also require strong web language to manipulate its tools.

In last, if personalization performs well, it will get customer loyalty and bring his attention to the organization web site.

List of Abbreviations

1.	ADO	ActiveX Data Object
2.	AI	Artificial Intelligence
3.	API	Application Program Interface
4.	ASP	Active Server Page
5.	HTML	Hypertext Markup Language
6.	IA	Information Architecture
7.	IIS	Internet Information Services
8.	Meta-information	information about information (i.e. information about content which is information)
9.	PC	Personal Computer
10.	PTV	Personal Television
11.	RA	Relational Architecture
12.	ROI	Return On Investment
13.	SQL	Sequential Query Language
14.	WAP	Windows API Profiler
15.	WML	Wireless Markup Language
16.	XML	(eXtensible Markup Language).

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Ihsan ϕ

Dedication

To my supervisor,

My family

(my parents & my wife)

To my friends

&

Those who have helped me in this work

Ihsan

Examination Committee Certification

We certify that we have read this thesis "**PERSONALIZATION IN WEB SERVICES**", and as an examining committee the student "**IHSSAN SALMAN J. AL-JUBURI**" in its contents and in what is related to it, and that in our opinion it meets the standard of a thesis for the degree of Master in Computer Science.

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Table of Contents

1-1. Introduction

In the recent years, the World Wide Web services have proved their capability of enriching the customer's needs with information and knowledge, satisfied what the customer needs and more, what he expects and what he does not expect in any field he wants to know about.

So, this environment where even satisfied customer and growth do not guarantee continued. As users become even more proficient in their use of the web and are exposed to a wider range of experiences, they may well become demanding, and their definition of what constitutes good services may be redefined.

Personalization is an ever-growing feature of on-line services that is manifested in different ways and contexts, harnessing a series of developing technologies. [4].

This will be offered to (so perceived) fickle web users and win over their loyalty of custom, and also it will help people find what they want when they do not know how to go in new web environments.

There are some take the position of personalization it is opportunity not hype, but they think it must be defined clearly and it must be designed to be useful and useable. [21].

Personalization is not the main subject, but instead, it is part of most prime directives for businesses giving the customer a high-quality product or service they really need and can use at the best, lowest price, and give the customer high-quality service with integrity.

Also, it gives the organizations loyalty in a given techniques, the organizations and companies can also measure their performance in their own sites by using personalization metrics.

1-2. What Is Personalization?

Personalization involves a process of gathering user-information during interaction with the user, which is then used to deliver appropriate content and services, tailor-made to the user's needs. The aim is to improve the user's experience of a service. [4].

In a marketing environment, the purposes of applying information technology to provide personalization are expressed by the personalization consortium as to: [23]

- Better serve the customer by anticipating needs.
- Make the interaction efficient and satisfying for both parties
- Build a relationship that encourages the customer to return for subsequent purchases.

And for the site, experts agree that personalization is an ideal way to achieve the level of differentiation of an Organization in the mind of a person on the web [11]. Also, it can be described as being about "building customer loyalty by building a meaningful one-to-one relationship". [21].

Personalization is not a project that is implemented once and is "done". Personalization is an ongoing iterative process, by which organizations plan how to influence site users to achieve measurable and profitable online behavior. [8] (See chapter 2 section 2-4).

Effective personalization is a delightful experience. It is when a customer logs-in a web site to get its service, greeting with his own name, and giving his favorite items, with the user interface already chosen, moreover recommendations the site just know that user will really like about the kinds of services this site provides.

1-3. How Personalization Works

User satisfaction is the ultimate aim of personalization. It is motivated by the recognition that a user has needs, and meeting them successfully is likely to lead to a satisfying relationship and re-use of the services offered.

Beyond the common goal, however, there is great diversity in how personalization can be achieved:

- Information about the user can be obtained from a history of previous sessions, or through interaction in real time. [4]
- "Needs" may be those stated by the customer as well as those perceived by the business [23].
- Once the user's needs are established, rules and techniques, such as "collaborative filtering", are used to decide what content might be appropriate. [4][11].

The user has attributes, interests, desires, needs – some or all of which need to be captured and processed.

1-4. Personalization Usage Area

There are two perspectives of view for this subject:

1- Some computer objective applications only could be personalized.
2- Most of computer objective services could be personalized.

Those who point to the first opinion will finish speaking about the useless of personalization, because of the boring preparation and the coast of doing personalization.

But those in favor of the second option have the opportunity, and think of trusting of this new subject in improving the applications by making it more useful and useable.

This study will take the side of the second opinion and will start, basing on this by asking, where personalization features can be used?

Personalization as a concept not restricted to the web; the benefits of personalization could be seen in different fields, and application areas, (few examples will demonstrate a wide variety of possibilities):[1].

Mobile phones: There are mobile phones now allowing users to choose custom ring tones. This personalization is very meaningful. It is a situation in which a single mobile phone somewhere in a room rings and everyone in the room pulls out their phone to see if they are the lucky person being called. That situation is happening less frequently now than it did before, because users can now choose a custom ring. Users can positively identify whether or not a custom ring is calling them.

Word processing software: Users can choose different fonts, type sizes, and styles in most document-creation software, which is a meaningful personalization because some users are more comfortable reading large text, and different fonts and styles can be used for emphasis or to convey a certain mood or feel.

Web services: Web Services is a wide environment and any user in any level of knowledge may lose in.

If users need to inter a strong field they know nothing about, they will be lost without leader or at least recommendations, so personalization here will be meaningful and useful, because services could help users to reach their goals.

1-5 Web services [28]

Web services are the services offered from the designers of the Web sites to users (customers) of these Web sites. The type of services offered are not restricted to special types but it could be any thing, and overall its data exchanging between applications stand for this type of data exchanging.

Web services let applications share data, and -more powerfully- invoke capabilities from other applications without regard to how these applications are built, what operating system or platform they run on, and what devices are used to access them.

Although Web services remain independent of each other, they can link themselves into collaborative groups that perform a particular task.

Web services usually use XML to exchange data. XML is turning the way to build and use software inside and out. The Web revolutionized how users talk to applications. XML is revolutionizing how applications, or more broadly, how computers talk to other computers (by providing a universal data format) that lets data be easily adapted or transformed. [28]

1-5-1 Benefits of Web services [28]

Web services can:

1- Open the door to new business opportunities by making it easy to connect with partners.

2- Deliver dramatically more personal, integrated experiences to users via the new breed of smart devices – including PC's.

3- Save time and money by cutting development time.

4- Increase revenue streams by easily making your own web services available to others.

1-6 Related Work

There is a growing interest in providing automated personalization processes on Web sites (Barrett et al., 1997; Hirsh et al., 2000).[20] Currently Web sites rely heavily on user inputs for a personalization solution. Mobasher et al. (2000)[18] propose a general architecture for automatic Web personalization. The architecture attempts to automate the personalization process by tracking the user's interest from the Web server logs. Perkowitz and Etzioni (2000)[19] addressed this problem by designing an adaptive Web site that relies heavily on the user's navigation pattern and tries to anticipate the user's need based on his past navigation history. Barrett et al. (1997)[15] describe the WBI (Web Browser Intelligence) architecture for personalizing Web sites. The previous two approaches rely on a server for the personalization process, but the WBI architecture can be used on the client side, mid-stream or server side. Pretschner and Gauch (1999)[15] discuss the applications for personalization that exists on the Web and the use of profiles in the personalization process. Few studies have surveyed the nature and extent of search engine Web sites that include personalization features.

There has been a growing interest in making the personalization process completely automated. Presently the Web sites rely heavily on user's inputs for presenting them a personalized solution. Manber et al. (2000) discuss the applications for personalization that exist on the Web and the use of profiles in the personalization processes.

1-7 Aim of the study

Since its first appearance in 1996, personalization has been considered an opportunity to be applied to the web site an additional feature to get perfectionism web site forgetting the importance of this concept to get high benefits.

Here in this thesis, this method will be discussed theoretically, finding out most of its techniques, strategies, measuring metrics and trying to give it some meaningful and powerful application in framework architecture and a maintaining planning cycle useful to any team trying to apply it in their sites depending on metrics given.

At last this study proposed application system as web site give publishing services using personalization techniques and strategies according to the personal frame work and using maintaining techniques in planning cycle.

1-8 Contents review

This study, which is an attempt to trace the function of personalization in service websites as mentioned in the aim of the study, falls into five chapters as follows:-

Chapter one: contains definitions of personalization idea, and how it works and the conception of its usage areas, followed by a definition of web services and samples of the related studies of automatic personalized web sites.

Chapter two: discusses ten most used techniques for personalization followed by five most user behaviors on web combined with push and pull strategies ended with measuring metrics.

Chapter three: falls in three sections, the first is presenting the architecture of personalization web services clearing its components and function, the second represent a planning cycle for personalization web site which presents services discussing how to implement a continuous process of offering personalized services; the last section offers some of the online experiences employing personalization services.

Chapter four: shows a simple application for personalized web service as a web site describing its main pages and stages.

Chapter five: contains conclusions and suggestions.

2-1 Introduction

The ability to deliver the experience of personalization described in the first chapter depends on the acquisition of a picture of the user. The user has attributes, interests, desires, needs – some or all of which need to be captured and processed.

The techniques used to complete the picture of the user are varied and, as mentioned, may engage the user at different degrees, directly or indirectly. Furthermore, there are other differences on how the 'appropriate content' that matches the user's needs is determined and delivered. This chapter explains some of the technologies in use, describing some of their advantages and disadvantages.

These techniques need to be worked in strategies with pushing and pulling strategy to make the technique work properly fine, and to influence the best user behavior from the user behaviors discussed here in this chapter.

At end of the work there are metrics to measure the process of personalization work in the web site that needs to be put on to be aware of usability of these strategies and techniques to influence the best user behavior.

2-2 Personalization Techniques

There are some technologies in use which can help in delivering information about the customer or user of the site, and provide what satisfies him.

2-2-1 Fill-In Profile

A profile is built through active involvement of the user, typically through fill-in forms. Users can often control the type of content provided as well as the look and feel of the interface by indicating their choices through their profile.

