Design of Tag Match Advertising System and the Evaluation of the Business Model

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This paper designs the ‘Tag Match’ advertising system which uses mobile RFID. Tag Match Advertising (TMA) combines features of the mobile RFID characteristics and content match advertising model on the Internet. TMA can be defined as ‘an advertising model, based on mobile RFID application, which offers advertisement for users after the consideration of users’ demographic information, the location and time when users scan a RFID tag and the content of the tag when users scan it’. This paper proposes the architectures and the user interface of TMA and evaluates the feasibilities of the business model by assessing the assumptions that are the basis of structured model.

Index Terms—Tag Match Advertising (TMA); Mobile RFID; Business Model; Ubiquitous Computing

I. INTRODUCTION

Mobile RFID (Radio Frequency Identification) can be defined as services that provide information on objects equipped with RFID tag over a telecommunication network [18]. The reader is installed in a mobile device such as a mobile phone or PDA. This approach is different from traditional implementations of ordinary RFID: Now the readers are mobile and the tags are fixed, instead the other way around. Mobile RFID has some major and obvious advantages over RFID: No wires to fixed readers are needed anymore and several mobile readers are enough to cover a whole area, instead of dozens of fixed readers [3].

Most of business models based on mobile RFID allow users to scan RFID tags on objects and they can get the direct information linked to the tags. Though there have been researches on the new business models which connect RFID with commercial transactions [22] [7] [10] [11] [16] [2] [21], there are few studies about advertising business models using mobile RFID.

In ‘mobile’ environment, advertising service providers can get accurate user’s demographic information and accumulate information on individual users when they use the services, because the ‘mobile’ has strength in ubiquity, convenience, connectivity, personalization and location awareness [12]. In addition, using ‘RFID’ advertising service providers can offer services suitable to the whereabouts and situation of user, reward the affiliates who contribute to the transactions with or connections to the service providers after a RFID tag is scanned and provide extra services related to the nature of tags.

Tag Match Advertising (TMA) is a new model which combines features of the mobile RFID characteristics and content match advertising model on the Internet [9]. TMA model can be defined as ‘an advertising model, based on mobile RFID application, which offers the most appropriate advertisement for users after the consideration of users’ demographic information, the location and time when users scan a RFID tag and the content of the tag when users scan it’. TMA model has two significant aspects. In mobile RFID environment, tags are attached to various objects and places, which means users and objects with tags can be linked in real-time and the users will be able to receive information about the tagged objects easily. What matter is: What is the information that users want? In most cases, mobile RFID tags have offered to users only the direct information about tagged objects. However, users scan tags not only to get the direct information linked to the tags but also the extra information related to the tagged objects. The core of TMA is in providing not only direct information but also extra information and contents.

TMA originally started as a way to expose right next to the article in a newspaper or a magazine and in a form of AdSense as in Google in a web context. The reason for consistent development of TMA is that the users who consume the contents are actually interested in the related field of subject and by that, it is very effective to the expose. This is proven in the successful TMA case of Google. Google’s partner sites generated revenues, through AdSense programs, of $ 1.66 billion, or 31% of total revenues, in the second quarter of 2008 [4].

II. TMA OVERVIEW

A. Scenario

Making a business model is similar to writing a story [13]. Therefore, a business model also has something that can be equivalent to characters, their characteristics and their roles in a story.

Sophia was scheduled to meet her friend in downtown. While she waits for her friend, she came across posters of the movie she wanted to see. She decided to see the movie but didn’t know where and when her friend and she could watch the movie.
Then, she found a mobile RFID tag named <For More Information> on a poster and scanned the tag with her mobile phone. Her mobile phone showed her nearby theaters which featured the movie, the time schedules of the movie, movie franchises including OST and informative advertisements such as restaurants, boutique and sightseeing locations near the theater. After that, the information is automatically stored in Sophia’s Personal Experience Management System; PEMS. Sophia bought tickets, made a reservation of a nearby restaurant and downloaded a 10% discount coupon for the restaurant through her mobile phone.

B. Process of Operation

Figure 1 depicts a process of TMA business model and roles of participants in that process.

In step ①, Advertisers can register advertisement by three kinds of methods. The first is ‘Direct Setting’ registration. In this method, the advertisers register keywords suitable for products and the mobile web sites that the advertisers want to advertise in. This method applies to the product-based model where a producer of OST promotes the person’s products by exposing advertisements to users when they request information and contents by scanning tag on the movie poster. The second is ‘Automated Setting’ registration and this is related advertisements that are exposed to users automatically after information about users and information and contents about tags are analyzed. This method applies to the place-based model where an owner of a place promotes the location by exposing advertisements to users when users request information and contents by scanning tag on the movie poster. The model exposes advertisements to a user after making a comprehensive analysis about the user’s demographic information, general information of the tag and the time when the tag is scanned. The third model is a hybrid of ‘Direct Setting’ and ‘Automated Setting’. In the case mentioned earlier, the advertiser who owns a restaurant would find that ‘movie watchers are highly likely to visit the restaurant’. Here, the owner would select ‘movie’ and ‘location of the restaurant’ as a keyword simultaneously which increases the effectiveness and efficiency of the advertisement.

