# Peripheral Interaction in Two Metaphor-based Communication Tools

**Yichen Dang**

University of Toronto
Technologies for Aging Gracefully
Lab (TAGlab)
Dept. of Computer Science
40 St. George St. #7224
Toronto, ON M5S 2E4 Canada
yichen@taglab.ca

**Ronald M. Baecker**

University of Toronto
Technologies for Aging Gracefully
Lab (TAGlab)
Dept. of Computer Science
40 St. George St. #7228
Toronto, ON M5S 2E4 Canada
ron@taglab.ca

## Abstract

InTouch is novel communications technology based on
metaphors such as picture frames and televisions (plus
their remote controls). The goal is to enable isolated
individuals, especially frail older adults, to more closely
connect with remote family members, without requiring
them to master a computer.

## Author Keywords

Assistive technologies, inclusive design, multimedia.

## ACM Classification Keywords

H.5.2 [Information Interfaces and Presentation]: User
Interfaces – Evaluation/methodology; graphical user
interfaces, prototyping, user centered design.

## Introduction

 "Peripheral Interaction …describe[s] interfaces located
on the side of the user's visual field … to describe brief
actions performed in parallel to other activities… or to
encompass both background perception and
interaction…" [1, p. 2], contrasted to … interfaces
where "… we … have to focus our attention on each
digital device we interact with." [1, p. 1]

Our work is directed at enabling individuals in social
isolation, often senior citizens, to be in better touch
with family and friends.  For most computer-literate

**Figure 1. Transparent interactive function overlay on top of relative's photo (picture frame metaphor)**
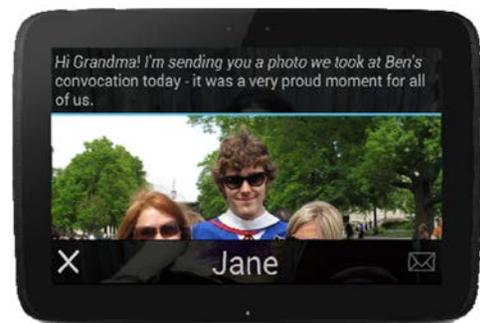


**Figure 3. Tablet shown message history from relatives (picture frame metaphor)**

users, this currently happens with email and desktop videoconferencing, and is done by positioning oneself in front of a computer, mobile phone, or tablet, focusing one's attention on an interface, and typing or speaking a message. For many seniors, or individuals with disabilities, or people in unnatural environments such as hospital rooms, this may be difficult.

Our approach is to use communication devices located throughout a natural home environment. This paper reviews the difference between our approach and that of others, and describes two ways in which we are approaching the problem — digital communicating picture frames and interactive flat screen television with augmented remote controls.

## Background

Canadians are aging. In 2011, 5 million Canadians were seniors, a number that may double in the next 25 years to reach 10.4 million by 2036 [2]. Social isolation is a prevalent problem. Current estimates of the prevalence of social isolation in community-dwelling older adults are as high as 43%, ranging from 10 to 43%. [3,4]. Social isolation leads to negative effects on seniors' health, e.g., greater incidence of loneliness, depression, stress, higher blood pressure, etc. [5,6].

This project targets individuals in isolation, especially seniors, who are not interested in or have problems with learning or using technology. We seek to support close connections between such individuals and possibly distant family members, so as to reduce isolation, loneliness, and depression. We employ metaphors of communication devices that appear not to be computers, and thereby seem less threatening.
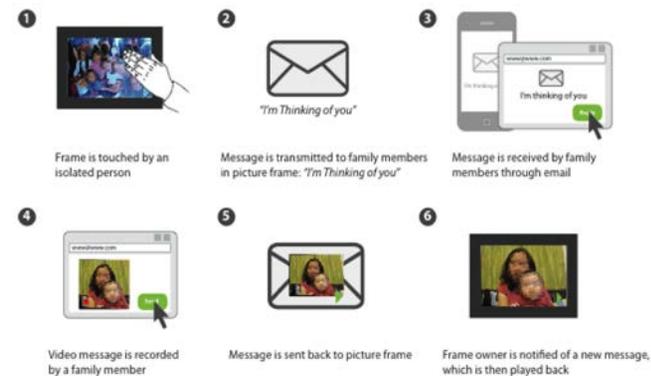


**Figure 2. Workflow of In Touch wave (picture frame metaphor)**

## Differences from existing Family Communications Technology

InTouch differs from most other family communication technologies [7] in that it focuses on asynchronous messaging rather than synchronous video chat (e.g., Skype and Hangouts). It differs from most commercial products for seniors' internet use in that it is just for communications; it does not support search or gaming, nor is it a social media platform for communications with anyone. Because of limited functionality and elegant design, the result is extreme simplicity and ease of learning and use. This is appropriate for frail seniors who do not want to be burdened by complexity. They want to stay in touch mainly with family; the unpredictability in their schedules and health makes messaging more appropriate as a starting point for communication than chat. Our goal is building appliances, most like the approach articulated in [8].

