Mandala: Supporting Social Presence and Interaction in the Chinese Home

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Abstract
Multiple factors lead social software to be unevenly adopted by differing age segments in urban China. This paper presents user research to understand the discrepancy between parents and their children and attempts to address them with the design of an information appliance. The appliance uses novel techniques to magnify and emphasize unidirectional social presence data so as to address social concerns that exist. The appliance attempts to support interaction ranging from peripheral awareness to real-time conversation. Initial reactions to the design are also presented.

Keywords
Social presence, China, information appliance, peripheral awareness, cross-cultural design

ACM Classification Keywords
H.5.2 [Information interfaces and presentation]: User Interfaces

Introduction
China's uneven integration of technology into the lifestyles of different age groups has created communication gaps between generations. The youth's continuous use of instant messaging (IM) (e.g. QQ,

Figure 1: A typical Chinese sitting room.

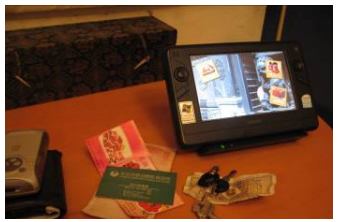

Figure 2: The Ultra-Mobile Tablet PC as an information appliance.

MSN Messenger) remains a mystery to many parents. Blogs and photo-sharing follow a similar pattern.

The one-child policy, combined with the uneven geographical distribution of jobs and higher education means the nuclear family is becoming distributed over the country and, when children go abroad, the world. In these cases, the lack of technology adoption by parents can worsen the communication gap. The present work describes results from user research and interface design that addresses this gap.

Related work

Peripheral awareness of one's social circle is the subject of numerous commercial and academic endeavors. Such awareness does not rely only on exchanges [1], so a great deal of room for experimentation exists.

A distinct subset of this area of research studies embedded information into the home. Digital picture frames are a well-known commercial example. Many presence displays exist to communicate status and other information peripherally [3, 6]. Casablanca [2] and HomeNote [5] also explored presence and lightweight messaging as augmenting communication on phones or desktops. The Electronic Family Newspaper [4] explored the asynchronous exchange large amounts of content between family members.

The unique context of urban China presents researchers with vastly different social characteristics that alter how communication technology should be designed.

User Research

Student interviews

At any time, our lab in Beijing contains scores of visiting technical university students from around China. They use IM extremely often to communicate with peers, not family members. SMS, voice calls, and sometimes email are used for family correspondence.

We became curious about how students modified their communication patterns to stay connected to their family members. We had casual interviews with 18 interns (aged 22-29, 7 female). Questions included: "What content do you share online (if anything)?", and "Do you share content with your family members? How does that content differ from those you send friends?" Nine of the students had blogs and five used webcams regularly. Nine of them used photo-sharing sites.

Home visits

The bulk of our research was parent interviews in the homes of 6 urban, upper-middle income Chinese families. Four families had only one child, 2 families had 2. Their children were all 22 years of age or over. Five families had at least one member from the immediate or extended family that was living abroad. All had at least one desktop or laptop in their home and were knew basic Internet operation. We asked about general communication habits and tools used within the house, went on home tours, and discussed their use (or lack thereof) of communication technology.

SECONDARY USES OF IM: Student IM usage is not limited to conversations. Unidirectional channels like reading 'taglines' (custom messages displayed next to one's IM handle), viewing buddy icons, and gleaning online status are arguably primary uses improving social

Figure 3: Mandala home screen with icons for Screensaver, Contacts, Archive, and Unread Messages (clockwise from top left).

presence. Only 4 students reported that they keep the IM application on when away from their desks for extended durations. This could be due to sensitivity to power consumption. As a result, when a user is on IM in China, it implies they will receive the messages in a timely manner.

COMMUNICATION METHODS: Email was used by 5 households, to varying degrees. 2 households had a family member who owned a blog, all of the children used IM regularly. Attachments in email were troublesome to some parents, as was their retrieval from storage. The parents who used digital content were consumers rather than producers. Many parents voiced their request for easy videoconferencing.

GENDER ROLES: The mothers used the computer primarily for communication, fathers for business.