The picture of the user built through the profile may consist of generic information (such as age or area code). It may also include explicitly stated choice of specific content, such as a general area of interest (e.g. genre of television programs), or news for a particular football team or sports.

Users could also specify general preferences for low-graphics versions of sites and other characteristics of interaction with the site.

This style of customization requires the users to exert most effort and make the initial investment; it depends on the motivation and the ability of the user to set up complex customization features. If users are reluctant to spend time setting up complex personalization features, the service may remain underutilized [12][24]. One advantage gained when users do fill in a profile is that the information is available up front – it does not require the information to build up through repeated use.

In case to get more personalized information, the more complex profiling process to get the desired information, would be better personalization. [22].

However the profile may remain static and not change with the user's changing needs (unless the user puts in the effort to update it and it is easy to do so). [4].

The implementation of this technique may easily be observed in a lot of web sites. This observation could be shown in sites use form the user fills, and stored inside database with specific ID for the user as his own profile.

2-2-2 Click-stream Analysis/ Web Usage Mining Systems

This is the technique of collecting data about user movements on a web site. It can be used to record a track of the links visited, including where users came from, their route through the web site and their destination on exiting the site. [4]

Link analysis can include observations of the links clicked and their associated position on the screen, time spent within a page and making connections between links visited and consequences (e.g. purchase made).

This method of learning about users from their behavior imposes the least extra work on the user. However it is also the most subtle since it happens transparently.

The information gathered can be intensively processed, giving insight into the make up of visitors using the site. It can be used for characterizing users and segmenting customers.

Data collected by this technique and used for group profiling can be anonymous before analysis, so that an individual user's privacy is protected. Click-stream analysis can become part of a process where rule-based systems are built to determine what content to offer. Delivery of content is automated according to rules, based on market analysis.

ClixSmart engine [2] is a good implementation example of this technique, and will be described more in (see chapter3 section 3-4-2).

2-2-3 Collaborative Filtering

This technique compares a user's tastes with those of other users in order to build up a picture of like-minded people.[4] The choice of content is then based on the assumption that this particular user will value that which the like-minded people also enjoyed. The preferences of the community of like-minded people are used to predict appropriate content. The user's tastes are either inferred from their previous actions (for example buying a book, or viewing a product is assumed to show an interest (or taste) for that product) or else measured directly by asking the user to rate products.

Collaborative flittering does this by [22]:

- Recommending stocks like (books, cars, and others).
- In information itself, something like "80% of people liked what you clicked, would you like to take it?".

This method has an advantage of speed and efficiency in computation, thus delivering rapid feedback.

The reliance on a 'critical mass' of users can be a problem for collaborative filtering:

- A small sample population may lead to lower-quality recommendations.
- The quality of recommendations increases with the size of the user population.

Another potential limitation is the inability to make a recommendation for an unusual user if a match with a like-minded set cannot be found. Collaborative filtering may be less important as a technique when categories of users and preferences are already well-known and well-defined.

2-2-4 Cookies [2][4][6]

Cookies are not particularly new in Internet terms but they continue to be useful for personalization. The cookie is a small data packet sent by a web site (server-side) and stored on the browser side, that can be re-used on the server-side (the web site that sends the cookie) as a unique identifier for a user. Cookies provide a means of tracing users.

The site can 'tag' the user, or rather the user's browser files, so that the browser can be identified as a unique entity every time a return visit is made to the site that issued the cookie. The cookie identifies the web user on a continuing basis within sessions and across user sessions.

The data about the user that is stored as cookies in their browser can be recalled by the issuing sites on subsequent visits. They can be updated on repeat visits. It can form the link to profile-specific information stored on the server (provider) side. The cookie can be used to store other data about the user – this can be either data that the user has provided (such as through a fill-in form), the time and date of the last visit, or other session information.

2-2-5 Qualifier Matching [5][11]

Qualifier matching is a filtering strategy in portal and e-commerce environments. This technique allows companies to target delivery of content, access to applications, and navigation paths to individual visitors and groups of visitors via qualifiers that filter and match appropriate content and capabilities with each visitor. Each visitor gains a personalized view of the site, with the paths and content those are relevant to his specific interests and needs, automatically displayed.

Qualifier matching can be used to support either push or pull strategies, with either the organization or the visitor(s) defining the qualifiers, respectively. A typical push strategy in the corporate intranet environment is filtering based on employees' job level. Users who qualify for access to certain management tools and information will automatically gain access to those tools and information, whereas users who do not qualify will not.

Qualifier matching offers significant benefits. The user experience improves dramatically, making it easier and faster for visitors to find useful and relevant information. The organization earns mind share and loyalty among customers. Because the organization must no longer invest in writing and maintaining huge numbers of complicated rule sets, significant costs are controlled.

Although qualifier matching is extremely valuable in driving overall behavior on a web site, it should not be used for versatile personalization such as online campaigning. Rules-based matching is best for that type of effort.

2-2-6 Rules-Based Matching [5][11]

Rules-based matching is a powerful technique that relies on IF/THEN, AND/OR statements to tell the system to take certain actions if the site visitor or the situation meets certain conditions. Taking a matching action then results in the display of content or granting access to certain capabilities on the site. Because business managers can create and modify business rules on their own without the involvement of IT staff, rules-based matching gives the organization an extremely high level of agility and accuracy in running online campaigns or in executing

marketing strategies. Indeed, rules-based matching is the most versatile personalization technique and provides the greatest amount of control for the business manager. Business rules can be used to target content, products, services, capabilities, and features to a huge range of criteria and user attributes. Specifically, as a sample, content can be matched to the following criteria: [5]

User Identity

Based on what the system knows about the user, each user is identified according to one of three categories: individuals, communities, and dynamic profiling. This approach requires that a profile of each user be stored in a database so that the business rules can match content to one or more user profile attributes.

User Activity

User behavior is observed and stored in the session profile. This approach uses the session profile to recommend content and capabilities, to launch cross-selling and up-selling activities, and to target anonymous users.

User Area

User activity is monitored by site area. A context of the user's activities is created to increase click-through rates on advertisements and incentives.

User Time

This rule can be used to support a wide variety of strategies, including sales incentives that are tied to a deadline or time of day, or targeting the interval between two subsequent site visits by the same user.

For example, if the user has not visited the site for more than a month, the site will display a “what is new” message at the next visit.

2-2-7 Notifications

Visitor notifications, also known as community messages, are messages sent to communities of registered visitors. The visitor can retrieve the message from an inbox on the site or from one of his own devices such as a fax machine. The business manager decides which community will receive each message.

Each message can be personalized for each visitor and is generated by a script that runs at a scheduled time. The schedules can be run once or periodically.[26][29]

2-2-8 Targeted Email

Targeted email can be created in plain text and HTML format and sent according to mailing schedules (hourly, daily, weekly or monthly). Plain text email messages can be personalized with visitor profile information, such as first and last name or product ownership. HTML email messages can be further personalized with offers created during the campaign. There are a lot of web sites employ this technique to personalize their offers to the customers. [34]

2-2-9 Personalized Toolbar

Tool bar is a bar placed in the browser window of the client-side, contains buttons specific to the functions of personal web site.

This tool bar will be static in the window of the browser, even if the site not calls; tool bar buttons have links to the site and to the specific functions determined by the button pushed.

The face of the tool bar could be a matter of change as the test of the customer, also the buttons used in, also according to the kind of customer's job. As example of this toolbar is the Yahoo! Companion (see chapter 3 section 3-4-1 Yahoo! Companion). [24][26].

2-2-10 Remember me

(Remember me) is a button used to remember users name and pass word used log-in to a site when the client side uses specific IP address.

This technique uses cookies to remember the user name and the password of this user and used it to log-in with the site. [3].

2-3 **Personalization Strategies: Pushing and Pulling Users to Influence Behavior**

Let's consider two key personalization strategies. [5]

- The push approach proactively recommends information and access to applications and features to the user.
- The pull approach relies on the user to request information, applications and features such as “personal lists and bookmarks” and “alerts.”

If only using push strategies, this will run the risk of inaccurate targeting.

On the other hand, relying only on pull strategies will place undue burden on site visitors and may convince them to avoid this site.

To create competitive advantage, designer must enlist both strategies and the techniques that enable them, and choosing the suitable strategy must be depending on the site service situation.

2-4 User's behaviors

“Personalization is first and foremost a business strategy, and is an attempt to counter-balance the anonymity that typically characterizes interactions between consumers and large businesses, especially over the Internet” says a recent Data Monitor report on global personalization technologies. Personalization strategies are designed to influence the five most important user behaviors on the web site: [5]

- Repeat visits and intervals between visits
- Registration rates and log-on rates
- Identification of user communities
- Conversion rate and cart abandonment
- Utilization rates

2-5 Combining Strategy with Technique

The personalization strategies and techniques that should be used to create the impact necessary to influence site user behavior differ according to which metric is targeted. Each metric will be examined in detail and discussed to show how each should be linked to the appropriate push/pull strategy to create the greatest value for the user and organization.

2-5-1 Repeat Visits and Intervals between Visits

Repeat visits are instrumental in creating loyalty to both the organization and the online channel.

(Convincing users to rely on the organization online channel rather than the call center should result in significant cost savings.) Although personalization will have only a limited effect on overall traffic, repeat visit rates can be influenced significantly. The shorter the interval between two visits, the greater the impact of the targeting and personalization.

How can organizations use push and pull techniques to drive repeat visits and shorter intervals between site visits? The most effective push technique is targeted email to registered users. If the user is not yet registered, site can request him to register for an email newsletter where he would indicate his topics of interest.[34]

The most effective pull technique is a user-set alert delivered by email. The recommendation allows the users to indicate which content they want to receive updates on. The alert schedule will then send an email to them whenever new content becomes available.

Consider a combination of push and pull if visitors are using personalized functionality such as personal shopping lists.[25]

Thus, when certain users are not accessing their shopping lists often enough, site can send a notification to raise their awareness. This approach is often combined with an incentive.

2-5-2 Registration Rates and Log-On Rates

Because users will register their profile if they see value in doing so, site can illustrate value by providing certain capabilities or access that is available only if they register, for example, direct users to areas of the site or self-service features that require personalization for future visits.