In step ②, Tag-related information and contents matched advertisement is stored on a web based PEMS. This process is to bring a shift to a marketing and advertisement methods. The ability for a common adult to memorize short term is as small as seven(±two) which is called ‘the magic number’ [14] [15] [1] and this ability of awareness has become a source of repetitive and stimulating advertisements. However, in this research, since users are able to control information, contents and advertisements that they would gain on a PEMS, marketing and advertisement message does not have to be repetitive and stimulating. Instead, it should be granting values that can be continuously managed. That is, marketing and advertisement in a ubiquitous context should be something of value through information or knowledge.

In step ③, advertising expenditure can be on the basis of CPC (Cost Per Click) that advertisers pay for one click on advertisements that attract users to click or CPA (Cost Per Action) that advertisers pay for each specified action (e.g. commercial transaction, subscription), rather than CPM (Cost Per Mile) that advertisers pay for exposure of advertisements to users. Especially, though click fraud weakens the credibility of CPC model, TMA model can track users more easily and reduce the possibility of click fraud and therefore the CPA model could be more widely used. TMA model can encourage small advertisers to enter the advertising market under the ubiquitous environment and will be a driving force of the expansion and promotion of the advertising market under the ubiquitous environment.
III. USER INTERFACE AND ARCHITECTURE OF TMA SYSTEM

A. TMA User Interface

Figure 2 depicts a graphical user interface of TMA. The upper side of Figure 2 is an example of users’ device in the case of when the tag on the movie poster is scanned. The users’ device shows the basic information about the movie (e.g. Synopsis, Cast & Crew, Genres, Photo, Nearby Theater & Time Schedule) and movie-related products, location based advertisements. Also, when the user takes a closer look at the restaurant advertisement (the lower side of Figure 2) the navigation map of a present location of the user and that of the restaurant, coupon, and reservation information are demonstrated. Similar to the model developed in the research, the exposure of unexpected advertisement is for the ‘Impulse Purchase’. Users are exposed to unexpected advertisement, which means a POP (Point of Purchase) appears in front of them. In addition, downloadable coupons also promote sales of products [8]. The effectiveness of TMA model can be inferred from the research by Totten & Block [20] which found price cuts increased sales only by 15%, the combination of price cuts and targeting advertising increased by 19% and the combination of price cuts, targeting advertising and displaying the time when the purchase is made increased sales by 25%. According to the recent research by Gopal & Tripathi [5], in terms of rate of response through mobile device, the closer the distance between the receipt of advertisement and the place of purchase, the rate of response increases. Through this result, the effectiveness of TMA can be inferred.

B. TMA Architecture

Figure 3 depicts the architecture of TMA. The structure of TMA model consists of analyzing, decision making and matching. First of all, Analyzing is about users’ situation. When users’ tag is scanned, user information such as gender, age, location, the exact information of tag, direct information of tag scanned, and information about the device user is holding is analyzed [6]. Secondly, decision making is deciding the advertisement that is exposed. When sponsors set up an advertisement in a way they want, auction based on a related ‘keyword’, ‘location’ begins so that the number of exposure and sequence of advertisement is set. At last, matching is combination of the two former structures. Through this matching process, the actual advertisement that will be delivered to users is decided.

IV. EVALUATION OF TMA

A. Assumption Evaluation of a Business Model

In this research paper, we suggest a scenario and diagram, User Interface, Architecture according to the scenario, deriving a business model. However, this is based on a several conditions so if not, the model itself can may as well be hardly realized. Therefore, in this chapter, we evaluate the assumptions which TMA is based on assessing the feasibility of TMA.

Shin [19] proposed the assumption evaluation methodology of a business model. The term ‘assumption’ is a hypothesis that is taken for granted in a business model. In case of any kind of problem occurs on any of this assumptions, it can be solved as taking alter into a plan but there even can be a give up situation. Thus, on the step of suggesting a business model, the evaluation of a business model based on an assumption is indirectly assessing the feasibility. Also, this can be a meaningful procedure of pre-examining the problems for actual situation.
B. Assumption Evaluation of a TMA

TMA model demonstrated in this paper is on the basis of following assumptions.

① The price of RFID tag will be less than 10 cents each. In a scenario mentioned before, the RFID tag is attached to a movie poster. That is, RFID tag is regarded as a waste so the price is assumed to be decreasing until it reaches below 10 cents. Presently, RFID tag used in Korean market in about a dollar and this is very likely to be reduced. If not, there is an alternative such as Bluetooth or color barcode instead of RFID. In terms of infrastructure, construction of the RFID infrastructure can be thought to be delegated to governmental agencies, not private companies.