ATTITUDES TOWARDS IM: Three pairs of parents reported IM was reserved for "young people," with some saying that parents "have nothing to say." Parents were unsure what kind of conversations their children have online. This creates a fear of bothering children using IM. ""I read the taglines because if they are doing any other work then I don't want to disturb them." The medium is praised by many children as a 'parent-less' bastion. "She was so slow at typing that when our family did a group chat then she would send something long after we have finished discussing that topic."

THE GAP: The three pairs of parents who used the Internet for social communication specifically reported that the people on their contact lists were only technologically adept family members. They complained that communication with family who do not use computers is less convenient.

WRITTEN NOTES: 5 households reported abandoning written notes in favor of SMS due to the immediacy and guaranteed delivery.

PHOTO-SHARING: Sharing photos with friends or family is more formal for parents than for their children. Parents shared physical photos when friends or family visited the home or by sending CDs.

DIGITAL ARCHIVES: Archives served mainly to provide a "sense of security" because emails stored there "might be important." Digital photos were stored differently because they were perused more often. ""I ask our son to show us the photo attachments that our daughter in Norway sends us."

PRIVACY: We faced considerable difficulties gaining access to Chinese homes. Family affairs are private to the outside but between family members there is little assumed privacy. However, all of the children reported privacy concerns of digital content being shared with parents. One mother expressed concern about other family members seeing her incoming IM messages.

All 18 students reported that the content they share with their peers is different than that they share with their parents. 6 of the students had particularly strong opinions about what content their parents could see – interestingly, those 6 studied abroad in the West. But most students felt little privacy constraints, e.g. **"**I seldom send email or IM to my families. And since I'm pretty open to my parents, I don't mind if they want to

Figure 4: 'Simple' view of contacts with (top right, from left) icons for: Back, Simple View, and Detailed View.

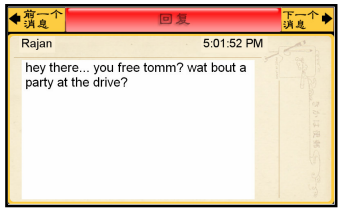

Figure 5: Reading an email message. The top icon says "Reply."

know everything about me. So I don't think this is really a privacy issue."

Summary of results

The peripheral and direct communication that IM affords does not exist within the nuclear family in urban China. This is due to IM being 'trapped' on the desktop, parents' misconceptions about IM, and lack of adoption by the parents' potential contacts. Unidirectional communication methods are important for both parties: so that children do not feel annoyed by parental intrusion and so that parents do not feel they are bothering the children. Privacy concerns exist regarding what content the parents should be able to see.

Design Goals

1. Guaranteed delivery of messages to a contact despite their online status.
2. Provide a sense of security regarding the receipt of messages and imagery.
3. Leverage unidirectional IM channels.
4. Scale user interaction from peripheral to immersive.

Design Walkthrough

Mandala is a situated interface to social information through different means: email, IM, and blogs. It attempts to emphasize unidirectional presence indicators while also allowing for real-time exchanges.

An Ultra-Mobile Tablet PC with integrated camera and microphone acts as the prototype hardware (Figure 2). The screen is touch-sensitive and can be operated via finger or plastic stylus. Mandala uses the MSN Messenger protocol and so remote contacts can be standard MSN clients.

In general, navigation is restricted to the top left and right corners, actions are listed on the top, and content is displayed in the remainder (Figure 6).

The interface was designed to support 4 levels of interaction: peripheral (screensaver), passive (viewing contact details, history data), interactive (exchanges with contacts), and real-time (conferencing).

To support design goal #3, Mandala uses presence data from the recent past to augment real-time data. For example, instead of taglines being ephemeral as with traditional IM, Mandala displays the last 5 taglines. Similarly, previous buddy icons are saved.

The home screen shows the Screensaver, Contacts, Archive, and Unread Messages icons.

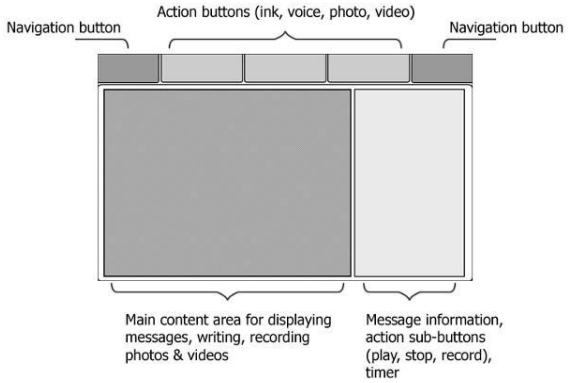

Figure 6: The wireframe for the 'Read Message' screen.

