Usability Challenges in Creating a Multi-IM Mobile Application

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ABSTRACT
We describe the usability challenges of designing a mobile instant messaging (IM) application with voice (VoIP) capability. The key challenge was to maintain the experience of PC-based IM applications while taking into account both the constraints of mobile devices and the differences in the context in which such applications are used. We also discuss the challenges involved in implementing solutions to correspond with the capabilities and UI conventions of varied platforms and devices.

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1. INTRODUCTION
Simple communication options provided by instant messaging (IM) applications - messaging and VoIP services - have become so popular that at least half of adult computer users report using IM applications [1]. The growing demand for seamless communication on the move - voice, instant message and photo and music sharing, while using presence status to indicate availability to contacts (e.g., busy or online) - fuels the need to bring these services to mobile devices. With the additional desire to integrate multiple IM services into a single application, this is a genuine challenge: to create a usable and intuitive service that is successfully integrated into a mobile device, despite the inherent usability limitations of such devices.

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fring is a mobile application that allows users to make mobile calls, exchange instant messages (chat), transfer files and see the presence status of other fring users and users of multiple PC-based IM services including Skype, Windows Live Messenger, Google Talk and VoIP-based SIP networks. fring is based on a thin-client technology that enables true IP-based communication over 3G, EDGE, GPRS and Wi-Fi networks. It dynamically adapts itself to the optimal network and handset characteristics while enabling seamless roaming on multiple networks. The dedicated three-sided P2P network architecture has been developed to support near telco-grade voice quality and network efficiency.

This paper discusses the challenges we identified when designing fring's user interface and the solutions applied to these challenges.

2. THE DESIGN PROCESS
Our design process included several theoretical and practical stages:
1. Familiarizing ourselves with the challenges facing mobile applications and with specific applications developed for mobile platforms, particularly those used for communication.
2. Defining representative user groups, each portrayed by a leading persona, and generating scenarios for each.
3. Creating a set of requirements and goals for the user interface based on the findings of the above-mentioned stages, and defining core activities (Section 3.1).
4. Production of a detailed-design document and preliminary prototypes for testing purposes.
5. Modifying our design based on feedback gathered from usability tests.

2.1 Familiarization
During the research phase and throughout the development phase, we studied the challenges facing developers of mobile applications and the solutions implemented by others, to gain insight from their experiences. We elaborate on these in section 3.

2.2 User Groups & Scenarios
We determined two main user groups as our target audience – teens and business people. Following are samples of scenarios for each group:
Meet Danny. He’s 16, is into gadgets and just got his first 3G cell phone. His parents make it clear that if he runs up a high bill, he’ll
be responsible for paying for it, so Danny knows he’s got to limit outgoing calls. He has a great data plan, so he’s interested in a solution that will enable him to IM his friends and talk to them using VoIP. He’s used to chatting with several of his friends simultaneously and hopes that the use of his phone for IM won’t limit the number of people he can communicate with at the same time.

Meet Meg. She’s in her mid-twenties, a senior producer in a big advertising studio, with a busy, around-the-clock schedule, and a big team of colleagues in several continents. Meg is a long fan of IM services - she uses Skype, Google Talk and Windows Live messenger concurrently, in addition to using her mobile phone extensively. Actually, Meg cannot imagine life without IM services, since, in addition to being able to connect to her colleagues and friends easily and inexpensively, she can also see who's online in different time zones and after working hours. When Meg leaves her computer during lunch or at the end of the day she still wants to stay connected.

3. DESIGN CHALLENGES
In this paper we will focus on the solutions to challenges that mobile devices themselves present and to the challenges of the specific application: transferring the instant messaging experience, including voice (VoIP) capability, to a mobile handset; integration of multiple IM services from different providers in a single user interface; and integration of the fring contact list with the address book of the handset.

