Improvements in Gathering the Related Web Pages for E-Commerce Promotion

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Abstract

Promotion is an important activity in the marketing for increasing the beneficial responses from customers. An approach for improving the activity construction of e-commerce promotion by gathering the related web pages is proposed in this paper. In this approach, we modified the labels of links among pages in a website. Then, the group of the related pages of an activity can be collected by traversing the labels corresponding the activity. And, the correspondences of traversing pages and the classification of activities in a promotion are matched with the starting pages which are specified in the classification hierarchy. Some general relationships of the hierarchy have explained to guide the constraint of activities selection. Hence, the related pages can be quickly and effectively constructed for supporting the activities of a promotion. This is helpful to increase the competencies of marketing.

Keywords: E-commerce, promotion, marketing, structure of Web pages, Web.

1. Introduction

The Internet has provided an opportunity for enterprises to move organizations beyond the constraints of the traditional marketing channels [7, 12, 14]. It creates the chances of marketing through the Web for the customer in the world wide area. Promotion is an important activity in the marketing for increasing the beneficial responses from customers[4, 5]. In this paper, we proposed an approach to rearrange the pages in a website to cater to the various activities for the promotion in the marketing. We add some flexibility of dynamicly gathering the related Web pages for an activity based on the fundamental infrastructure of the existed Web pages. This approach extends the current usages of the Web pages in a website to improve the conduction of a promotion by the support of World Wide Web.

Marketing of an enterprise is used to identify, create and maintain the satisfied relationships for customers with the suitable strategies and tactics. It improves the resulting value for both the customer and the enterprise. Promotion is usually adopted to improve the effects of marketing. Promotion is a method of corporate communication that would reach a target customer with a designated message in order to achieve some specific objectives of the organization. In E-business supported with the Internet, Web pages are one of the major media to load the message. Customers can easily access Web and obtain the designated message quickly. Thus, the Web provides a good support to carry promotion out.

Even though some techniques for recommenders of Web pages have been studied in the field, these studies in general focus on the desires of customers[3]. The recommenders are used to suggest right or possible products to customers with their information. They consider the behavior of an individual customer and make some promotions for the individual one only. These systems are not suitable to a marketer who wants to promote something to a lot of customers. Thus, we have to search another approach to support the promotion from the viewpoint of a marketer.

Promotion caused from a marketer consists of some activities such as advertising, sales promotion, public relations, personal selling, etc. And, the services or products for the promotion will be various categories for satisfying the various kinds of customers. Each type of activity of promotion should be supported by different groups of Web pages in order to communicate the desired audiences with their concerns. However, the fundamental infrastructures of current websites are almost fixed after its creation so that providing the flexibility for gathering the related Web pages depended on some desires may be difficult.

In this paper, we add some metadata derived from the activities of promotion into the Web to improve the flexibility of gathering the related Web pages for constructing a promotion. When the marketer constructs a promotion, the related Web pages in a website can be identified by the guidance of concepts or activities in the promotion. These guidance will map to some areas of the corresponding Web pages in the website. Thus, the supported Web pages for a promotion can be gathered and modified to carry on the related message for the preferred customers.

The remainder of this paper is organized as follows. section 2 describes some background of promotion supported by Web pages. section 3 explains the action of add links into pages in a website for restructuring the website according the desires of users. Then, the method for gather the related Web pages for the activities of promotion is discussed. section 4 discusses some considerations of implementation for the proposed method. Finally, section 5 explains the conclusions of this paper.

2. Background Information

The business on Internet has become essential parts of our lives, both personal and business. At present, the popularity of the Web has given impulsion to enforce Web-centric applications, such as e-commerce or e-business. They are Web-enabled applications that support business transactions between multiple parties of customers based on the Internet. Many businesses now use the Internet to grow market and their businesses effectively. The crucial processes for a successful business processes are in direct interactions with customers.

Some interactions are now shorter and thus more effective than those of conventional commerce. For example, in the online bank, collaborated business processes enable integrated products and services within a single interface to costumers. Recently, the trend of personalization calls for offerring customization to consumers. These customable services improve the responses for a customer's desire. The results of the personalization in e-business stimulate some recommenders for Web pages preselection. These recommenders can be used to promote or relate some services and products. They are not preferred to conduct the mass promotion, which is a major way to improve the effects of marketing from the viewpoints of a corporation.