Peripheral

When not in use, Mandala acts as a type of digital photo frame where successive screens are devoted to a contact (Figure 8). This view shows historical and real-

Figure 7: A contact's Details View. Recent taglines are displayed in the middle, along with photos from the contact's blog on the bottom.

time presence information. Imagery from the Archive (see below) is displayed with the corresponding contact to address design goal #3.

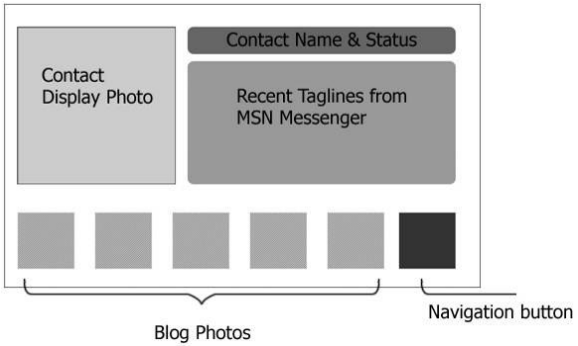

Figure 8: The 'Contact Details' screen displays current and historical data; it is also displayed in 'Screensaver' mode.

Contacts

There are two views in the contact list: Simple (3 at a time) and Details (1 at a time). The intent was for Simple (Figure 4) to be used when hunting for a person to send a message to whereas Details (Figure 7) is for 'catching up' on a person. The user can send different types of messages: ink, photo, video, voicemail, or videoconference. Similar to a mobile phone, the user can send messages to any contact, regardless of their online status (design goal #1). Mandala sends an email if the remote contact is offline and does not emphasize the distinction between online and offline contacts.

Archive

To address design goal #2, the archive separates media into 3 types (photos, videos, and text) and lists them in reverse chronological order (Figure 9).

Viewing messages

All incoming emails, IMs, attachments, and IM file transfers are accepted automatically and treated as individual messages (Figure 10). When a user clicks on the "New messages" icon from the home screen, they view each new message in chronological order. The only options available when reading a message are either to reply or the messages are read in their entirety and the reading task is exited, the messages are automatically moved to the appropriate category in the Archive.

Creating messages

Messages are created by either choosing a contact to send to or by replying to a received message. The user then chooses between ink, video, photo, or audio. No handwriting recognition is performed; ink messages are sent as images.

Figure 9: The Archive, with Images, Video, and Text folders.

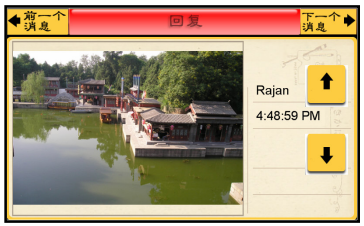

Figure 10: Email attachments and IM file transfers are treated as individual messages.

Initial Reactions

We brought the prototype to a mother and daughter (age 51 and 24, respectively), who both use IM and email regularly. Results focus on the mother's use.

Perusing the list of contacts (akin to scanning the list) is much slower using Mandala than on MSN Messenger, but this was enjoyable to the mother. The mother enjoyed seeing what are normally very small icons and taglines magnified.

Digital ink had mixed results because the canvas provided no erase mechanism and her palm on the canvas was interpreted as pen input. Here she asked us, "What does my friend see?" to ascertain if the system would convert her handwriting into text.

Buddy icons and taglines are traditionally ephemeral and children using IM treat them as such. Mandala changes the behavior of these by recording them and displaying them to parents. This may or may not violate the children's privacy.

A problem of account ownership existed: because the device was public within the home, it was not clear whose buddies would be on the list. As opposed to a 'family account', we plan for the device to house a chosen subset of the mother's contacts.

The appearance of automatically stored messages in the Archive was a pleasant surprise. This action would normally require traversal of folder hierarchies.

The next step of this research is to iterate and conduct more user evaluations of the interface.

Conclusion

The social and technological phenomena that resulted in uneven adoption of IM in China have been explored. We designed a device, Mandala, to address problems of inconvenience and unclear social protocol and describe how the design draws on these findings. Mandala emphasizes unidirectional presence data by making once-ephemeral data visible and by drawing on an automatically-generated archive.

Acknowledgements

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