Device challenges include introducing a familiar application to new platform, with a small screen size and limited input device, along with the need to enable the user to get started immediately with limited or no guidance. Finally, we faced the challenge of implementing fring on a wide variety of platforms (e.g., Symbian S60 and UIQ, iPhone, Windows Mobile and J2ME) and devices, with differing capabilities, input devices, screen size and proportions and UI conventions.

3.1 Transferring the IM Experience to a Mobile Handset
As user models stem from experience with prior technologies [2], we needed to consider what users would expect to see when starting fring for the first time. It was important to consider both users familiar with a single IM application and those who use multiple IM providers.

To address this issue we first identified the 4 core activities users are expected to perform using IM and VoIP services:

- View presence status of friends (Who's online now?)
- Initiate communication (voice, chat or file transfer) with specific contact
- Maintain the actual communication session (continuous for voice, interrupted for chat)
- Handle simultaneously open communication channels – either communicating with several people or communicating with the same person in different modalities (voice conversation together with textual chat as a supportive or completing channel)

The core activities we defined, beyond the obvious (initiating and maintaining communication sessions), were also supported by previous research performed on teenagers [3] that found teens felt annoyed with their inability to view the presence status of non-IM users and that they frequently used multiple windows simultaneously (e.g., exchanging IM with several users).

Based on this understanding of the 'genome' of IM services we decided on the following design principles:

First, the main application screen should present the list of contacts with their presence status, enabling users to decide to contact someone simply as a result of seeing that they are online. Using the contact list as the main screen of the application makes it familiar to users who use any existing IM services. It also supports users' expectations of what fring allows them to do. The following figure illustrates how fring's contact list resembles a typical IM contact list.

Figure 1 – fring contact list

Second, users should be able to initiate and switch between several active conversations, voice or textual. A user, like Meg, caught up in a boring conversation with a client, for example, can simultaneously exchange instant messages with her production team and give instructions for urgent tasks. To enable this multi-tasking we chose the familiar 'tab' mechanism that perfectly matches the common 4-way controls on nearly all handsets: browse the list of contacts using the up/down keys; move between active sessions (represented as 'tabs') using the left/right keys. This UI solution also supports usability goals of efficiency, with quick navigation and minimum number of clicks, and visibility, by displaying active sessions as tabs. Figure 2 illustrates how fring's user-interface supports multi-tasking abilities.
3.2 Integration of Multiple IM Services

Integrating multiple IM services in a single application required us to consider two distinct users – one who uses a single IM service, like Danny, and another, like Meg, who uses multiple services. The first might expect a high level of similarity to the familiar PC experience, whereas the second might expect separate lists for each service or perhaps an all-embracing list containing contacts from all services. Trillian, an instant messaging PC client that allows users of multiple IM services to use a single client, also dealt with this issue, ultimately leaving it up to the user to decide how to display their contacts – by IM service or by presence status. Offering such a choice on a screen as small as that of an average handset would add unnecessary complication and screen clutter. We therefore decided to use a single list incorporating contacts from all services the user has signed into, with the online contacts first, giving less weight to the actual service a specific contact belongs to and more to their availability.

The usability rationale behind this decision is based primarily on the results of the task and user analysis we performed. This analysis suggested that viewing presence status and initiating a call/chat is highly important while the specific service used is not critical. The downside of having a single integrated contact list is that it might contain several instances of the same contact name. To rectify this situation, we have implemented a mechanism to avoid such duplications using both automatic and user-initiated contact matching. The result is a unified contact list in which each contact appears only once regardless of the number of IM services to which it belongs, thus reducing the length of the list and enabling finding the desired contact more efficiently.

Another reason for the decision to present all IM services in a single list is the need to create a strong identity for the fring brand and to establish fring as a service of its own and not just as a platform for other IM services. However, we did not want to completely ignore the IM service providers and therefore decided to present the information both as a highlighted icon in the top screen area (the area that displays icons of the supported services) and in an active call screen.

