

Facilitating Consumption of Online Social Networking Services on Mobile Devices

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ABSTRACT

Mobile social network aggregators, such as Motoblur [2] and Windows Phone 7 People Hub, emerge as a common tool to access online social networking services on mobile devices. There are limited user studies, however, about how people use and perceive these aggregators. In this study, I explore this research field by deploying an innovative mobile social network aggregator named Linked Internet UI, or LinkedUI. It deeply integrates social networking services into the mobile device user interface and recommends new content that is likely to be interesting to the user. The main research question is that of how people use and perceive these designs, and what user practices these designs enable. The supporting research emphasis is on exploring how we apply user-centered design in the era of online social networking services.

Author Keywords

Social Networking Services, Social Network Aggregator, Mobile Devices, Aggregation, Recommendation.

ACM Classification Keywords

H.5.2 [User Interfaces]: User-centered design.

General Terms

Design, Experimentation, Measurement, Verification.

INTRODUCTION

Mobile devices have been shaping the landscape of how we keep in touch with each other. In addition to voice calls and text messages, mobile phones deliver Facebook, Twitter, Flickr, and other online social networking services (SNSs) [4, 16]. According to Naaman and his colleagues, 25% of all “social awareness streams” are generated from a mobile platform [14]. The “social awareness streams” are the most common SNS content. People share little pieces of information with a group of friends or with the public. A user reads much from social awareness streams but only responds to a small proportion [18].

People may use multiple social networking services. When checking these services through mobile applications and Web browsers, they have to constantly switch services to check their contacts [8, 13]. They often receive too much content to read in full. This is particularly true for the tools that automatically retrieve SNS content in real time.

In this research, I experiment with aggregation and recommendation designs aimed at facilitating consumption of content of social networking services with mobile devices. I focus on the consumption activities because they are the most common activities in social networking services but are not well explored [18]. Mobile phones are the primary devices in this research, but the findings may also apply to other ubiquitous devices.

The term “aggregation” here refers to the key design principle in a mobile social network aggregator where content from multiple services is fetched and interwoven into one consistent user interface (UI) [7]. Such systems notify users of the latest updates nearly in real time, combine content from multiple services, and integrate the content with native device functions. The commercial examples include the Vodafone 360 people menu, Motorola’s Motoblur [2], Windows 7 People Hub, and HTC’s friend stream. LinkedUI, the platform used in this study, includes some unique way of aggregating services. As explained later, it introduces hypertext navigation in organizing and presenting integrated content.

“Recommendation” refers to the designs that automatically prioritize and highlight content for individual users on the basis of their interaction history and other contextual factors [12]. It learns from what a user has interacted with earlier and highlights similar items. These designs face accuracy and user acceptance as major challenges. They have to accurately predict content that interest users and render the UI ready for user acceptance.

The goal of this study is to explore how people use and perceive these aggregation and recommendation designs in mobile access to online social networking services and how we create and evaluate the relevant systems. The designs in question are not completely novel as of this writing. The aggregation designs are seen in mobile social network aggregators [2]. The recommendation designs are seen in mobile devices and social networking services, although they have not been systematically explored in mobile access to social networking services before [6, 11, 17].

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RELATED STUDIES

Aggregation designs exist in many commercial systems. For example, Motorola's *Motoblur* combines Facebook, Twitter, and text messages for each contact in the phonebook. Similar designs include *Palm Pre Synergy*, *Vodafone 360*, *HTC Friend Stream*, and *Windows Phone 7 People Hub*, and *Nokia's N9 Notification Home View*. These social network aggregators combine content from multiple sources for a reader but do not influence publishers who can maintain multiple identities. These differ from publisher-initiated aggregators such as *FriendFeed* that allows publishers to merge their identities and generate one unified presentation for everybody [7].

To our knowledge, there have been only limited user studies of mobile social network aggregators. The exceptions include the *universal inbox* that combines e-mail, text messages, RSS feeds, Twitter, and Facebook updates and allows people to create *lenses* in order to control the collections of all items [19]. An informal field study with the concept reveals that people appreciate the ideas of auto-fetching and aggregating services on mobile devices. The study did not gather sufficient user data to analyze usage patterns.

Mobile social software applications do not address social networking services, but the relevant research provides a source of relevant studies of aggregation designs. Some of them explore notifying users of new events in real time. For example, *Dodgeball* is a mobile social networking service that allows people to broadcast their location via text messages to their articulated networks. The users meet up with friends who just happen to be nearby or are available to join [10]. This design resembles the key feature in mobile social network aggregators for notifying users of new content in social networking services. A user study with *Dodgeball* shows that this feature can facilitate serendipity.

