

Figure 1. NeighBoard prototype.

NeighBoard: Facilitating Community Policing with Embodied Tech Design

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ABSTRACT

Augmenting grassroots community policing (CP) efforts with technologies that assist citizens is a promising strategy for reducing real and perceived fear of crime. We used a human-centered design approach, working with residents of the St. Paul Summit-University neighborhood, to discern abstract functionalities for developing new CP technology. We then created and evaluated NeighBoard (Figure 1), which aims to enhance the social fabric of communities by letting citizens implement their own strategies for preventing crime and maintaining safety in their neighborhood.

1 INTRODUCTION

Imagine living in a place where repeat burglary offenses are a shared neighborhood experience. *“It’s hard to live our lives without being worried that he is gonna come back”* [2]. These words from a resident of the Summit-University neighborhood in St. Paul, MN, USA reflect a deep anxiety about public safety. Working with this racially and economically diverse community (Table 1), we ask, can novel technology design assist citizens to reduce crime and enhance the social fabric of their neighborhood?

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KEYWORDS

Community policing; Embodied computing; Safety; Technology

Community policing (CP) has varying connotations, but a widely accepted definition provided by the US DoJ Office of Community Oriented Policing Services is: “a philosophy that promotes organizational strategies that support the systematic use of partnerships and problem-solving techniques to proactively address the immediate conditions that give rise to public safety issues such as crime, social disorder, and fear of crime” [1].

For our purposes, we focused on community led solutions aimed at engaging residents to collectively promote public safety.

Table 1: Summit-University demographics (42,352 residents).

	# of Residents
Male	20,984
Female	21,368
Median Age	28.8
White	17,160
Black or African American	12,688
Asian	8,690
Hispanic or Latino	2,746



Figure 2: Websites and social media forums used in St. Paul for CP.

Crime erodes sense of security, heightens fear of strangers, and causes alienation from local community life [5]. Even the perceived fear of crime negatively affects community members, especially those who are more isolated and vulnerable (e.g. elderly, racial minorities, women, and those who live alone) [5]. However, residents who feel attached to their community are less likely to be afraid of crime [11]. Resolving public safety concerns often involves partnership between police and grassroots efforts using an approach known as community policing (CP) [1]. Beyond traditional citizen-input channels (surveys and public meetings), CP platforms have expanded to web and social media forums. But while evidence suggests closer knit communities deter violence and crime, social factors complicate current technology solutions [4, 6, 8, 10]. We aim to overcome key social barriers of adoption caused by inaccessibility, irrelevance, and inflexibility. Through a human-centered design process, we created and evaluated NeighBoard, a multi-modal kiosk system that provides information and resources to facilitate emergent community self-policing.

2 BACKGROUND

2.1 Technology and Community Engagement

At least 42% of law enforcement agencies and residents have implemented CP activities (e.g. community meetings, neighborhood watch, and social media platforms) [9]. However, the use of technology in the implementation of CP is still wanting at best. One study found that a crime information website maintained by Chicago police, CLEARpath, had been used less by citizens than the community-generated web forums [6]. Residents tend to use technology to build community relationships, discuss collective action plans, share information with each other, and regulate social norms [8]. In the Summit-University neighborhood, many residents use web-based public forums, community groups, and newspapers (Figure 2).

Studies have found Facebook to be a useful social bonding tool, supporting community cohesion; however, some populations are less likely to endorse social media to support crime prevention efforts due to fear of information misuse, being ‘trolled’, or being seen a ‘snitch’ [6, 9].

2.2 Technology and Social Connectedness

Nuances can also be found in research regarding social connectedness. Early studies on the social psychology of the Internet show that increased use of electronic communications have a negative effect on social involvement and psychological well-being [7]. However, other studies assert benefits when used to augment, not replace, our real-life relationships and civic engagements, resulting in enriched psychological well-being and perceived social support [3].

To effectively benefit from technology’s capability for large-scale and personal communications, community policing should not lose sight of key social considerations for physical presence, visibility, and trust-building when fostering community cohesion.

Table 2: Participant demographics.

