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This is the author's version of a work that was submitted/accepted for publication in the following source:

Ravendran, Rajinesh, MacColl, Ian, & Docherty, Michael (2011) Mobile banking customization via user-defined tags. In *Australian Computer-Human Interaction Conference (OzCHI)*, 28th - 2nd November 2011, Australian National University, Canberra, ACT. (In Press)

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Mobile Banking Customization via User-Defined Tags

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ABSTRACT

In this paper, we describe on-going work on mobile banking customization, particularly in the Australian context. The use of user-defined tags to facilitate personalized interactions in the mobile context is explored. The aim of this research is to find ways to improve mobile banking interaction. Customization is more significant in the mobile context than online due to factors such as smaller screen sizes and limited software and hardware capabilities, placing an increased emphasis on usability. This paper explains how user-defined tags can aid different types of customization at the interaction level. A preliminary prototype has been developed to demonstrate the mechanics of the proposed approach. Potential implications, design decisions and limitations are discussed with an outline of future work.

Author Keywords

Website customization, mobile banking, tags, interaction

ACM Classification Keywords

H5.2. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

Website customization is the ability to modify aspects of a website to suit the individual needs and preferences of users. This is a significant aspect of online banking as it positively affects user satisfaction (Rahim & JieYing, 2009) and loyalty (Fung, 2008). However, in the Australian banking context, customization is poorly addressed (Rahim & JieYing, 2009).

This paper is focused on mobile banking (m-banking), an emerging and fast growing side of online banking. M-banking offers a convenient banking option, enabling customers to access and complete banking transactions anytime, anywhere. According to Global Industry Analysts (GIA), the global customer base of m-banking is expected to reach close to one billion users by 2015 (<http://www.prweb.com/releases/2010/02/prweb3553494.htm>). The inclusion of customization features as part of m-banking can further increase its appeal and improve user satisfaction and loyalty.

Prior research on website customization indicates that customization approaches can be grouped into two categories: static and dynamic (Fung, 2008). Static

approaches are typically user-based, where the user is responsible for initiating and carrying out the customization (e.g., content and feature selection during registration). Static approaches are simple, straightforward and put users in control. However, they overlook the impacts of dynamic approaches such as the ability to predict what a user might find interesting or useful (Fung, 2008). Also, users do not like to spend time configuring complex customization features (Nielsen, 1998). Dynamic approaches, on the other hand, are system-based, with the system entirely responsible for initiating and carrying out customization (e.g., web usage analysis and collaborative filtering). They require minimal effort from users but are complex and sophisticated. Some of the known issues with dynamic approaches include expensive computational cost, technical issues and ethical concerns (Pierrakos, Paliouras, Papatheodorou, & Spyropoulos, 2003). Additionally, dynamic approaches are likely to fail in dynamic settings (Nielsen, 1998). An amalgamated approach combining both user and system aspects of customization may be advantageous for a more balanced solution. In the next section, a technology supporting such an approach is proposed that actively engages users to be part of the customization process.

TECHNOLOGY AND ASPIRATION

Tags, also known as user-defined metadata, are a popular Web 2.0 technology, enabling users to assign keywords to Web resources (e.g., photo, video, people, etc) primarily for the purpose of personal information management (PIM). Tags are largely personal and contextual (Marlow, Naaman, Boyd, & Davis, 2006), and considered as a potential source of knowledge (Durao & Dolog, 2009). Recognized as an easy-to-use, dynamic and engaging technology, tags aid users to recall and retrieve information content and when represented as tag clouds they facilitate visual information retrieval (Hassan-Montero & Herrero-Solana, 2006). Also, the underlying meanings of tags can be discovered through semantic analysis to form associations between like-minded individuals (Durao & Dolog, 2009).

In the financial space, tags are widely used to assist personal financial management via third party tools such as Mint (<http://www.mint.com>) and Yodlee (<http://www.yodlee.com>), where a user can assign tags to annotate transactional data for purposes such as budgeting, expense tracking, etc. Users with smart phones (e.g., iPhone) can download and install widgets that ease the process of assigning tags to transactions. However, these tools, only allow tags to be assigned to financial transactions at a high level as category or description, but not at a lower level for details such as bank account, for example. There may be compelling advantages in doing

OZCHI 2011, Nov 28 – Dec 2, 2010, Canberra, Australia.