Some mobile social applications explore integrating content into augmented phonebooks. *ContextContacts* [15] integrates contextual cues into a mobile phonebook. Field studies with the concept show that people feel better connected to their contacts when observing the contextual cues. People use awareness cues as a coordination tool, expression medium, and companionship proxy. It supports a sense of connectedness and helps people to maintain perpetual contact with others. *Motion Presence* [3] augments the phonebook with motion information, which allows people to view each other's motion status. The user study shows that motion presence helps one infer location and activity and plan communication. *Friendlee* integrates some social information into mobile phonebooks, to provide users with ambient awareness of their social network. This concept involves analysis of the user's call and messaging activity to form an intimate social network, presuming that people mostly want to interact in their close relationships [1].

Recommendation designs have recently been used to tackle information overload problems in social networking services. One research direction is to detect what parameters indicate the importance of a content item. In an enterprise context, Jacovi and colleagues (2011) prove that familiarity with a contact is a dominant factor in determining the importance of a new social networking event [11]. For example, people are interested in the events initiated by other people in their team in a business context. The importance of relationship with a contact is also supported in a study with Twitter users. Chen, Nairn, and Chi (2011) report that the relationships indicate the importance of a Twitter conversation, especially for people who use Twitter for a social purpose. A recommender needs to consider each user's purposes of use when generating predictions [6]. In addition to the importance of contact relationships, Paek and colleagues (2010) reveal the importance of text corpus features. The authors argue that having access to the message text and corpus features is vital to predicting the important social feeds [17].

In my literature review, I do not find studies that address recommending content from social networking services in mobile settings. The findings from studies involving desktop computers do not necessarily apply to the mobile domain. For example, mobile devices are constantly available for use; the temporal context may contribute significantly to recommendations. As another research gap, the existing studies focus on offline accuracy evaluation but do not address subjective assessment. Their assumption that that people need recommendations in social networking services may not necessarily be valid for users who use them mainly for social purposes [6]. Common concerns in a design with intelligence are lack of comprehensibility or predictability, compromise in perceived control, privacy concerns, and low breadth of experience [12].

RESEARCH QUESTIONS AND METHODS

The key research questions of this work are the following:

How do people use and perceive aggregation and recommendation designs in a social network aggregator aimed at facilitating consumption of online social networking services on mobile devices? (MQ)

How do we create and evaluate designs that deliver online social networking services to mobile devices? (SQ)

The key part of this research is to evaluate new solutions through laboratory and field studies. These studies should reveal how people use and perceive designs that deliver social networking services to mobile devices, to answer the main research question, *MQ*. The other part of this research is a series of explorative user studies intended to understand user needs and practices when using existing interaction solutions. Putting all of the studies together, I aim to understand how we should create and evaluate designs in the era of online social networking services, for the supporting research question, *SQ*.