## InTouch

InTouch currently uses two primary interaction metaphors, a picture frame metaphor, and a TV and remote control metaphor.

The picture frame version was implemented as a tablet-based digital communicating picture frame application. The user can choose an action from four function buttons (Figure 1): send a wave as an "I'm thinking of you" message to a family member (Figure 2); record an audio message to send to the family member; take and send a still picture; and take and send a video message. The frame can also receive and display text, photographic, audio, or video messages from family members (Figure 3).

The TV with remote control version consists of an app running on a mobile phone, which displays a traditional TV remote user interface (Figure 4), and an app running on a smart TV, which displays a digital family album on the TV screen (Figure 5). A user can employ the directional pad (shown in Figure 4) to navigate and select a relative. The selected picture is then enlarged to occupy the entire screen and the interaction functions are displayed (Figure 6). Similar to the picture frame version, the TV with remote control version also allows users to record a voice message, capture a video or photo, or send a wave (like the Poke feature in Facebook) to their loved ones. Once a user selects one function button (e.g., record a video), the remote control app on the mobile device will automatically open the phone's built-in camera and switch to the video capture view, and the smart TV app will allow displays a prompt to ask user to record a video using the remote control app. Once a video is captured, it will be sent to the corresponded relative, and both the mobile control app and the smart TV app will change back to display their

regular screens (Figure 4, 6). Our next step with this TV version is to incorporate the message view feature so that users can review message history from their loved ones on the TV screen.

## Going Beyond Current Metaphors and Using Peripheral Interaction

Although we started by designing communication tools that mimic real world objects, we go beyond the capability and properties of the objects themselves. By allowing users to view their loved ones, a regular picture frame provides only one-way communication. In contrast, we offer users a more pleasant interaction experience that supports two-way communication by incorporating a camera and microphone to allow users to send multimedia messages. Moreover, the message history feature can capture and help remind users their unforgettable moments.

The TV version of InTouch breaks the conventional use of a TV, which is for viewing television programs, as well as the conventional concept of a remote, which provides basic functions such as changing between channels or adjusting the volume. The TV version of InTouch allows users to view their relatives' photos from a digital family album on the TV screen. The smart remote not only supports basic functions as does a traditional remote, but also allows users to navigate between relatives in the family album, take photos, record a video/audio message, and send those messages to their loved ones.

InTouch can easily be extended to enable peripheral interaction. For example, in a smart home, when a new message from a loved one arrives, the picture frame version of InTouch can play notification sounds in

**Figure 4. Remote control interface (TV metaphor)**



**Figure 5. Family album TV screen (TV metaphor)**



**Figure 6. Transparent interactive function overlay on top of relative's photo (TV metaphor)**

different volumes based on the user's current location; the TV version of InTouch can turn on the TV screen in various ways to display notifications.

We also plan to explore other metaphors that rely on real world objects that people are familiar with, such as those that hold special meaning (e.g., family albums, lockets) or those that we use or see everyday (e.g., watch, fridge magnets), as well as supporting peripheral interaction with those metaphors.

## Conclusions

We have presented the InTouch project, exploring two ways of exploiting existing technology through the use of metaphors to facilitate individuals in social isolation, especially senior citizens, to be in better touch with family and friends. We believe that our tool can provide a less obtrusive and more natural and accessible communication experience, especially as it begins to exploit peripheral interaction.

## Acknowledgements

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[8] Mackay, W., Riche, Y., & LaBrune, J. B. (2005). Communication appliances: Shared awareness for intimate social networks. In Position Paper at the CHI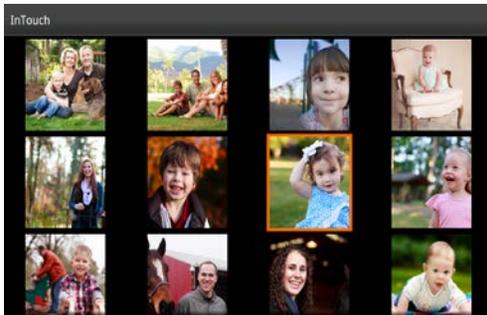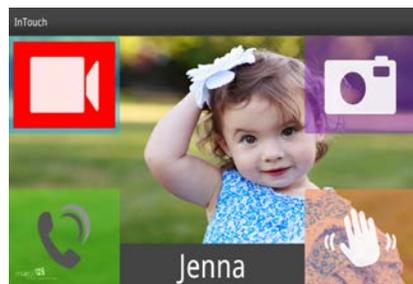'05 Workshop on Awareness Systems