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OZCHI 2011 Proceedings ISBN: 978-1-4503-1090-1

so in the online banking environment, opening doors to tag-based interactions alongside personal financial management. Although, the ability to tag financial data has existed for a while now primarily through third party tools, this trend is likely to change with banks considering the inclusion of personal financial management features. This view is particularly evident among Australian banks who have begun to do so as part of their offerings with Australia and New Zealand Bank (ANZ) pioneering the initiative through its ANZ-MoneyManager service (<http://www.anz.com/ANZ-moneymanager/default.asp>). The inclusion of tags as part of online banking adds to the relevance and practicality of the proposed approach to customize m-banking interaction.

TAGGABLE RESOURCES

In order to define the range of taggable resources in the m-banking environment, a piece of information not readily available from the literature, a background case study was conducted. The study involved manual examination of personal banking websites of two leading banks in Australia: Commonwealth Bank (<http://www.commbank.com.au/>) and Suncorp Bank (<http://www.suncorp.com.au/>). Personal banking was chosen over other banking websites because it appeals to a wider customer base. Four types of resources were identified namely account, description, biller and application. Table 1 lists and describes the taggable resources found.

Resource	Type / Description
Account	Personal - User owned accounts (e.g., everyday, savings, cheque, credit card, business, etc)
	Payee - Linked (personal account) or Other (third party e.g., internal, external and overseas account)
Description	Description of transaction for personal reference (transaction types include offline e.g., EFTPOS, direct debit, etc; and online e.g., BPay, fund transfer, shopping, etc)
Biller	All types of registered and unregistered billers
Application	All types of financial products (e.g., account, credit card, loans, etc)

Table 1. Taggable Resources.

PROTOTYPE

An early prototype with tag integration for a few key resources namely account, description and biller has been implemented. The prototype is intended to demonstrate the mechanics of each customization in the mobile environment for two main activities: bill payment and fund transfer. The prototype is web-based and has been tested on a mobile browser on an Android powered device.

The prototype uses iPhone-like slide navigation and supports two types of transactions: new and recurring. This is done to simplify interaction and to clearly illustrate the customizations. Tags defined by users in the

online banking environment will be accessible through m-banking in addition to the ability to add new tags.

The following sub-sections elaborate the different types of customization and the proposed use of tags to facilitate them. The examples largely depict scenarios of day to day banking activities performed through m-banking.

Remembering-type

This customization type is defined as the ability to provide customization through simple remembrance of user’s information based on the recurrence rate of a particular action on a website (Fung, 2008).

Remembering-type customization can be fulfilled through tags assigned to resources that are presented as tag clouds. This provides a visual retrieval interface that can simplify and ease the execution of past or recurring transactions. Simply by clicking on a tag, related information about a transaction that the tag is associated with can be retrieved and displayed. If a selected tag is associated with two or more tags then the tag cloud can be filtered to show tags which are co-occurring with the selected tag. This removes the need to navigate to a different page or perform a manual search query. This also means to carry out a past or recurring transaction, users will only need to update necessary information such as amount (if different) and possibly retain other details.

Scenario 1: Mobile bill payment (recurring activity). User selects “mobile” (1) tag from tag cloud. As a result, the form is completed and relevant tags are selected (tick). Note: The hand icon indicates a tap.