How should site use push and pull techniques to ensure user registration and high log-on rates? The best push technique is to use business rules for pushing community messages and testimonials from other users who have already registered and find the site valuable.[5][11]

The most effective pull technique is personalized functionality such as personal lists or stored bookmarks to allow site's users to set alerts. They will understand that the site must be able to remember them.

2-5-3 Identification of User Communities

A community is a segment of users with identical needs [5] and/or requirements. Identifying a user community is a key since it is usually the first step to convincing people to register and providing immediate relevance through personalized navigation.

Community identification is also driving the use of features and content and self-service applications. A best practice is to provide relevance and value as early in the onsite experience as possible.[4]

The best way to identify communities is through self-identification where users choose a statement or a graphic that best represents them. A good example of this pull approach is the strategy where insurance companies group users according to life stage such as “young”. In that case, users would be presented with images of

different life stages such as “young” and asked to choose the image that best describes them. The push version of this strategy is to track the user’s first clicks on the site and then infer the community to which that user belongs.

Which technique is deployed usually depends on site industry and site customers. There are certain environments where users are less likely to self-identify into a specific user community.

On those sites, it would be most important to find out why users are visiting. For example, are they there to browse products, to compare different products, or make a purchase?

2-5-4 Conversion Rate and Cart Abandonment

Conversion rate, or the rate at which visitors “convert” from being a one-time visitor to being a customer, is usually a push mechanism. Companies calculate the conversion rate by dividing the number of registered orders by the number of site visits or unique visitors. The conversion rate is a key measurement of success for commerce environments. [5]

Cart abandonment (the rate at which visitors abandon their online shopping) strongly affects conversion rates. The most common strategy is to use business rules to target a variety of user characteristics and behavior such as product preferences and earlier purchases. Cart abandonment is often reduced by allowing users to store their intended purchases in a shopping list or by making shopping carts persistent (which can later be targeted at a subsequent visit, if it is close

enough to the earlier visit. Launching incentives via business rules that target the contents of the shopping cart can also reduce cart abandonment).

2-5-5 Utilization Rates [4][5][12]

This is perhaps the most important metric for any web site and will ultimately define the level of value derived from the site. Developing and maintaining relevant content, features and applications require resources. The resulting level of utilization defines your return on investment (ROI).

Utilization can be influenced in many ways and usually involves the use of multiple push and pull techniques.

Personal home pages, for example, play a critical role in driving utilization. The personal home page is typically the place where push and pull techniques are combined to ensure that users need a minimal number of clicks to access relevant content, features and self-service applications. It also helps companies avoid having to personalize the entire web site.

2-6 Measuring Metrics for Personalization Operation

The ability to design, implements, and maintain user interface and user navigation in personalized interactive services requires defining some metrics: [8].

Turn from user behavior as key operating metrics including:

1. The types of transactions and interactions that users perform on the site
2. The frequency with which users perform the above transactions and interactions
3. The number of users who perform these transactions and interactions
4. The types of users who perform these transactions and interactions
5. The rate of user retention and site loyalty
6. The level of user/customer satisfaction
7. The degree of web channel loyalty,

These metrics with feedback techniques (in chapter 3 section 3-3-1 planning cycle) used to measure the web site utilization and effectiveness.

Using these metrics and feedback techniques will be clearly defined in planning cycle section in chapter 3.

2-7 Summary

In case of performing personalization on any web site, there are techniques that must be employed to reach the level of personalization; these techniques like profile, collaborative filtering, click stream, rule based, and others governed by strategies (either push or pull), are combined to influence best user behavior, to

reach personalized services for the customer, as well as to achieve the level of differentiation in the mind of customer.

The overall work could be measured through some metrics to find out the usability.

3-1 Introduction

The techniques, strategies, user behavior, which have been mentioned, will be used here in this chapter to perform architecture for personalization.

Planning cycle will be attempted afterwards, to reach a level of perfection in view of customers through working online and updating the functions of website by the managing team through analyzing the results.

In order to make a good understanding of personalization, there will be some real experiences in online offered here which employ personalization.

3-2 Framework Architecture For Personalization

Personalization services are based on *data* and *information*. Data come from users and customers as queries or favorites or other, and information comes from Web sites or databases of services.

In personalization the flow of these data and information through the Web need to be controlled in special case (to get the special information to the particular user from a site which wants to build loyalty with this user).

This controlled flow can be done with rules governing the user needs with what the contents offer. These operations need to be managed through a knowledge management system which works with resources crossing rules to get target.

Furthermore, to make a good understanding of this (knowledge management system), it will be suitable to be represented by a *Framework architecture*.[11]

Certainly the architecture must be in generalizing representation, that's to be comfort for most situations we want to make it personalized.

3-2-1 Analysis of Information Architecture of Personalization.

The Information Architecture (IA) is made a representation for personalized information; this representation should permeate all aspects of personalization.

The extent of IA, to which a personalized interactive service or product can adapt to individual users, depends on the information captured by the system, and how that information is utilized.

Issues of representation should pass many questions and -challenges- that must be solved before implementation.

These are like: [9]

- What is the service and what is its goal?
- Who is the user and what is his or her goal?

And after that:

- How do these two sets of goals relate?
- How can the interactions be structured to best achieve both sets of goals?
- How should goals and related information be represented in the form of data structures, whose contents can then be processed to produce the desired level of personalization?

3-2-2 The Main Components of the Architecture

To answer the questions above we need to focus on the operation of personalization and determine the main aspects that it deals with.
Well in fact the components of the information architecture for personalization come from three areas [fig 3-1]: [11].

1- business context
2- content
3- users

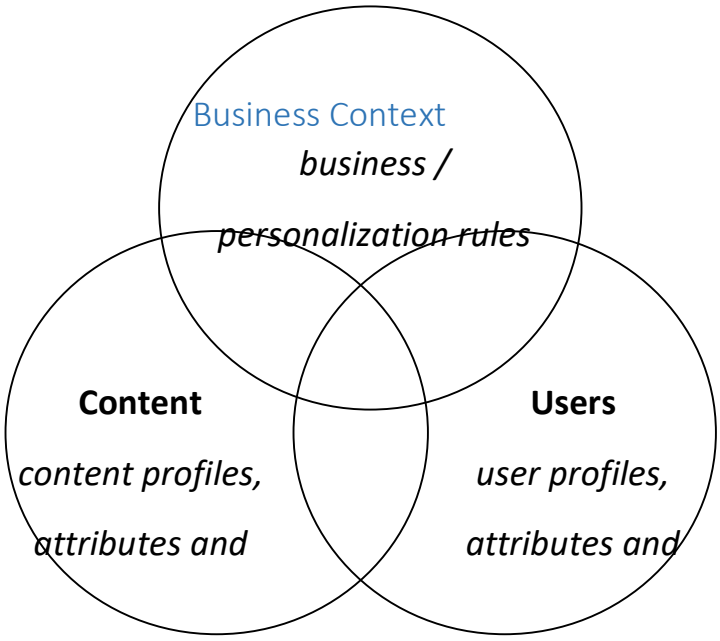


Fig (3-1) Main areas of personalization information

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.[3]

Also, information can be captured through the interactive of the user online (user behavior).

Content: Likewise, content is profiled, based on a set of attributes and assigned specific values.

Content may have statistic information and dynamic information, like how many browser and number of customer make purchases in specific items of the content.[11]

User database and content database are usually relational database.

Business Context: The business has certain rules that determine how personalization happens.[5][11]

Profile

Profile is a main component in personalization project, which represents the main location for the initial information.

Profile needs to be for both the user and content.

Users will have certain characteristics that you will want to track to leverage for personalization. These attributes could describe:

- Where they are located (geographically).

- What their job are (buyer, manager, and assistant).
- What their interests are (science books, research centers, mainframes, pink clothing).

And other attributes could be added.

Content similarly will have characteristics that will need to be leveraged for effective personalization. These could be:

- Price.
- Author of the content.
- Manufacturer of the product.
- Location where the service is offered.

And others.

These sets of attributes and their possible values are governed by a **controlled Vocabulary.**

The need for controlled vocabulary

In users and content profile, the set of attributes and their possible values must be governed by a **controlled vocabulary.** For each attribute, it needs to be consistent to be used throughout the entire system.

For example, many products have variations on their names. If users can specify they are interested in "ديالى للصناعات الغذائية" but the information about the product is tagged "د.ص.غ", there will be big problems in trying to do any personalization.

Sometimes creating the controlled vocabulary means deciding on the preferred term ("ديالى للصـــناعات الغذائية" not "د.ص.غ") and changing anything indexed with a

variation. Sometimes it is a simple list of synonyms that can be created to link the different terms together.

Usually, the problems are harder to solve. One part of the company may use its own classification scheme for its products, while a different department has its own "better" scheme. The two ways of tagging the products will probably be (80%) similar, but each will have its own (20%) that works best for them or their customers.

Everything is fine until the two areas are forced to work together on the company's new, personalization web site. The conflicts will have to be resolved, sometimes peacefully, sometimes violently.

The most important (and hardest) attributes will be those applied to both the user and content profiles. [5]

For example, if you have a site for horse breeders, you will want to know which breeds each user owns. You will have content and products specific to each breed, so this attribute will also need to be part of the content profile. Without this common vocabulary of horse breeds for both your user and content profiles, you will not be able to effectively create *personalization rules*.

User Interface

It's important for a site to offer personalized services which have an active interaction with the user; that is because it is an effective component, being the first one the customers deal with.

If we deal with ordinary system interface, it will be easy, just studying the content and identifying the hot objects and main indexing lines, and after that we

offer what we have in content as a service to the customer. That means the (user interface designer) deals with the content only.

In personalized system, the designer of user interface, or in Web term (the home page), should take into account the user who logs into this content, the field interest, and his favorite items.

“The success in designing such interface is based on understanding the user, the users' tasks and the context in which the user accomplishes tasks.

When understanding these aspects of the context of use, it becomes possible to design a system the users understand, appreciate, and use, and feel like it was designed specifically for them”. [13]

That means the designer should care about the registered customer, give him his own page interface after logging with his (user name and password), talk to him with his name, and offer him the suitable content according to his favorites and needs. Of course the interface should be nice look well design in view of managing its colors and best choosing of objects places to be in the perfect look.