Some organizations, both commercial and noncommercial, have engaged in some form of promotion with a business website, e-mail, and something about e-business. In general, marketers of a corporation have their power to use some activities of promotion[4, 5]. For example, some activities are listed in the following,

- **Advertising**: It is an activity of a promotion. This activity is used to promote services or products for mass customers, and is often using popular media to deliver the marketer's message. It is not designated for individual customer.
- **Sales Promotion**: It is a short-term promotion to encourage customers to respond or undertake some special offer. For instance, the special discount offerred by retail stores after holidays.
- **Public Relations**: This type of promotion uses third-party sources, for example, Web pages on the Portal to offer a favorable mention of the marketer's service or product.
- **Personal Selling**: This form of promotion involves personal contact between company representatives and consumers. Often this promotion occurs via face-to-face, telephone, or through the Web pages on the Internet.

Each of these activities will be flexibly selected by a marketer's intension to take a promotion.

In general, each activity for promotion has its own group of Web pages to support it. Thus, if a business website could provide the corresponding Web pages flexibly according to the activities, then various promotions can be conducted more effectively than those of creating a new part of website for a specific activity.

On the other hand, in a promotion, searching for the interested or related customers is an important step to increase the possibility of a successful activity. Customer profiles, in which customer preferences and usage history are stored or analyzed, would be helpful for customer preselection in a promotion. Thus, the problem of the study can be reduced to how to flexibly maintain the correspondences between Web pages and the interests of customers.

In the next section, an approach to maintain the correspondences between Web pages and the interests of customers will be presented. Some meta-

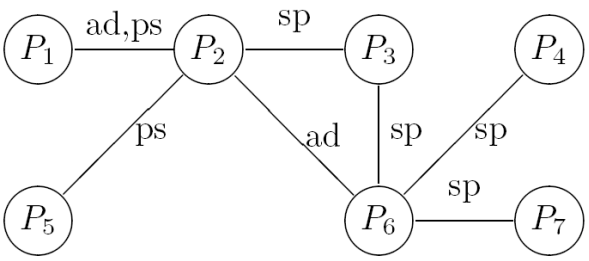

Figure 1: An example of some Web pages.

data are put in the relationships of Web Pages in order to gather a group of the related pages by traversing the website. Furthermore, a hierarchical structure of the relationships between the activities of promotion and the services or products to be promoted will be established to handle the starting points of the traversing progress. Thus, the group of the related pages for a promotion can be flexibly catched with the assistance of the two structures of relationships just described.

3. Gathering the Related Web Pages for E-Commerce Promotion

In this section, some activities of promotion were organized by the technology of knowledge representation into a classification hierarchy. Then, the searching process for gathering the related Web pages of an activity is discussed. Some techniques to restructure the Web pages in a website are also explained in this section.

To illustrate the process of searching for a group of the related Web pages about the activities of promotion, an example of Web pages in a website, denoted as website S_1, is presented in Fig. 1. Where seven Web pages, P_1, P_2,… ,P_7 are connected by some links labeled with notes of the activities of promotion. In the website, we can search for the related Web pages of sales promotion starting from page P_2, and we received a group of pages of { P_2, P_3, P_6, P_4, P_7,}. Some pages in the group are not necessary to be connected directly by page P_2, e.g., page P_7.

Now, it is necessary to record the starting Web pages of the activities of promotion with a table. For example, the following table lists some starting Web pages of the four activities of promotion,

Activity	Abbr.	Starting Web pages
advertising	ad	P_1
sales promotion	sp	P_2
personal selling	ps	P_2
public relations	pr	P_6, P_7

Where, the abbreviations of activities are used to label the links between Web pages. Some activities have several starting Web pages, for example, the activity of public relation has two starting pages. Now, the related Web pages about the activities of promotion can be gathered as follows,

Activity	Web pages
advertising	P_1, P_2, P_6
sales promotion	P_2, P_3, P_6, P_4, P_7
personal selling	P_2, P_5,
public relations	P_6, P_7

As we will see, one Web page could belong to several different groups of pages. For example, page P_2 presents at three groups in the above table.

Now let us see a more complicate example of the activities of promotion. For instance, four activities of promotion, such as advertising, sales promotion, public relations, personal selling, can be applied by a marketer. And, these activities can carry on the website of own company or other websites in somewhere. Then, the services or products for the promotion will be various categories for satisfying the various kinds of customers. For example, services of bank, electronic products, and agriculture products can be the candidates for promotion.

The relationships among the above concepts are organized in a hierarchical structure[1], shown in Fig. 2. Where the correspondences of abbreviations and whole names are listed as follows,

pm	promption
ad	advertising
sp	sales promotion
ps	personal selling
pr	public relations
sw	self website
ow	other websites
bs	bank services
ep	electronic products
ap	agricultural products
ap1	the first category of agricultural products
ap2	the second category of agricultural products

To illustrate the process of searching for a group of the related Web pages about the activities of promotion in Fig. 2, an example of Web pages in a website, denoted as website S_2, is presented in Fig. 3. Where seven Web pages, P_1, P_2,… ,P_7 are connected by some links labeled with notes of the activities of promotion. In this website, Web pages are not necessary to be connected together.