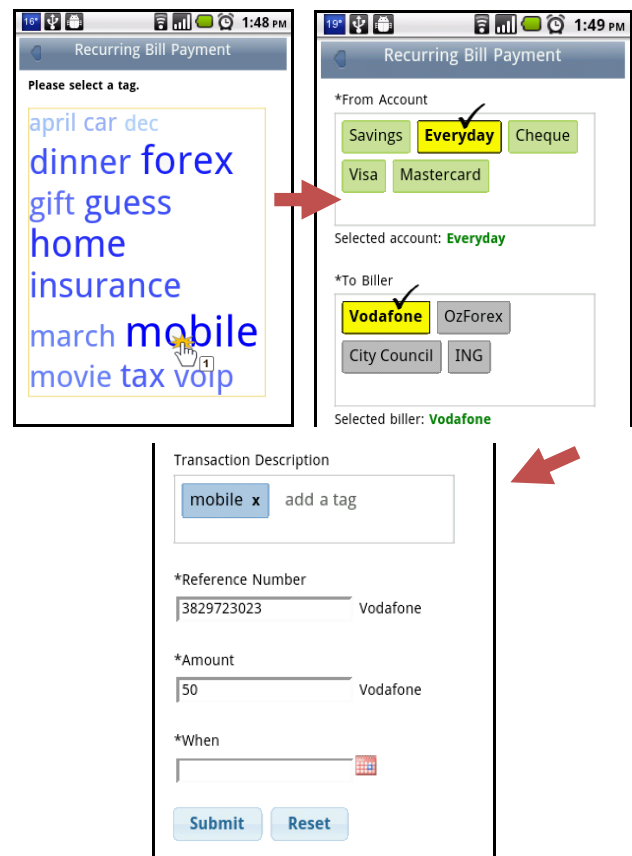


Figure 2. Bill payment

Comprehension-type

This customization type is defined as the ability to recognize user's behaviors and provide assistance towards fulfilling the user's needs (Fung, 2008).

Comprehension-type customization can be fulfilled by inferring possible banking actions (i.e., fund transfer) based on tags selected by a user. Such inference is possible for tags with certain types of relations (e.g., account to account). Using these relations and simple pre-defined rules (e.g., transfer from Savings account to Visa account is valid but not the other way around) possible actions can be populated.

Scenario 2: Internal fund transfer from Savings to Everyday account. User selects "Savings" (1) and then "Everyday" (2) tags. Consequently, the possible actions are populated as 1) 'Transfer from Savings to Everyday', 2) 'Transfer from Everyday to Savings' and 3) 'View transaction history of Savings and Everyday'.

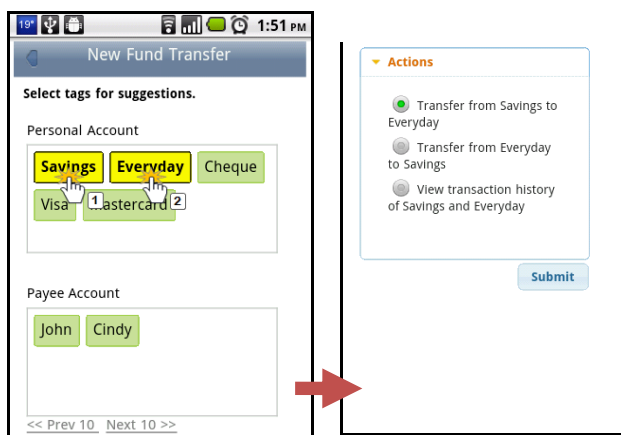


Figure 2. Internal transfer

Scenario 3: External fund transfer from Everyday to John's account. User selects "Everyday" (1) and then "John" (2) tags. The possible actions are populated as 1) 'Transfer from Everyday to John' and 2) 'View transaction history of Everyday and John'.

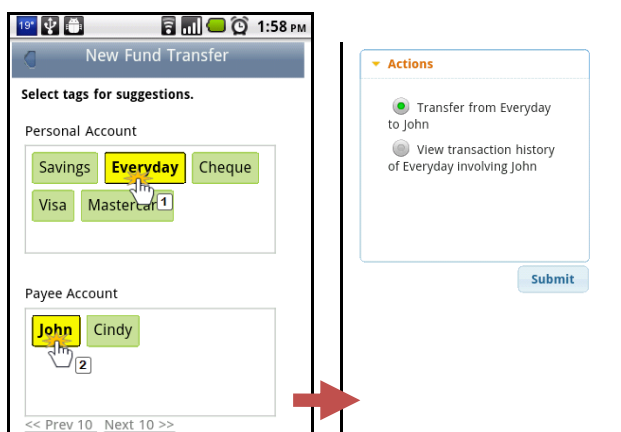


Figure 3. External transfer

Associative-type

This customization type is defined as the ability to provide customization through association of user's

behavior with other individuals who share similar interests or needs (Fung, 2008).

Associative-type customization can be fulfilled by recommending tags to users (dropdown as user enters a tag). The semantics of tags can be used to find association between tags across the network and to select/rank the most relevant sets of tags based on similarity score (Duraio & Dolog, 2009).

Scenario 4: Tag recommendation for multiple bill payment (mobile and money transfer). User selects "Vodafone" (1) and then "OzForex" (2) biller tags, and enters a description (3). As a result, a set of related tags are recommended that are used in the context of the selected billers.