	# of Participants
Male	8
Female	7
Age 18-35	4
Age >35	11
White	10
Black or African American	4
Asian	1
Hispanic or Latino	0

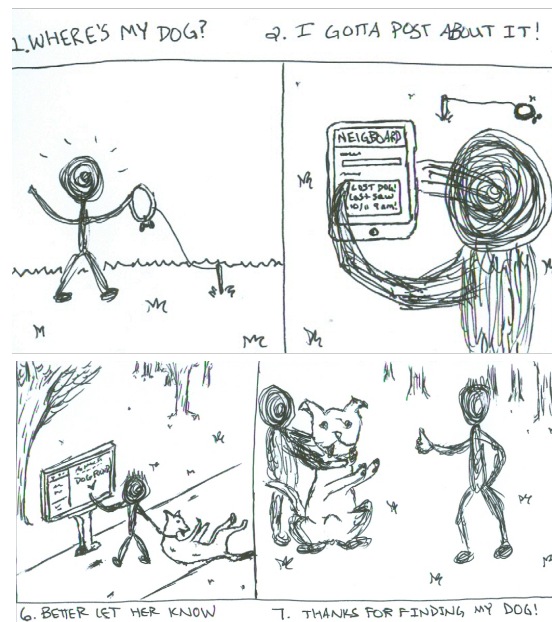


Figure 3: Sketch of storyboard design idea.

3 FORMATIVE METHODS AND RESULTS

We described this work as a design project and publicly advertised via Facebook, Nextdoor, and paper flyers inside popular businesses and on street corners with heavy pedestrian traffic within the Summit-University neighborhood (House District 65A, as defined by the state). Care was taken to flyer public areas that would reach residents of many backgrounds, such as cafes known to be popular with various resident populations. Focus group participants and interviewees reviewed an informed consent form with a moderator before agreeing to participate, including: project intent, contact information for the team, procedure of gathering information and evaluating the eventual prototype, permissions, foreseeable risks and benefits, and confidentiality of data. All participants were over 18 years of age and judged able to act autonomously.

We held three community focus groups with eight residents and one public safety liaison to understand: current community-oriented technologies, liked and disliked community elements, perceived safety, and police presence and surveillance (Table 2). We also interviewed seven community residents who had not attended the focus groups. We transcribed the data and completed a Grounded Theory analysis.

Using an affinity map to organize codes, we generated thematic clusters of our data. Interestingly, more themes related to interpersonal interactions and communication than law enforcement and self-policing. Three abstract functionalities (AF) emerged, which are design implications that encompass general technology goals.

3.1 AF-1: Empower Residents to Build Local Support Networks

Many participants discussed a deficiency of interpersonal interaction (e.g. between neighbors and strangers crossing paths on a sidewalk). *"If...I know I can call on these two, I wouldn't necessarily have to call the police because I know...they're accessible"* (S1). Increased interpersonal connections can provide personal resources and safety to individuals in a community. One issue potentially preventing the creation or expansion of a local support network is an avoidance of talking to strangers [10]. *"People are scared of people"* (S2).

3.2 AF-2: Enable Technology to Adapt to Local Customs

CP technology should align with local and social customs to discuss topics of community relevance. For example, residents view the value of online conversations differently depending on the topic and scale of seriousness. *"Most people seem to use the Facebook neighborhood group more for happy things (block parties)...while Nextdoor seems to be more serious communication"* (P5). Yet there is concern over moderating content, balancing free speech and censorship for appropriateness. *"I would go to my neighborhood Facebook page first before I would go to Nextdoor...I feel like there is victim blaming on Nextdoor"* (P3). These quotes show a need to respect social context, protect freedom of speech, and hold users accountable for inappropriate behavior.



Figure 4: NeighBoard bricolage prototype.



Figure 5: NeighBoard homepage screen.

Furthermore, some participants have the custom of engaging in personal activism and indicated a desire to encourage collective local efforts. “[Paraphrased] I’ve been volunteering to clean up the graffiti now for six years...Maybe we can start a chain reaction to get people to each clean a different area to spread out cleaning graffiti” (P1). Increasing volunteer activism has the potential to increase community cohesion to reduce crime and disorder.

3.3 AF-3: Provide Accessible Resources for Community Engagement

Technology solutions should be accessible to all local residents. Multiple applications came up in our focus groups, from acclimating new residents, providing relevant and local public services (health, safety, and government-related), to advertising volunteer activism. Complaints of current technology offerings include how to navigate and ignorance of available resources. “Old folks struggle with technology, so changing things is tough. It needs to be simple” (P10).

4 IDEATION

Based on these AFs, we ideated over 100 ideas using the IDEO method and sketched storyboards (Figure 3), such as mobile apps, a new online social forum, or tools for connecting police to residents. In our second focus group, we co-evaluated our top design ideas and arrived at the idea of a network of digital kiosks that physically embody community policing efforts. Each kiosk provides access to an online forum as well as a lockable communal space accessible to registered residents.