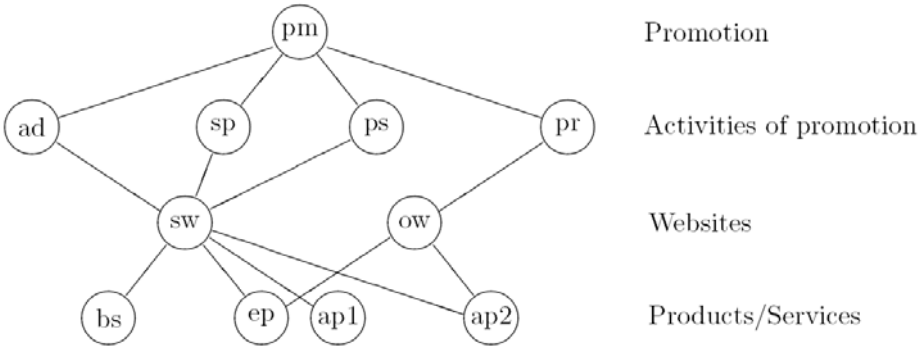

Figure 2: An architecture of the original design.

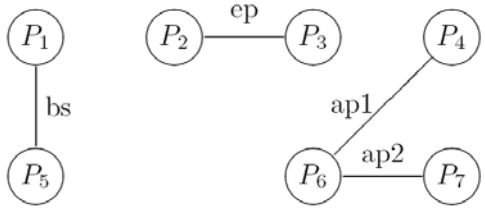

Figure 3: An example of some Web pages.

Now, If the starting Web pages of the leaves in Fig. 3 are listed as follows,

Activity	Abbr.	Starting Web pages
bank services	bs	P_1
electronic products	ep	P_2
1st agricultural products	ap1	P_6
2nd agricultural products	ap2	P_6

By the similar discussion as above, the related Web pages about the activities of promotion can be gathered as follows,

	Web pages
bank services	P_1, P_5
electronic products	P_2, P_3
1st agricultural products	P_4, P_6
2nd agricultural products	P_6, P_7

Here, simple traversing the website from staring points will obtain the results.

For the leaves of a hierarchical structure of activities, it is simple to get the related Web pages. For the activities which are not leaves we have to gather the certain activities contained in an activity. For example, the activity of promotion in own website includes subactivities such as promotions of bank services, electronic products, and the two categories of agricultural products. Thus, we need first to gather the starting pages of these subactivities, then traverse the Web pages in the website in order to getting the related Web pages.

For example, if we want to collect the related Web pages of promotion in own website, we first gather the starting pages of nodes 'sw', 'bs', 'ep', 'ap1', and 'ap2' in Fig. 2. Thus, the result of starting pages of this promotion will be { P_1, P_2, P_6,} if no more pages are specified in node sw. Hence, the related pages for this promotion could be the collection of pages, { P_1,P_2,P_3,P_4,P_5,P_6, P_7 }. Similarly, the related pages of advertising, sales promotion, and personal selling are also the collection of pages, { P_1,P_2,P_3,P_4,P_5,P_6, P_7 }.

A more complex situation would be happened in some kinds of promotion carried on the other website. Referring to Fig. 2, let us assume pages P_6, P_7 of website S_1 have included in the starting pages of node 'ow'. Then, the gathered starting pages of the activity of promotion on the other website will be the collection of { $S_1.P_6$, $S_1.P_7$, $S_2.P_2$, $S_2.P_6$} which includes the Web pages in the two websites. Then, the related pages can be collected by traversing Web pages from websites S_1 and S_2. Finally, the result of the gathered pages are pages $S_1.P_6$, $S_1.P_7$, $S_2.P_2$, $S_2.P_3$, $S_2.P_4$, $S_2.P_5$, and $S_2.P_6$.

In the above discussion, we use the same name of labels for traversing pages in the other website. More precisely, a website can extend some labels of links for the traversing from other websites. This extension is not difficult for the legacy websites by current Web technology. Thus, if one can traverse in a Web without the particular constraints of the above tasks, gathering the related information is possible. And, getting the group of the related pages for a promotion can be done easily. This flexibility is helpful to a marketer in order to experience the various types of the activities in the pressure of marketing all the time.

4. Some Considerations of Implementation

In this section, we will explain some considerations for the implementation of the above methods. Some programming slices about XML and knowledge representation are used to show the work of implementation.