3-2-3 Framework

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. [11]

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.[17]

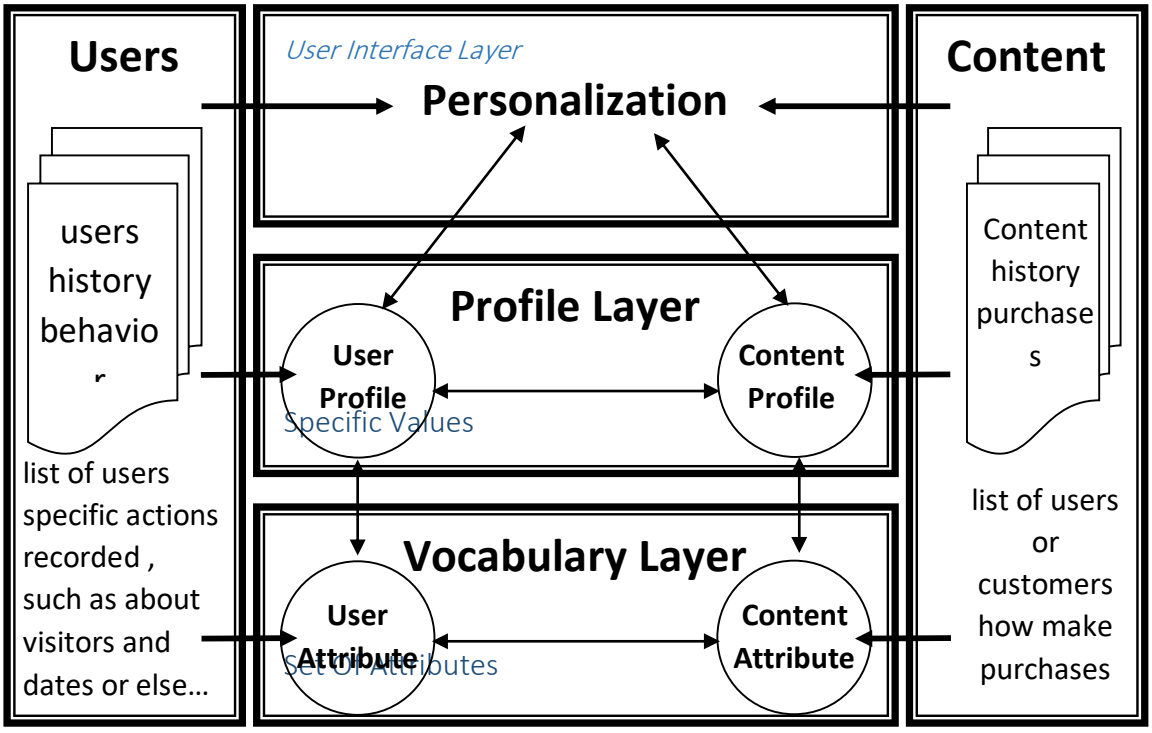


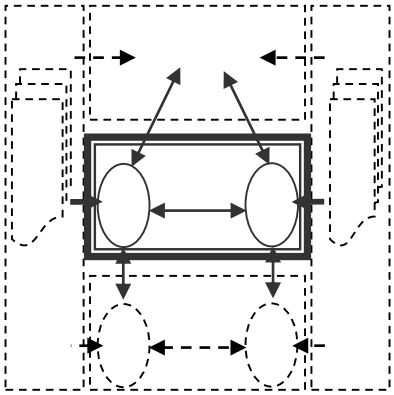
Fig (3-2)

Flow of personalization information in the Framework

In framework shown in [fig 3-2], we have users and the content meeting at the (user interface) through the process of personalization.

Profile Layer

In Profile layer, 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).
- Implicitly: by certain action (such as buying certain products), (these actions will be recorded by the system).

Likewise, profile of the content exists and is matched with user profiles through a set of rules. Meta-information for a piece of content can be changed:

- Explicitly: by rating as example.
- Implicitly: by modifying the content profile which could be done by tracking purchases of a product, and enough purchases could change the value of popularity of that product from "average" to "hot", thereby affecting other user's experiences.

User involvement	User profile	Content profile

Explicit	Fill in a form: where they are located, what they want to subscribe to, etc.	Pick your favorite brand name between different types of products.
Implicit	Viewing several pages on a single product.	Products purchased.

Fig (3-3) Users can be explicitly or implicitly involved in setting user and content profiles

The level of user involvement is an important aspect of personalization because: [8]

- Too much explicit user involvement up front usually turns users away.
- A mix of explicit and implicit, over time supports planning cycle personalization, and allows users to build up a sense of trust before they commit more sensitive profile information.
- Users can set content profiles to affect *other users'* personalization results, (often called collaborative filtering).[4]

Attribute values can be set manually (by users or system managers), or automatically by some software process.[4][5][11][14]

Profile setting	User profile	Content profile
Manual	• Managers assign profile values for	• Human tag content by assigning values to attribute.

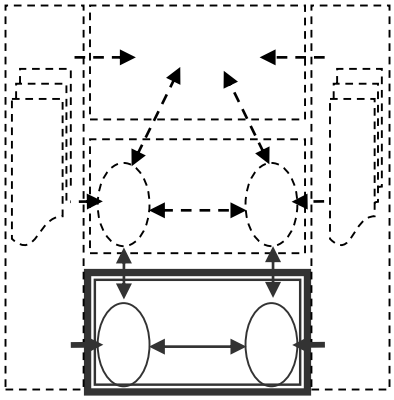
	users (such as after a sale's call). • Users assign own profile (fig 3-3).	• Human validates automatic classification recommendation. • User assigns content profile (fig 3-3).
Automatic	The system detects certain values, such as browser version or language.	Auto-classification software assign attribute values based on rules and concepts extraction, such as assigning brand name values based on text in product description.

Fig (3-4) user and content profile could be set manually by human (managers, users), or automatically by software.

The ways the personalization system supports profile setting is important because if it is all done manually, there will be too much work to maintain. Likewise, some human management will be needed for fine-tuning and keeping everything running smoothly. [11]

Vocabulary Layer

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.[4][11]

The relationships between attributes are defined, such as (child and parent) attributes.

For example, in the services of horses Web site, a users owns a “pony”, that will lead to a broader term “small horse”, which can match with products for “small horses”, like displaying a transportation cage for the owner, that is the right size for his “pony”.

Both, users and content have their own attributes, but they are likewise coordinated to make sure that the higher-level profile information is in synchronous.

Personalization Rules

The mechanism that leverages the profiles, attributes, and values in order to make the personalized user experience.

Also, recommendations, offering stacks, listing some favorite items could be done through personalization rules.

The most powerful rules operate on the set of attributes as a whole. [11].

The work starts at “vocabulary layer”. When user and content profiles sharing attributes have the same values, then they make rules that work for all values of these attributes.

For example: making vocabulary rule that states:

- Show books by this user’s favorite author.

  If the user profile has a “favorite author” attribute that shares the same values as the content profile “written by” attribute, designer can make a general-purpose rule that works for all values.

  If the profile layer rules cannot be done, then a series of rules should be made based on each value:

- If the favorite-author is “علي الحمادي” → show books written by “علي الحمادي”.
- If the favorite-author is “علي الطنطاوي” → show books written by “علي الطنطاوي”.
- If the favorite-author is “المؤلفين” → show books written by “ أســامة أنور عكاشــة، إحسان عبد القدوس، نجيب محفوظ”.

  This would become very inefficient very quickly.

  But doing this to do some profile layer rules could be done based on specific values of the user and content profiles, to offer the sale price as example, for all users whose breed ownership is “Arab stallion” because they turn out to be some of the most loyal customers, or to feature video games whose brand is “Nintendo” (because the site makes more money on them) but not whose brand is “PlayStation”.

The set of profile and vocabulary rules is what will make the personalization either good or bad. This is where the business model will become reality and where a large part of the customer's experience will be determined. [11]

It is the combination of the personalization rules, the user and content profiles, and the controlled vocabulary of attributes and values that will determine the effectiveness of the personalization.

3-3 Planning cycle For Personalization Web Services

Experts agree that personalization is an ideal way to achieve the level of differentiation of an organization in the mind of a person on the web.[5]

How then should an organization think about personalizing its web site?

Gene Alvarez, vice president of e-business strategies at META group, says: [5]

- We recommend personalization to segments of the population that have been fine tuned through the use of business intelligence and data warehousing tools.
- We also recommend that organizations blend various personalization techniques to match the business model they want to create and use continuous process improvement, similar to what we've seen in the manufacturing world, to refine the model.
- Web services and service-oriented architectures will play a role in this continuous process improvement going forward.

