Exploring the Design Space of Interactive Telephony Applications for Activist and Community Organizations

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Abstract

The global telephone network rivals the Internet as a platform for social engagement and social change. While phones have long been used as a platform for social activism and community organization, modern telephony applications offer a design space that could greatly support the modern needs of formal and informal groups that are engaged in social activism.

Keywords

Telephony, Social Activism, Design Space

Introduction

Global telephony is a powerful digital network for social exchange and social action that is increasingly integrated into the global Internet. The social power of telephony is derived from the immediacy of human vocal interactions, the global ubiquity of telephone access, the universal compatibility of phones (at least in regards to the voice channel), and the special ability of telephones to interrupt ongoing behavior.

Computer-supported telephony is a widely used but problematic technology. The dominant forms of computer-supported telephony are voice mail and IVR

menus, or Interactive Voice Response (often used to route calls within an organization, IVR menus are operated by making selections with the number keys on a touch-tone phone). For a variety of reasons [2], these two interaction designs are widely disliked forms of human computer interaction.

In the past, interactive telephony applications required expensive equipment and proprietary software. With the advent of the open-source Asterisk project [16], many more individuals and small groups have begun developing new applications. Despite this, the Asterisk software environment still poses high barriers to learning and adoption. To address this, we have established an iterative development team that is capable of rapidly prototyping new telephony applications.

We now seek to explore the potential value and relevance of novel telephony applications. Our focus is on design affordances derived from the mechanisms of call initiation and the types of output provided by the telephony application. We use the subsequent design space [16] suggested by the multiplication of these design affordances to develop example telephony applications. We propose that these resources could be used to engage community organizations in a series of reflective design conversations at the Politics and City Workshop.

Related Work
There is a significant body of prior work in the area of interactive telephony. The field of ICT4D (Information and Communication Technology for Development) has produced a number of relevant innovations in interactive telephony, largely because the penetration of mobile phones in developing contexts is much higher than the penetration of networked computers. IBM's Spoken Web Project has even developed a Hyper Speech Transfer Protocol (HSTP) for standardizing data transfer between telephony applications [7]. There is active, ongoing research on a variety of voice-based applications in developing contexts, which include web publication [10], wikis [1,9], group communication [4,5,12] and social networks [3]. Additionally, researchers have developed voice-based tools to support human subject data collection [2,6], citizen reporting [1], and information dissemination [11].

A number of commercial services have also emerged to provide interactive social telephony. During the 2011 street protests in Egypt, young Egyptians used the service SayNow [12] to post audio blog posts as status updates to Twitter. Bubbly [13] is a similar voice-based blogging system that is used by over 2 million paid subscribers in India.

The social activist artist collective "Bureau of Inverse Technology" released the citizen reporting tool "Anti-Terror Line" [14] to enable disgruntled passengers to use their mobile phone to record abusive treatment by TSA members. There has also been significant work that employs SMS technologies for social activism, such as TxtMob [17] and FrontlineSMS [18].

Design Space for Interactive Telephony
We propose a design space for interactive telephony that organizes applications based upon 1. the types of output from the telephony system and 2. the means of initiating the call. Aside from organizing a wide range of existing applications, this design space can serve to

prompt a systematic investigation of new interactive telephony applications to support social activism.

Table 1: Design Space of Existing Interactive Telephony Systems

		Call Initiation	
		Human Initiated	*Computer Initiated*
Call Output	*Prerecorded Audio*	• Voice Mail • IVR Menus • Citizen Reporting	• Phone Surveys • Campaign "RoboCalls" • Telemarketing
	Text to Speech	• Weather • News	• Emergency Response Calls
	Asynchronous User Audio	• Voice Blogs • Voice Social Networks • Voice Wikis	--
	Live Conversation	• Phone Calls • Conference Calls	--

This design space can be further explored by considering the number of simultaneous users (one person, two persons, and multiple persons). For instance, IVR systems (including voice mail) typically serve a single individual at a time, phone calls occur between 2 people, while a conference call necessarily involves 3 or more people. Many of the applications discussed here may, at various points, serve one, two or many people simultaneously.

Further Work
The design space presented here is not complete. For instance, it does not consider non-voice channel outputs, which can include missed calls, SMS, email or other forms of data transmission. We also do not provide a consideration of the different types of user input, which can include missed calls, speech, and touch tone keypad input. Finally, we do not consider the various types of processing that may occur, such as database queries, speech recognition (for voice commands or transcription), or machine learning systems for predicting user affect or availability.

Proposed Applications for Social Activism
During the workshop, we wish to present prototypes of various forms of the following applications:

- PhoneTeam: Project management tool to enable diffuse organizations delegate and track tasks as well as provide reminders
- AutoChat: Supports consistent collaboration by automatically initiating calls between 2 or more people according to a schedule or specified event
- PartyLine: Supports live conversations between diffusely connected supporters of a cause or members of an organization
- PhoneForum: Supports asynchronous conversations between diffusely connected supporters of a cause or members of an organization
- HelpNet: A phone network to recruit and organize mobile-phone empowered volunteers
- StoryPhone: Enables the collection of personal stories and experiences through a computer-prompted or live interview format
- FocusChat: Automatically assembles focus groups to discuss a topic and then privately vote for a specific outcome.
- AutoBlog: Reverse audio blogging and status updates

- SocialUpdate: A service to enable phone-based access to audio blogs and status updates
- ESMToolkit: A toolkit for deploying experience sampling methods, as well as constructing traditional phone-based surveys and polls.
- CitizenReporter: A toolkit that enables community organizations to collect and process citizen complaints.
- NewsFlash: Supports rapid computer-to-human dissemination of news or events
- PhoneTree: Supports rapid human-to-human dissemination of news or events
- GlobalLocal: Provides a local phone number that can be called to initiate international phone connectivity

Table 2: Proposed Applications for Social Activism

		Call Initiation	
		Human Initiated	Computer Initiated
Call Output	Prerecorded Audio	• CitizenReporter • NewsFlash	• AutoBlog • ESMToolkit
	Text to Speech	• NewsFlash	• PhoneTeam • HelpNet • NewsFlash
	Asynchronous User Audio	• NewsFlash • HelpNet	• SocialUpdate • HelpNet • PhoneTeam
	Live Conversation	• GlobalLocal • PartyLine • PhoneForum • AutoChat	• HelpNet • PhoneTree • StoryPhone • AutoChat • FocusChat

Biography

Derek Lomas is an artist and scientist with a background in cognitive science and social design. He is currently a doctoral student at the HCI Institute at Carnegie Mellon University, where he conducts design experiments with educational games to understand the complex relationship between learning, enjoyment and challenge. Lomas received his BA in Cognitive Science from Yale University, where he studied the neurological bases of empathy.

Lomas received his MFA from UC San Diego, where he researched Social Design, or the design of objects and environments to influence social behavior. With artist Natalie Jeremijenko, he co-founded the Social Movement Laboratory (socialmovement.org), an action research laboratory investigating the relationship between sociality and materiality through critical interventions that seek to catalyze social change by design. Projects include Memory Columns: A Comparative Graffiti Study, an urban architectural intervention that enabled a controlled study of the production of graffiti across four neighborhoods in San Jose, during the 2008 ISEA arts festival.

Bridging the fields of learning science and social design, Lomas is the founder of Playpower.org, an open-source community that is developing 8-bit learning games for a $10 home computer that is widely sold in developing countries. In 2009, Playpower received support from the MacArthur Foundation to seed local 8-bit development communities in India and Brazil. Playpower.org has developed and field-tested a set of participatory learning games, which teach skills ranging from typing to malaria prevention.

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