The first one is to add a label in the link be-

tween two Web pages. We have specified it by XML[13], for example, the following fragment of XML defines a stereo type for promotion,

```
<Stereotype name="Promotion">
<Association name="advertising">
<Node name="Service page"
  url="/examples/bankService1.jsp"/>
<Node name= ‘‘Product page’’
  url="/examples/Electronic/Product1.jsp"/>
</Association>
</Stereotype>
```

Where also define an association, named ‘advertising’, to be a label to the link between pages ‘bankService1.jsp’ and ‘Product1.jsp’.

Then, the hyperlinks in a Web page should be replaced with the customized labels. For example, for an original hyperlink, as follows:

```
<a href="/examples/portal.jsp">portal</a>
```

will be replaced as the following one:

```
<rosm:HyperlinkTag stereotype="Promotion"
   nodename=
   "/examples/Electronic/Product1.jsp"/>
```

Where records the information of hyperlink and the related Web pages. And, tag rosm:HyperlinkTag is a Java Tag supported by the TagLibrary technology in Java[11]. It will be used to transfer the information dynamically in the tag to the plain information for hyperlinks such that the hyperlinks in a modified legacy Web page can be working as those in the original one.

Thus, the flexible definition of stereotypes in XML can be used to define the labels for the activities of promotion. And the specified labels and links can be attached to the related Web pages in a website by combining some Java programming and a parser of XML documents. We have extended some source codes in the previous research for doing this work[2]. Hence, the addition of new labels or links in a website almost can be automatically done with some programming of Java. This is good for changing the labels and links quickly and effectively.

Another consideration for the proposed method is about the specification of labels in the links among Web pages. In the examples of the above section, we use the labels of the leaves of the hierarchical structure of the activities of promotion. This is helpful for constructing the related pages for activities which are not leaves. However, there are no constraints for the usage of labels corresponding to the activities which are not leaves. For example, when we attach a label ‘adverting’ to a link, this link will not be going through as doing the traversing caused from starting pages of ‘self website’. Thus, the slicing of the Web pages is flexible, and depends on the intension from a marketer.

In fact, the relationships in Fig. 2 are assumed to the ‘‘parts-of’’ relationships. Some other relationships have been included in the research, e.g., relationships ‘‘is-a’’ and ‘‘one-of’’ [8 , 15]. For example, to deal with these we assume that there are activities a_1, a_2, a_3, a_4. For the’’is-a’’ relationships, if activity a_{i+1} is a more specifical type of activity a_i for $1 \le i \le 3$. Then, a marketer can select one activity from these activities with the assistance which reminds the possibilities of generalization and specialization. For the ‘‘one-of ’’ relationships, if activities a_1, a_2, a_3, a_4 are one of activity a. Then, a marketer can only select one activity from these activities with the assistance which reminds the exclusive possible selection.

Another consideration for the proposed method is about the level of detailed concern in searching for the related Web pages of a promotion. In the above section, referring to Fig. 2, we default the whole concerns of all levels so that we gather the starting pages in the subactivities for an activity. It is not necessary to include all the subactivities of an activity. The flexibility of selecting a suitable subset of subactivities would be helpful to construct more genius promotion. To deal with the selection, a graphical interactive interface could be designed for user to visualize the effects after a particular selection.

The final comments are about the research in this paper. We have studied the flexibility of modifing the legacy websites. The structure of these websites are in general provided by the hyperlinks within the Web pages in the websites. Redesigning the related hyperlinks provides the possibilities of restructuring the Web pages. In addition, we guide the possibilities of restructuring with the hierarchies of the aims, based on the desires of users, and the corresponding points of Web pages. This combination gets a seamless implementation approach with the current Web technology and knowledge representation of hierarchical relationships.

5. Conclusions

An approach for improving the activity construction of e-commerce promotion by gathering the related web pages is proposed in this paper. One hierarchy of activities of promotion has been illustrated to show the possibilities of activities selection. Some general relationships of the hierarchy have explained to guide the constraint of activities selection. These possibilities based on various relationships will provide various combinations for constructing suitable activities for carrying on a promotion.

For gathering the support Web pages to assist an activity of a promotion, we proposed an approach to collect the related pages of the activity. We have provided an implementation for modifying the labels of links among pages in a website. Traversing the labels corresponding to the activity, the group of the related pages of this activity can be collected. And, the correspondence of traversing pages and the classification of activities are matched with the starting pages which are specified in the classification hierarchy. Hence, the related pages can be quickly and effectively constructed for supporting the activities of a promotion. This is useful to increase the competencies of marketing.

Graphical User Interfaces (GUI) have been used to help the construction of a classification hierarchy, for example, Protégé ontology editors use GUI to enhance the representation of knowledge hierarchy[10]. Combining the proposed approach in this paper with a GUI and the related editor will increase the flexibility of constructing the supported Web pages for promotions[6 , 9]. However, Protégé is still not directly bound to the Web. We will study how to conquer the gaps between the classification hierarchy and the Web in the near future.

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