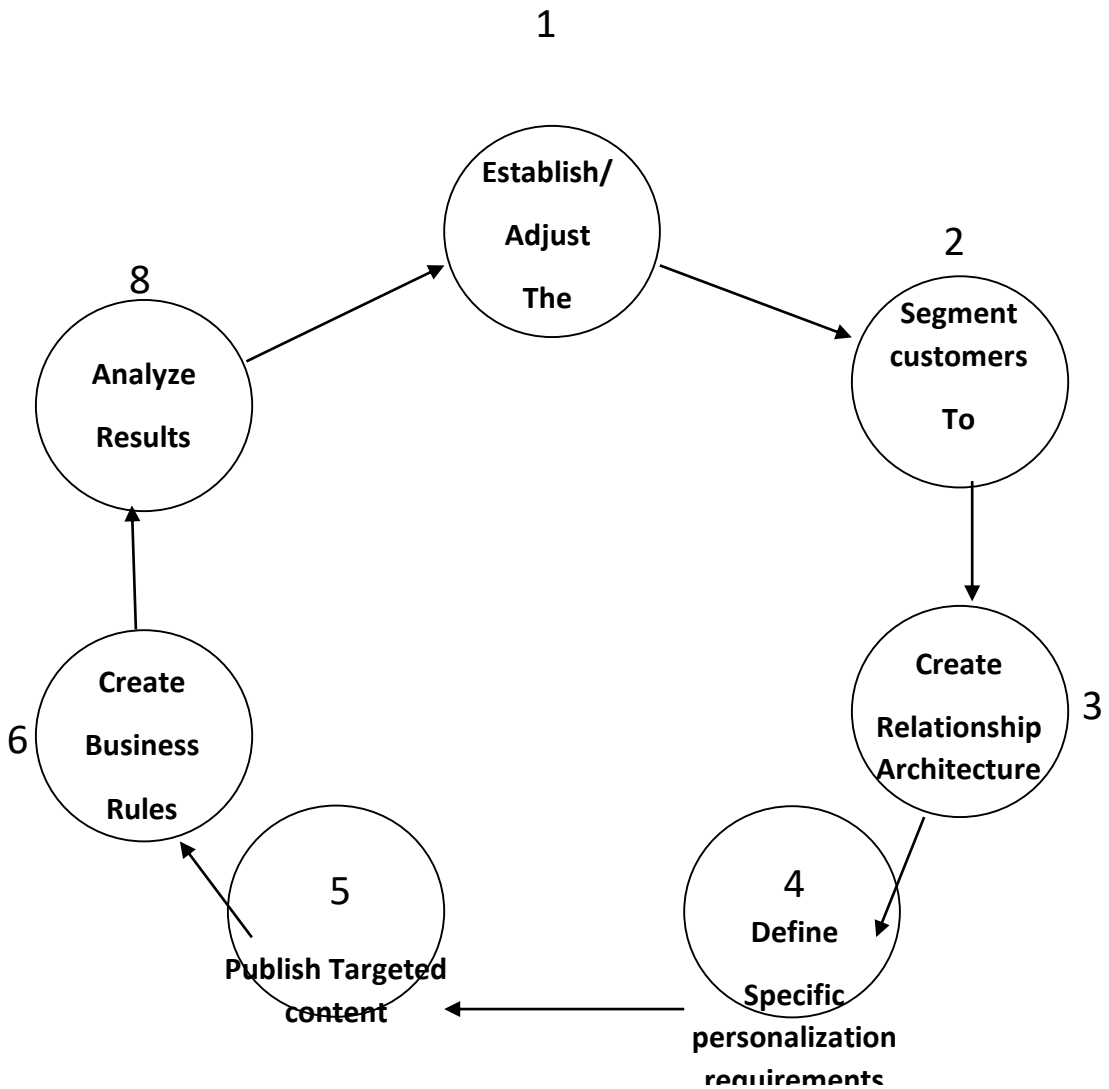
3-3-1 Personalization Planning Cycle

As noted earlier, Personalization is an iterative process that involves an ongoing cycle of creating strategies, implementing strategies and techniques, measuring success, making any necessary adjustments, and then re-strategizing. [35]

The personalization planning team, which ideally would include a project manager, web site designers, product marketing managers, merchandise managers, business unit managers, and others according to the need of the project. [5]

All of those must be prepared to support the process on an on-going basis.

Figure (3-5) will show the planning cycle elements, it will be followed by a description for each stage.



Strategy Development or Adjustment

This stage starts by having a very clear understanding about what the team wants to accomplish through their web channel.

Quantifying objectives and deciding what will be measured, and how, to understand the business performance of the site, plan to measure not only high-level business performance, but also site utilization metrics.[5][8]

It will be important to assign business objectives to specific user communities to determine which communities are most relevant to site overall goals. For example, for some user segments it will be more important to drive repeat business, while for others the most important goal will be longer time online.

Customer Segmentation and Community Definition

The first principle of building accountable customer segments, understands what makes site customers unique, how their needs are different and what impact each group is intended to have on site business objectives.[19] If site organization has a data warehouse and analytical software, the designer can group site customers into segments quickly and accurately. If the designer doesn't have the resources to do this kind of analysis, however, the designer can probably learn enough about site customers from site marketing team to at least get started.

Once the segments defined, the designer have three ways of grouping them into communities: [5]

- Based on information existing in site customer database.
- Based on observed customer behavior on the site.

- Or based on direct questioning.

Once the designer has defined site communities, organizing them is a matter of grouping them into high-level communities and sub-communities. Sub-communities will be more numerous and will help to filter and refine information even more to meet site customers' need.

Grouping site segments into communities offers several benefits:[4][5][35]

1- Web designer shows site customers that the designer understands their needs by providing immediate, relevant content and features.

2- The designers allow non-registered, anonymous customers to provide information about themselves quickly and easily.

3- Segmentation also facilitates the use of business rules, the monitoring and reporting of customer activity, and the development of a one-to-one dialogue with non-registered visitors.

Creating a Relationship Architecture [4][5][11]

The next step in treating different users differently is developing a Relationship Architecture (RA). This process involves deciding which combinations of products, content, and features the designer will offer each community.

Defining Specific Personalization Requirements

There are four steps to mapping out site personalization requirements.

1. Identify which web template pages will be personalized.

2. Choose a targeting strategy (using one of the personalization techniques) for each region of the page.
3. Develop site marketing and communications campaigns.
4. Validate site profile elements.

The key is to mix and match personalization strategies in a logical way that will simulate a customer service or sales representative and simplify management of the site. Companies typically choose the following combinations:[5]

- Personal advisor page (self-selection into a community);
- Advisor results page (one-to-community marketing);
- Personal home page (B-to-C commerce);
- Shopping cart page (cross-sell);
- Account information page (one-to-one and moment-to-moment marketing);
- Business portal page (targeted messages, matching agent, and one-to-one marketing).

Publishing Targeted Content

After the designers have decided which web template pages will be personalized, the content must be reviewed on site to decide whether any additional content is needed.

It is extremely important to determine the necessary amount and format of content early in the planning process. The designer should also categorize site content and assign content attributes that will be used to describe the content when tagging.[11]

If the designer plans to use third party content (e.g., news feed from a newspaper), he will decide what attributes come with the news feed.

To develop an effective editorial production process, issues such as who will review, edit, and publish content (e.g., product managers, writers, the web team, etc.), and the easiest ways for them to introduce new content into the system should be resolved and communicated to everyone involved in the process.

Creating Business Rules

Once site personalization strategies have been analyzed and the content is in the database, the designer can write business rules to execute site campaigns, embedding rules in the web template pages by using suitable web design language. *For example*, if the designer plans to always cross-sell some items, it may be best to hardcode the script rather than writing a business rule for each product. Before the site goes live, make sure the designer run a pilot test to ensure that the business rules are executing properly.

Results Analysis [4][5][8][35]

After site has been live for several months, evaluate the effectiveness of site which must be done by examining use and performance. (Additional business

reporting and analysis may be necessary to understand the full impact of site web site on site organization's overall business.) Key measurements include:

- How many unique visitors visited the site? From where? How many were converted into registered users?
- How often did registered users visit the site? Did this differ by community?
- What was the overall most popular content?
- What was the most popular content in each community?
- What were the total sales generated by the site?
- How helpful were my campaigns in generating these sales?
- Did the cross-sells increase the average order size? If so, by how much?
- Did users click through on the banner ads? If so, did they buy or sign-up for the suggested product or service?
- What percentage of shopping carts was abandoned?
- Did the web site help increase sales from other channels?
- Did the web site help reduce costs? For example, did customers stop calling the call center and begin using self-service on the site instead?
- Did customer retention increase?
- Did site organization get (win) new customers via the web site?

Adjusting Strategies

Once the designers have thoroughly analyzed the effectiveness of web site, they must determine what adjustments need to be made to optimize personalization. There are several key areas to examine.

- What was the amount of traffic from each online advertising site? Did the designer receive less traffic than anticipated?
- If the designer didn't have enough visitors registering on site, perhaps the registration process is too lengthy or invasive. Consider offering an incentive to register.
- If the site had many abandoned shopping carts, it may need more moment-to-moment incentives to close the sale.
- If overall sales were too low, perhaps site promotional items should be more targeted and highlighted as specials on the home page.

3-4 Online Web Experiences

The most important thing in any new idea in all computer fields is the experience, which means putting this idea in applicable form and discovering the advantage and disadvantage of using it, the opportunities and challenges, the development points and at last the degree of usage advantage.

Personalization as a new idea meets the mind of web developers and scientists and finding its place in web sites.

About eight years spent since the introductory of personalization, it is between acceptance and refuse (and this is the normal reaction because of the variance of the viewpoints).

And now many web sites have been adopting personalization for years, have thousands of customers (a sign users) in commerce shopping and interchanging information in personalized techniques and have great stock portfolios and making an amazing successful all these years ago; that would have seemed preposterous if they had designed the system never to allow it; they would have missed it out. [24].

The following are the most important online live web sites employing personalization features, showing the different kinds of personalized services encountered to illustrate some explanation.

These are popular sites like:

3-4-1 Yahoo! The Big Experience

Yahoo! was one of the first sites on the Web which use personalization on a large scale. [15]

Yahoo! has three examples of personalization:

- My Yahoo! .
- Yahoo! Companion.
- Inside Yahoo! Search.

My Yahoo!

(my.yahoo.com) is a customized personal page of Yahoo!.

After registering, users can have their own pages in Yahoo!, log in with their own user name and password; users can select from hundreds of modules, such as news, stock prices, weather, and sports scores.

The actual content for each module is then updated automatically, so users can see what they want to see in the order they want to see it, with latest information on every subject, but only the specific items they want to know about. [29].

Some content is personalized automatically. After obtaining information from the user profile to be matched with the content information, this matching is updated in intervals specified by the user (from 15 minutes to several hours).

My Yahoo! provides this service to millions of people from thousands of sources changing thousands of times a day. This done with a relatively small number of (off-the-shelf) computers, the architecture is completely scaleable as user base grows, by simply adding more (low cost) hardware, eliminating the need for expensive hardware solutions. [24][29].

Modules can be added by clicking on a button at the original contents page, for example, weather page (weather.yahoo.com) contains an "Add to My Yahoo!" button. Also each module on My Yahoo! pages has an "Edit" and "Remove" button, allowing users to manipulate their pages directly, without visiting "Edit/layout" screen. [33].

Yahoo! Companion

(companion.yahoo.com) is a browser's embedded toolbar from which a user can directly access most of Yahoo! features from anywhere on the Web.

It is like a mini My Yahoo! that takes a small space at the top of the page, and is always with the user, user can customize the look and makeup of the toolbar at any time, and changes stay with users even if they switch to different computer. [24][26].