Another issue of importance is the use of icons to indicate a contacts' presence status. These should support the integration of several services into a single list, but still be recognizable for users who use only one service. The result is a new and simplified set of 5 icons that are based on the fring logo but use the familiar color coding of IM services – online, busy, away, in call and offline (see Figure 1). Although the icons differ in shape from those used by other IM services we believe that the abstract nature of the fring figure together with the standard color convention convey the presence information in addition to supporting fring marketing messages.

3.3 Integration of fring and Phone Contact Lists

In anticipation of business users, like Meg, who would be both frequent fring users and still need to make non-fring calls and in order to better integrate fring with the handset, we identified several usability opportunities: First, enabling the user to access the standard address book from fring’s contact list; Second, to enable making cellular calls from the fring user interface using a ‘smart dial’ feature that understands user keystrokes and identifies whether the user is searching for a contact or is dialing a cellular number. In addition to being a useful shortcut, this feature increases the ‘stickiness’ of fring, as fring becomes the starting point for all types of calls. Third, we recommend that the user integrate fring into the handset. By connecting a fring contact (identified by his/her phone number) with the phone contact, a user can call directly from the handset address book, without having to open fring. This integration must occur only after the user specifically requested it, to avoid the possibility that his/her privacy has been violated and to ensure that s/he has control over the application.

3.4 Device Limitations

Screen size of mobile devices is perhaps the most critical limitation in terms of usability [4], with a predictable result of fewer contacts being visible in the contact list. In effort to overcome this shortcoming, we included an integral search field in the contact list to enable finding contacts that are farther down the list quickly. An additional solution we implemented is the Call History tab that displays the latest calls, taking into account that users frequently communicate with the same people. The Call History tab is presented in the following figure:
Most handsets use similar input controls - typically a 4-way key with additional click-in. The effect of this configuration is that the multiple traditional interaction styles offered in computers (e.g., menus, direct manipulation, text) is replaced by “impoverished” interfaces [5], consisting mainly of lists and menus. The resulting challenge is to make frequent tasks as accessible as possible while still providing novice users with a logical menu system. As we mentioned earlier, a user’s most likely task will be initiating a conversation (after searching for a contact and determining presence status). In fring’s design, we provided at least 4 different ways of performing this task, using both shortcuts and the structured menu. A user can choose to:

- Find the contact and click the handset ‘OK’ key;
- Press the handset green (‘Call’) button;
- Use the Call History tab;
- Select ‘Call’ from the Options menu.

3.5 Multiple Platform and Device Support

Each new platform for which fring was adapted presented a variety of challenges. For example, design for a handset that runs UIQ instead of Symbian, with touch-screen capabilities, a bigger screen and a different set of input keys required careful consideration of the optimal interaction methods and the adaptations necessary to existing software. The touch-screen ‘Pensyle’ UI enables richer user interaction including direct-manipulation and handwriting recognition, to mention just a few. The usability challenges here are to preserve the look-and-feel a user is used to when using fring, while still utilizing the full benefits of the new platform. Additional advantages of maintaining similar design on a variety of platforms include enabling users to easily alternate between platforms and the ease of providing technical support regardless of the device being used. To this end, when designing for the UIQ, for example, we decided to keep the original layout and navigation scheme and add capabilities that make use of the UIQ strengths, such as: using a second level of tabs to create an alphabetic folder division of the contact list; allowing handwriting in chat; and defining middle soft key actions (in addition to the left and right soft keys).

The figures below present a sample of the solutions implemented for both UIQ and the iPhone.

4. CONCLUSIONS

fring has addressed several usability challenges in an effort to provide intuitive, easy-to-use VoIP and IM services to users who are on the move. Evaluating prior experience of users both with IM applications and with mobile devices, in addition to creative thinking and problem-solving have enabled fring to create a rich user experience despite the inherent limitations of mobile devices.

As designers of a mobile application we like to move at least as fast as our users do. Looking toward the future, we intend to continually improve the user-experience of fring by incorporating user feedback and performing additional usability testing as well as cleverly integrating new and innovative features.

5. REFERENCES

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