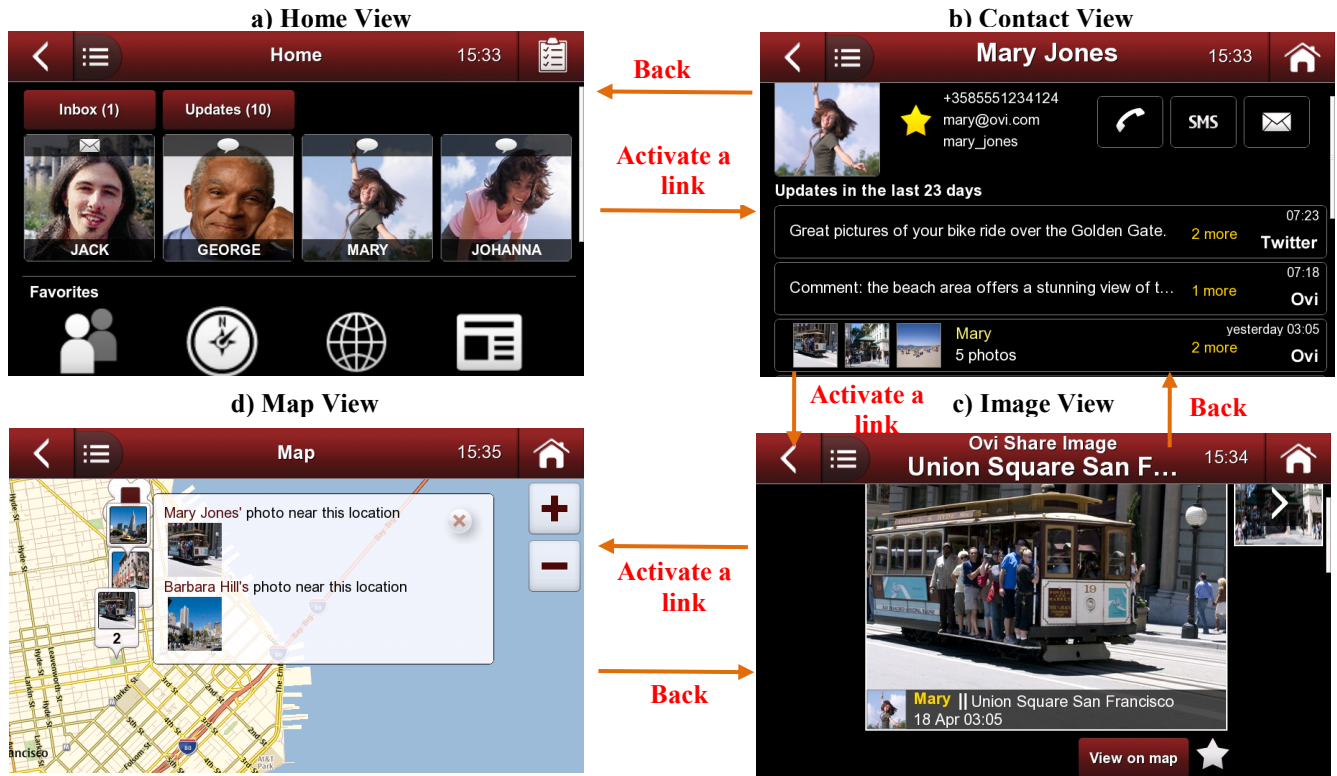


Figure 1. Hypertext navigation between key LinkedUI views (adapted from Figure 1 in [7]).

LinkedUI is developed as the research platform for this study. Unlike existing mobile social network aggregators, LinkedUI introduces hypertext navigation for the entire device user interface. See the review of hypertext in [5]. Content from social networking services is presented in any view as far as this is logical for the user. For example, any content is linked to the identity that produced it and the location geo-tagged. Through the identity and location, the users can traverse to similar content. Figure 1 shows some essential views in the system, as well as hypertext navigation among them. This integration is deeper than that of the existing solutions, which mainly support an augmented phonebook and home view. The recommendation designs can be applied in any LinkedUI view. For example, the home view by default shows the contacts that produce content, with recommendation values.

RESEARCH STATUS

This research will be published in a set of papers as the key part of my doctoral dissertation. So far, three papers are published [7, 8, 9], and three more papers are under draft.

In the first paper [9], I explore the user practice of using the Web on mobile devices, with social interaction as one major focus. The work reveals that people use the Web to communicate with each other, and exchange user-generated objects for social goals. People seldom reply to e-mail messages on mobile devices, apart from the short and urgent ones.

In the second paper [8], I explore how people perceive mobile interaction activities at micro levels. The study highlights the limitations of current mobile user interfaces. The users must constantly handle UI elements, as when switching windows, instead of concentrate on the content objects that interest them. The paper suggests the value of applying the content-centeredness rationale in those mobile designs that integrate content from multiple services.

In the third paper, I present the concept of LinkedUI and some findings from a laboratory test [7]. The result shows that users like aggregation designs in general, although some of them feel disoriented when first starting to use one. The results also indicate that aggregation designs may support some new user practices. For example, the users may check their phone more often and feel better connected to their contacts. The laboratory study also confirms the information relevance problem. The users find it hard to get access to interesting content.

As ongoing efforts, I am running a field trial to explore the user practice that LinkedUI enables. For example, LinkedUI notifies users of new content in real time, which may change how people use social networking services. Another field trial is under way, to evaluate recommendation designs through a between-subjects design. One group of users receives LinkedUI without any recommendations. These users' data logging evaluates recommendation accuracy in an offline fashion. The other group of users receives LinkedUI with recommendations.

They can directly evaluate how much they like or accept a system that gives recommendations.

The field trials are still under analysis. Among the initial findings is that a) the users do not check content the instant it becomes available. Instead, they briefly glance at the content stream at intervals and read a small portion of the content. b) LinkedUI presents content in any views that are logical for users, which increases the chance of users serendipitously discovering relevant content when performing other tasks. c) The recommendation system can predict the level of interest in a new item with reasonable accuracy. Some media properties, such as publisher and age, significantly contribute to the prediction power. d) Recommendation does not significantly improve the overall user experience with LinkedUI, but most users preferred to keep the feature after using it for three weeks.

FUTURE WORK

LinkedUI introduces a fundamental change to the device user interface, which makes it hard to be packaged as an installable application for public distribution. To further ground the study findings, we should conduct large-scale user trials by means of deploying a publicly distributable variation of LinkedUI, or an off-the-shelf system such as Motoblur or Windows Phone 7 People Hub. The other plan is to consolidate the theoretical contributions of these empirical studies further. The findings should be further distilled and related to other studies, and made applicable for other researchers and designers.

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