Inside Yahoo! Search

Tens of millions of different queries are sent to Yahoo! search every day. It is impossible of course to customize every one of them.

But several thousands of phrases are clear enough, and Yahoo! has related content good enough to implement the usual Web search with direct, focused content that can sometimes be personalized. [24][31].

3-4-2 Television Listings [30]

Personal Television PTV (www.ptv.ie) is a personalized TV portal site, providing a personalized information service for television viewer. PTV uses ClixSmart personalization engine to generate electronic TV guides personalization for the viewing performances of individual users. (see click stream in 2-2-2).

The ClixSmart personalization manager employs two different content filtering strategies:

A content based filtering approach seeks to recommend similar items to the items a user liked in the past.

Collaborative recommendation approach seeks to select items for a given user that similar users also liked. [2].

PTV offers full listings without requiring user registration and has theme guides which users can browse. The themes include comedy, drama, soap operas, music, sports, kid's games, quizzes, and gardening.

Alternatively, personalized guides can be received after registering, these are available either as HTML pages or as WML for WAP-enable wireless devices.

In the personalized guide one can pick preferred viewing times, programs, and channels.

PTV also learns about your viewing preferences overtime, and using this information, it automatically constructs a TV guide to match user-viewing tastes.

Thus the user information is tailored to contain these programs that a user has explicitly expressed an interest in (through their profile), as well as others PTV suggests will be relevant to users tastes. [4].

The user can provide an opinion on the suggestion by giving them a rating.

The daily guides can also be received by email.

Quality Evaluation: PTV has proven to be extremely successful and popular. Between 1999 (first introduce) to 2000, the system has attached over 20.000 registered users from Ireland and UK (where the site targeted).

Also in a study carried out in which new users were asked to evaluate the system in terms of guide precision, case of use and speed of service, the results were: (3%) poor, (30%) satisfactory (67%) Good. [2].

It was extremely positive.

3-4-3 GMBuypower (www.gmbuypower.com). [27].

This site guides the user through the steps of buying car-researching options, building up the description and locating a local dealer that can provide that choice of car.

Criteria for selecting a suitable car can be provided by first specifying: (make, body style, and price range), (all optional). If a car that fits the general description is found, one can go on to choose the specifics: (color (interior and exterior) and exact model).

The system can then locate a nearby dealer given a zip code or city/state name or dealer details. The system can also be used flexibly, for example to find a dealer for a make of car at a particular city.

Another feature allows the user to make comparisons of their chosen model with other marks of car.

The MyFiles facility allows the user to make save information about vehicles that are being considered, customization, messages from dealers (the site can be used as an intermediary to make 'anonymous' contact with dealers). Using this last feature requires registration.

A user with a well-formed description of the vehicle desired can skip the researching steps and directly to locating a dealer for that car.

So, as observed above, there are many successful web sites that attempt personalization successfully and gain attention of thousands users and customers and win loyalty of them and there are more other sites like Staples [32], Amazon [25] and others, each web site gives different services with personalized touch.

3-5 Summary

Using information architecture as a foundation for thinking about personalization helps to explain the concept of communication of information architecture by putting them into the context of personalization, also to think deeper about personalization and look below the user interface to see how the rules match users with content and at last to evaluate personalization system.

In the online world, personalization is the most effective way to create competitive advantage. By influencing behavior on web site so that site users become frequent visitors, register their personal preferences, tell which communities they identify with, and grow to rely on site's content and services, create a loyal customer base at a lower cost.

In order to develop and implement an effective personalization strategy that meets organization's business objectives, however, a designer must understand the advantages and disadvantages of push and pull strategies and then learn how to match the appropriate techniques with the right strategy. And he must strike a balance between what he hopes to achieve and the additional resources he is willing to invest. Although personalization requires planning and some investment, the benefits are compelling: greater customer loyalty, higher conversion rates, reduced costs, a boost in productivity and operational efficiency, and a more agile and profitable organization.

The online experiences will be a great benefit for understanding personalization and trusting in it, so as to see how to employ overall personalization in complete work.

4-1 Introduction

Personalization Web Services must have special treatment when used in Web Sites because a personalization site to give a personalized content to the registered user, needs an appropriation to be done in first entry to the customer at first registration for him in the site.

Not just that but also the site should continue with the customer when he wants to change his favorites and interests about the content of the site and offer him each new items available in the site.

The site needs to be administrated and managed after it has been designed, to be maintained if needed and be updated with any new techniques, features, or contents.

Here in this chapter the proposed web site application will be discussed to show how to make a personalization technology in a web site in code level.

4-2 Description to Implemented System

This Web Site considers a library of electric publishing named:

(مكتبة النشر الإلكتروني المخصصة).

To offer fields like: (كتب ، بحوث ، صحف ، مجلات).

With interests like: (ثقافية ، علمية ، كومبيوتر ، فنية ، سياسية ، طبية ، رياضية).

Functionality: because of the importance of *publishing* in the internet the study proposed this system to be useful for any publishing consortium in personalization

design, to show the utility of using this concept in internet, taking into account the customers how deal with these sites and them desires fields and interests.

The site accepts registration by the customers to fill a profile containing the field they prefer with the favorite interests and then offer the suitable contents to their preferences and favorites.

The site uses some personalization techniques and personalization strategies to perform the job of the site; the site also uses points in different places of the site to be useful for the development team to develop the work of the site according to specified metrics discussed (see chapter 3) and measure the success of the Web Site.

The Web Site has Arabic Interface to be suitable for Arab Users (customers).

The project tools: This project is done with the following requirements:

1- software requirements:

- Microsoft Front page application as first step of design.
- HTML (Hyper Text Markup Language) as design language to accomplish the design and the appearance face of the pages.
- ASP (Active Server Page) codes for programming the links of the pages, rules, and exchanging the data and information between pages.
- Microsoft Access application for the design of the database tables.
- SQL (sequential query language) for searching, adding, removing and updating the database tables.

- ADO (ActiveX Data Objects), making use of its object methods for accessing the data as record sets from the database and manipulating these data.

2- The operating system: Windows XP, setting as local server using (Internet Information Services) (IIS ver 5.1).

3- The project has been accomplished with the following hardware:

- Pentium 4, 2 GHZ
- Ram, 128
- Hard disk, 40 GB

Project Layout: The project main work briefly is: "new customer registers in the Web Site and gives information and interests, and then logs-in with his chosen name and password to get his favorites list of content according to his registered interests", (this is the personalization side of the project for the customer).

While for the organization, the administrator page, with rating of the visitors and their comments also (the number of overall purchases with the number of registered users) will provide a (personalization side for the organization).

4-3 Main project pages

The project has four main pages shown at the header and footer of most of the Web Site pages as shown in [fig 4-1].

These are:

- Home page.
- Search page.

- Visitor page.
- Administrator page.

Each one of these pages contains other pages according to the job they carry out.

Home page

Figure 4-1: Home Page of the project

Home page or (الصفحة الرئيسية) [fig 4-1] is the first page appearing when calling the Web Site; in addition to the header and footer and the welcome phrase, it contains two text boxes marked with (الاســم ، كلمة الســر) referring to name and password of the interred user to get his personalized page if registered, followed by a button marked with (دخول).

And after this there is another button marked with (تســجيل) used to register a new customer going to the registration page to get information about this new customer [fig 4-2]which will be discuss in (4-5 first stage).

Search page

Figure 4-2: user form page

This search represents global search for titles, the page as illustrated in [fig 4-3], contains text box followed by button marked with (ابحث); the text box accept text and after activating the button the simple search engine will try to find this text between the titles of all fields and their key words and retrieve titles linked up to their information.

Figure 4-3: search page

Visitor page

This page represents a record for the visitors of the site. At first it will show information about how visit the site and registered as visitor like their names and addresses and how they find this Web Site followed by comments of visitors, the comment is programmed as desired not optional that mean the web site will not allowed the registration without this comment this done in code to valid the

registration, and will not put the information of that visitor without this comment [fig 4-4].

This technique has been used in more than one place in this project, that to make the entry data be accept in tow way optional (this accept any thing even space) and desired (this need data to be accept).

Figure 4-4: visitor page

The page has a link marked with (أضـــف ملاحظاتك) for the new visitors to add their notes about the Web Site with registration page [fig 4-5].

The rate of the Web Site here and the comments could be useful for the developer team in the cycle of developing the project.