② RFID tag will be attached to all products. As mentioned in a scenario mentioned before, it can be applied to all kinds of products since the core value of TMA is to match user information and tag information even though the RFID tag is attached to the movie trailer. This has a lot to do with sponsors’ participation because if it’s attached only to the specific field of products, that would be a less advertisements resulting in a difficulties of attracting more sponsors.

③ Most of the people will be using devices with RFID reader modules. The TMA model mentioned in this paper is suggesting scenario through device with RFID reader modules inside. Yet, if separate RFID reader module has to be attached every time to the device, the usage rate would be very low because of the inconvenience. Consequently, the model to be realized, device with RFID reader module should be spread out. But, only when RFID tag is scanned in a certain space with a enough time (e.g. Exhibition Space), using external FRID reader module would be applicable.

④ Providing a direct information through RFID tag will offer users value. Users scan tag when the person has curiosity toward the product. For that reason, the direct information provided to users is to offer a great value in a quantity as well as quality.

⑤ Related information provided altogether with direct information will supply value. Advertisement that is displayed to users by TMA will be able to suggest incentive such as decrease in searching expenses through informational advertisement. In a reality, the reason for a user to scan a RFID tag is mostly to gain additional information related to direct information rather than direct information itself. As can be seen in the scenario, users take additional information like timetable more seriously compared to the direct information. During this process is when TMA takes place.

⑥ Users will not be bothered by product purchasing or signing up by the mobile device. When E-Commerce was first embodied, users often felt uncomfortable with the security. This may happen in case of commerce based on mobile devices and for this, we need to promote especially in a ubiquitous environment, even affirmative action from government will be needed.

⑦ Users will not feel inconvenient toward information being stored on the web based PEMS. One of the core values proposed in this research, is the information achieved through individual RFID tag is stored on a personally set PEMS. This is called ‘Life-log’ and some of the users may be irritated by the lack of privacy. This is why we need to ask users explicitly whether users want to store it on the web.

⑧ Advertisement expenses using TMA will be less than that of conventional ones. In a previous scenario, restaurant used flyers most of the times. Still, it did not appeal much to customers and effect could not even be measured. On the other hand, adapting CPC or CPA, TMA enabled sponsors to spend rational advertisement costs, and moreover to assess the results of the advertisement. Comparing to conventional costs, the possibility of TMA participation is very high.

⑨ Users will not feel burdened with data traffic costs. One of the things we need to consider during the process of attracting users into a TMA model is data traffic costs. Nevertheless, TMA model itself tends to pay a lot more data traffic costs through sponsors, not users. This is applicable as well to the fact that various services provided on a web for free even if it was not free of charge at the first time.

⑩ TMA model will bring a benefit to all of the Content Provider, Tag Provider, and TMA Network Company. In order for a business model to bring a success, participating entities should all be granted advantages. TMA model generates following incentives in a table 1 for the users.

Table 1. Potential Benefits of Business Entities

<table>
<thead>
<tr>
<th>Entities</th>
<th>Potential Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>User</td>
<td>Cutting costs for search through informative advertisement</td>
</tr>
<tr>
<td>Tag Provider</td>
<td>Incentives for advertising</td>
</tr>
<tr>
<td>TMA Network Company</td>
<td>Incentives for advertising</td>
</tr>
<tr>
<td>Content Provider</td>
<td>CRM can be available, based on database of information on user</td>
</tr>
<tr>
<td>Advertiser</td>
<td>Securing new advertising channel</td>
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<tr>
<td></td>
<td>Accurate targeted advertising</td>
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<tr>
<td></td>
<td>Automatic research based on statistics of user activity</td>
</tr>
</tbody>
</table>

V. CONCLUSION

Ranganathan & Campbell [17] suggested seven requirements for effective advertising under the ubiquitous environment: 1) Conveying proper advertisements to appropriate people, 2) Conveying advertisements at the right time, 3) Conveying advertisements through the best method, 4) Serendipitous advertising 5) Providing methods for users to track advertisements, 6) Collecting revenues under the
ubiquitous environment and 7) Privacy and security.

TMA model can expose proper advertisements to users through ‘Tag Match’, a new process based on the information on users and the information and contents about tags. When ‘Tag Match’ process is conducted, the time when users scan tags is included in the criteria for the analysis, which enables advertisements to be conveyed at the right time. TMA model can secure the interactivity and feedbacks between the advertising providers and the users through mobile devices and the users can store and access to the information given to them, which enables users to track advertisements offered to them. TMA model is the model that can consider activities and the location where the activities are done. That means, the place where the users are located can be found through the users’ mobile phones and scanned tags and the behavioral intention of users can be found through the information which the users tag.

REFERENCES


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