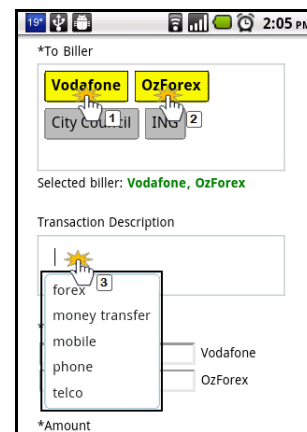


Figure 4. Tag recommendation

DISCUSSION

The examples above show that user-defined tags can be used to facilitate different types of customization in the m-banking context. There are a few potential implications in particular for m-banking users and providers. For m-banking users, the customizations afford a quick and intuitive way of conducting transactions through m-banking. Additionally, since tags are user-defined, they can be personalized in ways that are meaningful only to the user. This includes idiosyncratic tags (e.g., '####') and also the use of non-English keywords as tags (e.g., Chinese or Arabic), particularly relevant in a multi-cultural community such as Australia. As a result, a positive sense of control and identity of users (Marathe & Sundar, 2011) can be provided in the m-banking environment. For m-banking providers, the customizations may help to alleviate key concerns with m-banking, such as privacy and security (Wessels & Drennan, 2010). The proposed approach can impart a sense of confidence among users in conducting transactions over m-banking especially in public vicinity given that no financial information such as bank account details is transmitted or displayed on screen. This, in turn could positively influence the acceptance and adoption of m-banking.

During the prototype development phase, a few key design decisions were made. Firstly, in order to use tag clouds as a visual information retrieval interface, they had to be well rendered and spaced to ease selection. This was

achieved by using large fonts (20-34pt) with sufficient spacing between each tag. However, as a result, the number of tags shown had to be limited. Only the top 15 tags are populated based on their frequency. Secondly, the information displayed on screen had to be aptly laid out. A vertical layout was preferred over a horizontal one because users can quickly scroll in one direction (top to bottom) and complete their transaction. This would be mostly useful for users with a mobile device that has a small screen compared to other devices.

LIMITATIONS

The proposed approach in its current form has a few limitations. These limitations are in addition to those that arise due to design decisions discussed above. Firstly, in the presence of large numbers of personal tags (e.g., more than 50), a user may find it difficult to recall or even associate tags with another if the tags themselves are not meaningful enough. Secondly, navigating through a large set of tags can be frustrating and time consuming, especially on a mobile device. One possible way to alleviate these limitations is by offering a search functionality that allows users to perform a basic search based on tag name, and also an advanced search based on transactional details such as account, description, amount and date. The advance search functionality is more likely to help users find tags when the tag names are not meaningful or ambiguous. For example, if a user is not able to recollect a particular biller tag but he/she knows the amount for a transaction for which the tag is part of then all biller tags associated with transactions with the given amount can be retrieved and shown.

CONCLUSION AND FUTURE WORK

The main point of interest of this research is the potential use of tags to facilitate personalized banking interactions. We provided an overview of customization, defining the range of taggable resources in this m-banking context and arguing for the value of the proposed approach.

The preliminary prototype demonstrates the feasibility and practicality of the proposed strategy. The ability to employ a light-weight user-driven technology such as tags to facilitate various types of interaction customization is both advantageous and useful and can be achieved with minimal effort for implementation and adoption.

In future work, the focus will be on evaluating the prototype with the aim of assessing its utility and usability. These are key factors of user satisfaction and acceptance (Höök, 1998) and will allow us to explore ways in which the prototype can be improved.

The proposed method of evaluation is experimentation using a pre-test/post-test control group design. This design will provide strong internal validity, suitable to measure cause-effect relationships (Marathe & Sundar, 2011). The aim is to answer two key questions. First, what is the perceived utility and usability of the different customization types? And second, what do the users feel about the design? Each customization type will be evaluated separately through experimental manipulation

in a similar fashion to Fung's study (Fung, 2008) and experiential feedback from participants will be gathered through a post-test questionnaire. The feedback will be used to improve the prototype incrementally for ongoing experiments. The results of the experiments are expected to indicate the suitability of the customizations in the m-banking context. In addition, the knowledge gained from the experiments will inform a set of guidelines for the design and implementation of m-banking customization via user-defined tags put forward in this paper.

ACKNOWLEDGMENTS

This research work is sponsored by the Smart Services Cooperative Research Centre (CRC) of Australia. We would like to thank our colleague Ms Claudia Murillo for her feedback.

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