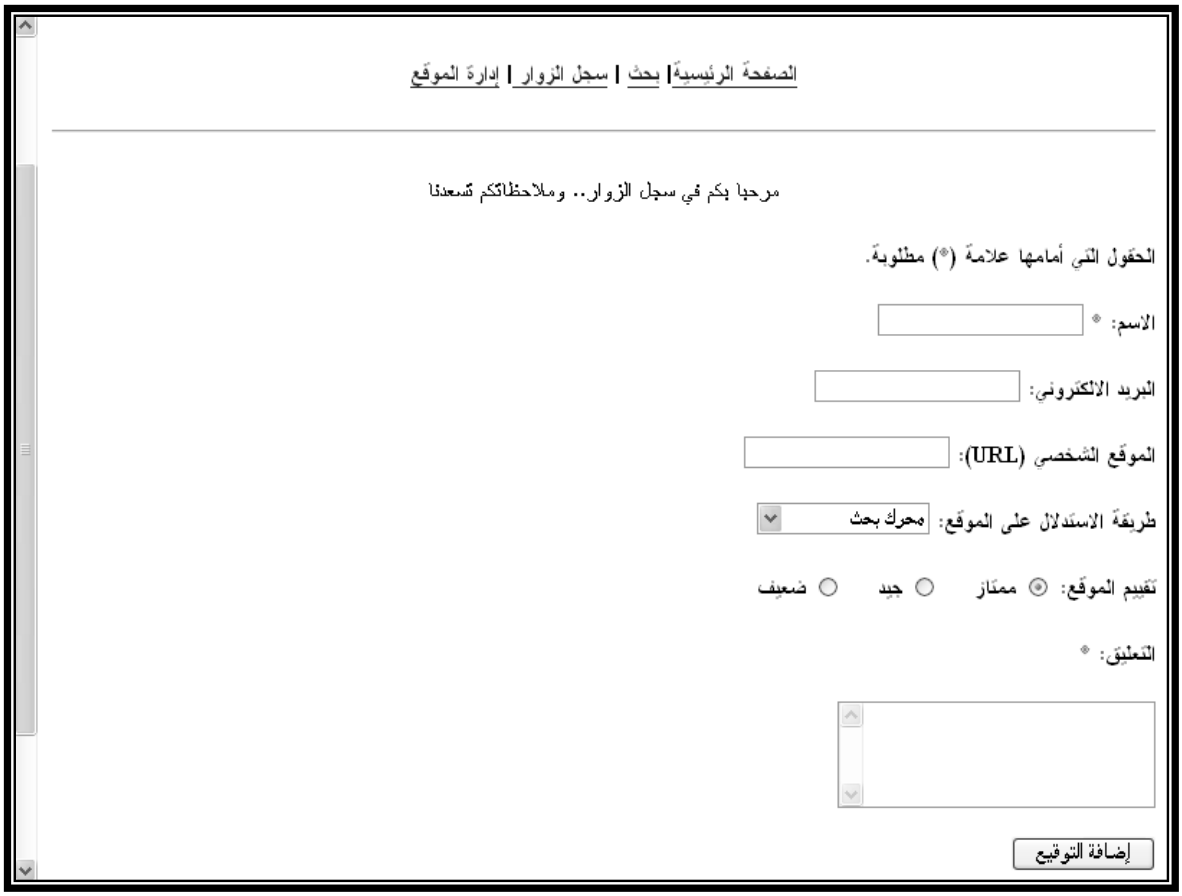


Figure 4-5: visitor register page

Administrator page

This is the page used by the administrator team here, where the team of the project can manage the Web Site and can check it through time.

If clicked to this link (إدارة الـمـوقـع), a page of authentication will appear to authenticate the log-in person is from the administration team or not, it has name and password text boxes with script of validity in hidden page to check the name and the password of the administrator are correct to allow him login this area [fig 4-6]. The validity here is important because the administrator page has a great role in the web site, because it contain important information about the site, also it is

the place where the administration team update and can change the content and this is so sensitive point.

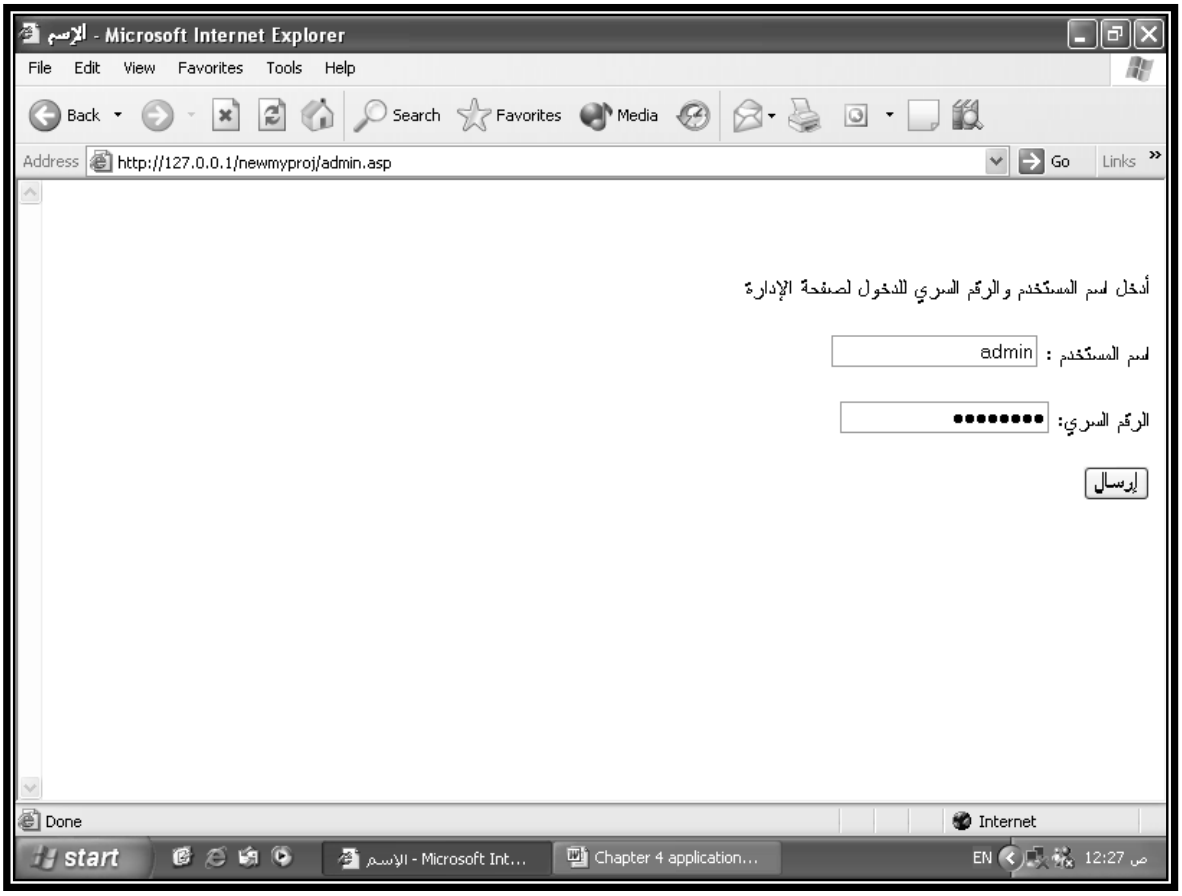


Figure 4-6: Administrator page

After log-in the administrator team can watch statistical information about the site work and links to pages can update the content of (books, papers, magazines, and newspapers), and fill full data about them, also can delete some items not useful and they can change any data from the administrator page.

4-4 Web Site Database

The database of this project will be represented by the following tables:

- The profile of the customers table: this table contains information about the register customer and his interests; it also contains last log-in date, all joined with the customer ID. This table is made by the customers at first log-in for them in the Web Site, and it is a mater of change by the users themselves during interaction with the site at any time.
- The profile of the content table: this table contains information about the content and the interest that this content works with and it is divided into four tables (books, papers, news, and magazines), joined with No. of buyers and viewers to be used as collaborative filtering when offering this content to the customer. This table is made by the administrator team, and is a matter of change (adding and deleting and updating) by the team during time.
- The profile of visitors table: contains the visitors' information, made by the visitors and the administrator can delete any one of them.
- The profile of administrators table: this table contains information about the administrator team, their log-in names to the administrator page and their passwords, and could be changed by the administrator.

There are four additional tables: these are (ulib_book, ulib_news, ulib_papers, ulib_mag), which represent the purchases cart, each one contains the purchases of a specific user for a specific item, each one contains the customer ID and the name of item that this customer purchases, in order not to offer him next log-in.

4-5 Module Description

According to this brief illustration, there are two main stages that could be defined as follows:

First stage: begin with the (Home page) and push the button (تسـجيل) to go to the customer information entry (filled by the customer); this information must be filled carefully and the customer must remember his log-in name and the password that he chose, and give his suitable interests and the fields he liked.

Of course, there is simple checking of the user's name and the password when it given by the customer in case of repetition, and checking for comfort password in the user form in customer information entry.

Comforting could be done in hidden page code like the following:

```
<%@ Language=VBScript CodePage = "1256"%>
<%   Name=Request.form("Name")
    Password=Request.form("Password")
     If Name = "" Then
          response.redirect ("default.asp?error=Name_Null")
      Else
           If Password = "" Then
             response.redirect ("default.asp?error=Pass_Null")
           Else
      %><!--#include file="conn1.txt" --><%
    SelectSql="Select * from dbo_tabuser where u_namei='"&Name&"'"
```

```
                    set rs=ADO.execute (SelectSql)
     If rs.eof  then response.Redirect ("default.asp?error=Name_Entry")
    Else
If rs("u_pass") <> password Then
   response.redirect ("default.asp?error=Pass_Entry")
Else
   Name_Cooky= request.cookies("Name")
If Name_Cooky  <> Name then  response.cookies ("Name")=Name
End IF
id= rs("u_id")
response.Redirect ("uproduct.asp?uid="&id)
End If
End If
End If
End If     %>
```

Represent the validentry code page in the project.

After registering and pushing the button (تسجيل), the site will show the (home page) again, as a sign for accepting this information, and if there are any problems' the site will inform the user (the customer) about the details, like if there a difference in the information of the user name and password.

This could represent the personal input in the site. From here the second stage could be started.

Second stage: the second stage, which represents the personal output, starts by giving the log-in name and the password. Again there is checking about the user name and password: if there is no mistake a personal page will appear to the customer titled with his real name which he gives in user form, with a title suitable to his interest field from the content of the Web Site, represented by titles of "books", "papers", "magazines" and "newspapers", which the customer prefers with additional recommendations this customer may like.

Suggestions

1- Analyzing the services should be given in the site carefully and accurately to find out which technique will be useful in the site, trying to apply it combining strategies and techniques for achieving objectivity in the work, and accomplishing the service properly.

2- It is better when trying to design personalization Web Site services to work top-down design instead of bottom-up so as not to increase the techniques without practical benefits.

3- Personalized web site services depend on a complete team; after the administrator the team need a specialist in the type of services that the site offers, and these should not necessarily be professional in programming, it also needs analyzers to design the framework of the site software and database needed in, either static or dynamic, and programmers to give this job a life of codes and to choose the suitable platform as an area of the codes.

4- If the database grows and become complex, the suitable choice is SQL as database platform, and it is better to choose the latest version to be convenient with the applications that you may choose to make the Web pages.

5- Personalized Web Site services management must be run by a team to analyze the metrics used in site and its issues and give the suitable reaction to give the site some perfect feel and to reach customers' satisfaction through watching metrics during customers log-in and their behavior.

6- Whenever the content details increase, the fields of profile must be increased too, either by direct filling or taking during customers log-in and their interaction with the site. The rule base and the queries will also be increased.

So the designer of the Web services must consider his team's capability to finish such complex details.

7- Because of the importance of privacy, to protect the information of customers, it will be suitable to be studied with personalization services as a special case.

8- Trying to find optimized solutions for personalization because it's now hard to be implemented and expensive.

9- It is suitable to update personalization platforms and applications to make personalization web services easy to use, "this could be notice in the newer versions of dot net, there is special treatment for this growing field".

Conclusions

1- **Users need to be given a certain amount of personal freedom and control in order to feel secure with a website, software, or consumer product. If something is too restrictive, users may be frustrated and find reaching their goals nearly impossible, even if there are workarounds.**
2- **Grouping customers to communities can be so helpful in designing the website and managing; communities can be grouped according customers, personal preferences.**
3- **In order to develop and implement an effective personalization strategy that meets organization's business objectives, designers must understand the advantages and disadvantages of push and pull strategies and then learn how to match the appropriate techniques.**
4- **Working with personalization in the design of web sites and web services requiring strong tools needs powerful codes when designed, so it will make a powerful designer with perfect ability in dealing with the codes.**
5- **Profile of the user and the content, is the most important component in designing personalization Web Services.**
6- **Attributes of user profile and content profile must be chosen carefully by making a good analysis to user needs, and comparing this with a good analysis of the content according to the need of users.**
7- **Choosing the attributes of user and the attributes of content will be compared in driven rules. That will be useful and enables the designer to make the Web Site choose the suitable content to the suitable user.**

8- **Designers should recognize that users have unique tastes and needs that are related to their broader personal goals, and offer personalization that is simple and understandable.**

9- **Personalization is the most effective way to create competitive advantage. By influencing behavior on your web site, your users become frequent visitors.**

10- **We can consider personalization in web site is a good started for the intelligent web sites that give solutions for variety of situations or problems and give "self solutions"; the matter which make it as self-machine thinking, and could be consider in the side of (A.I).**

References

[1]. Baker, Adam, "Meaningful personalization", 2004 http://www.merges.net

[2]. Barry, snyth and Paul, cotter, "A personalized Television listings services", communication of the ACM, August 2000.

[3]. Bonett Monica, "An Architecture for Personalization services within subject gateways", 2002, http://www.imesh.org/toolkit/work/components/personalization/architecture.

[4]. Bonett. Monica, ”Personalization of Web Services: opportunities and challenges", 2001, www.ariadne.ac.uk/issue28/personalization/intro.html .

[5]. BroadVision center, "Using proven personalization techniques to derive measurable and profitable on line behavior", Inc, www.broadvision.com, White Paper, 2004.

[6]. David, Gourley and Brian, Totty, "HTTP The Definitive Guide", O.Reilly, 2002.

[7]. Earley, Kathleen, "Personalized communication networks", Communication of the ACM, august 2000, vol 43, No.8.

[8]. Edith Schonberg, Thomas Cofino, "Measuring Success", communication of the ACM, August 2000, Vol 43, No.8.

[9]. Edwin P.D Pednault, "Representation is Every Thing", Communication of the ACM, August 2000, vol 43, No.8.

[10]. Hirsh Haym, Basu Chumki, D. Brian "Learning to Personalized", communication of the ACM, August 2000.

[11]. Instone, Keith, ”Information Architecture And Personalization", Argus Associates, December 2000. http://argus-acia.com/white_paper/personalization.html .

[12]. Jakob Nielsen's, "Personalization is over-rated", Alert box for October 1998, www.useit.com/alertbox/98/004.html.

[13]. John Karat, Glare Marie, "Affordances, Motivation, and the Design of user interface", Communication of the ACM, August 2000, Vol 43, No.8.

[14]. Kantor B., Boros Endre, Melamed Benjamin, Menkov Vladimir, Shapira Bracha, J. David, "Capturing Human Intelligence in the Net", Communication of the ACM, August 2000, Vol 43, No.8.

[15]. Khopkar Yashmeet, Amanda spink "search engine personalization: an exploratory study", 2003, http://www.firstmonday.org/issues/issue8_7/khopkar/index.html .

[16]. Mathew Berk, "Beyond the personalization Myth", published sep. 2003, Jupitor research.

[17]. Miller, Eric, "Towards Personalized Metadata of knowledge systems", September 2003, http://crreativecommons.org/licenses/by-nc-sa/1.0/

[18]. Mobasher Bamashad, Cooley Robert, Srivastava Jaideep, " Automatic Personalization Based on Web Usage Mining", Communication of the ACM, August 2000, Vol 43, No.8.

[19]. Perkowitz Mike, Etzioni Oren, "Adaptive Web Site", communication of the ACM, August 2000, Vol 43, No.8.

[20]. R. Barrett, P. P. Maglio and D. C. Keller, "How to Personalize the Web", In proceedings of the ACM conference on human factors in

computing systems, 1997, www.almaden.ibm.com/cs/wbi/papers/chi97/wbipaper.html.

[21]. Riecken, doug, "Personalized Views of Personalization", Communication of the ACM, august 2000, vol 43, No.8.

[22]. Robert Seidman (Seidman's On Line Insider), August 1998, Vol. 5, Issue 24. http://www.goodreports.com.

[23]. The Personalization Consortium, www.personalization.org/personalization.html.

[24]. Udi Manber, Ash Patel and John Robison, "Experience with personalization on Yahoo!", communication of the ACM, August 2000, Vol. 43, No.8.

[25]. www.amazon.com.

[26]. www.companion.yahoo.com.

[27]. www.gmbuypower.com.

[28]. www.microsoft.com. What are Web Services, May 2003.

[29]. www.my.yahoo.com.

[30]. www.ptv.ie.

[31]. www.search.yahoo.com.

[32]. www.staples.com.

[33]. www.weather.yahoo.com.

[34]. IT Research Library, www.Forbes.com

[35]. Kromer Joseph, Noronha Sunil, Vergo John, "A user-center design approach to personalization", communication of the ACM, August 2000, Vol. 43, No.8.

الخلاصة

) بسيطة. بعد HTMLكَانَ الإنترنت أصلاً عبارة عن مواقع ويب ساكنة وهي عبارة عن صفحات (أن بَدأتْ الشـركاتُ باسـتخدام الإنترنتِ وكميةِ المحتوى نَمتْ، أصـبحتْ مواقع الويب أكثر صـعوبةً وغاليةَ للإدارة.

) إضـفاء طابع الشـخصـيةِ لمواقع الانترنت، personalizationظهر في هذه الأثناء اهتمام بالـــــ(حيث ظهرت قوانين للعمل ووكلاء مطـابقـة لمحـاكـاة التفـاعل بين وكلاءِ المنظمـةَ والزبـائنَ، ثم تغير هـذا الأمر.وبدت خدمات الويب تشـــبه خدمات زبائن وممثلي المبيعات في الحياة الواقعية، إذ يتم تنقية معلوماتَ الزبونِ آلياً، ثم يتم عمل توصـيات، وتنبيهات للزبونَ حول العروض الحديثة، ثم يتم استخدام تقنياتَ لإضـفاء) للزبونَ،إذ يتم تذكّر الزبون، وتعدّل هذه الذاكرة الشخصيةَ للزبونِ personalizationطابع الشخصيةِ ( ) أضـفتْ طابع شـخصـــي على personalizationطبقاً لحاجاتهِ المتغيرة. لأن تجاربَ المسـتعملين مَع (الموقعِ إرْضـاءً للزبون في النهاية، فإنهم على الأرجح يُصـبحوا زبائنَ مواليين ودوريين، الأمر الذي يُوضـح استخدام العديد من المنظماتِ لهذه التقنية.

علاوة على ذلك، فإن مواقعِ الويب لَيْسَ مِنْ الضـــروري أَنْ تبقى على التصـــميم الأولي لَكن يمكن تعديلها لِكي تتلاءم مع الحاجاتِ المُتزايدة للزبائنِ وذلك بتطويرِ تقنياتِ تصـــميم مواقع الويبِ لكي توافق عمليةَ التنمية المستمرةَ.

) في خدماتِ مواقعِ personalizationهذه الدراسـةِ محاولةُ لتَتَبُّع وظيفةِ إضـفاء طابع الشـخصـيةِ ( )، بعدها تجميع لأغلب personalizationالويب، إذ يعطى في البداية تعريف لإضـفاء طابع الشـخصـيةِ (تقنياتِها العشرة المستعملةِ من ثم تدمج ستراتيجيتي الدفعِ والسحب للوصول لأفضل تَأثير على خمسة من أهم سلوكيات المستخدم على الأنترنت وتَعطي انتباها لموقعِ المنظمةِ للزبونِ.

ثم تم تعريف هيكل معلومات مناسب عام لمواقعِ الويب الشخصيةِ، مع خطوات عملية إدامة وتطوير للموقع عند تنفيذه على الانترنت تسـمى (دورة التخطيط)، مع بعض المقاييس المعتمدة التي يمكن أن يسـتفيد منها فريق التطوير.

ثم يتبع ذلك النظام المقترح وهو تطبيق (مكتبة النشر المخصصة)، وهي موقع أنترنت يؤدي خدمات) واسـتراتيجياته بالاعتماد personalizationللنشـر المكتب ينفذ بعض بتقنيات إضـفاء طابع الشـخصـيةِ (على هيكل المعلومات العام.

بالإضـافة لما سبق، الموقع لديه صـفحات إدارة فيها مقاييس وإحصـائيات لمعلومات ينتفع منها فريق التطوير، وروابط لمساعدتهم على إضافة أو حذف أو تعديل أي محتوي بالإضافة لإمكانية تعديل الموقع من صفحات الإدارة هذه.

إضـفاء طابع الشـخصـية تقنيةُ قويةُ في مواقعِ الويب، وهي تضـع موقعَ الويب في مضـمار المواقع الذكية، لَكنَّه يَتطلّبُ الكثير مِنْ العملِ يَتطلّبُ لغةَ ويبِ قويةِ أيضاً لبرمجة أدواتُه.

أخيراً، يؤدي إضفاء طابع الشخصيةَ إلى الموقع إلى أستحصال ولاءَ الزبونِ وجلب انتباهه إلى موقعِ الويبَ.

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الشخصية في خدمات الأنترنت

أطروحة مقدمة إلى مجلس كلية الحاسوب في جامعة الأنبار كجزء من متطلبات نيل شهادة الماجستير في علوم الحاسبات

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