4.1 NeighBoard System Design

We used a bricolage technique to rapidly prototype a vertical kiosk structure using plywood, a metal cabinet, and a music podium covered with upholstery fabric (Figure 4). We also affixed a bulletin board on top to allow for non-digital interaction and accommodate existing posting practices.

A tilted surface at average adult elbow height affords ergonomic access to a Windows Surface tablet running a software application built using Intuiface. For purposes of prototyping, Intuiface offers a convenient downloadable offline application. (Future work could integrate real time online functions, such as accessing the Internet, instant chat features, or linking to Facebook and Nextdoor neighborhood communities.) The Surface displays relevant information for the community provided by residents or city representatives (Figure 5). Residents can register using a given name and address to unlock resident-only features, while the majority of content can be accessed without signing up (ideal for children, visitors, or individuals valuing privacy).

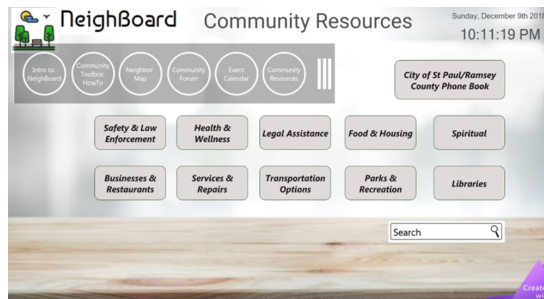


Figure 6: NeighBoard community resources page.

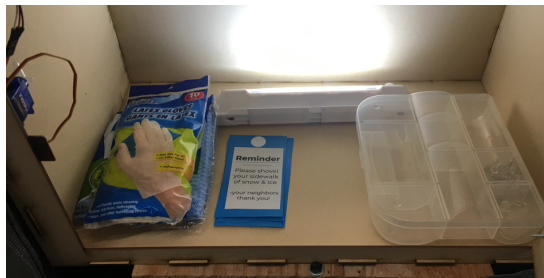


Figure 7: Lockable communal space used as a toolbox.



Figure 8: Participant testing NeighBoard during the evaluation focus group.

Information for important sensitive services, such as local mental health resources, food services, abuse hotlines and housing options, is provided anonymously (Figure 6). A local resident map overlays contact information, affording the ability to digitally “meet” fellow neighbors, addressing AF-1 by fostering local support networks and interactions. The neighborhood-customized software can be accessed at the physical kiosk but also through an Internet web browser. It serves as a template with features that allow residents to customize content based on location and social norms, affording adaptability and addressing AF-2.

Below the tablet is a secure communal tool box space (Figure 7). We used MDF laser cut board to create a locking servo-controlled cabinet used to store tools for volunteer activities. This addresses AF-2 by allowing residents to place any tools and materials they want to share for collective volunteering or any other community-determined function.

4.2 User Evaluation

Our user evaluation centered on: participant’s interaction with the prototype, the perceived value of meeting community needs, advantages and disadvantages of the design, recommendations for future prototyping, and strength of connection to AFs. Participants were paired and given time to interact with NeighBoard without prior instruction how to use it, to capture real-life use scenarios (Figure 8). After, participants took a survey reflecting their user experience and prompts for the focus group discussion.

Results indicate participants appreciated the multimodal posting function (physical and digital posting boards) and saw usefulness in having a communal space. Participants rated their experience using the NeighBoard at an average of four out of five (five being the most enjoyable). Interestingly, views were equally split on whether this would be more engaging outdoors in a public place for community engagement or indoors as a resource for finding local information (e.g. at a library, community center, or governmental office). Desired features discussed were linking to current CP technologies and including an email or chat function to contact other residents. Additionally, an informal bartering feature was proposed to increase interpersonal interaction.

5 FUTURE WORK

Even with a small number, our participants’ diverse backgrounds, roles, and passion for improving community engagement and safety generated valuable discussion and insights. However, we would also like to gain feedback from local police and other relevant stakeholders in community policing efforts. After improving the prototype based on the recommendations received, a future deployment would offer an exciting opportunity to study how local residents use NeighBoard and appropriate its features to express and protect their unique community.

6 CONCLUSIONS

NeighBoard improves residents' ability to digitally access information regarding local resources and public safety, while still remaining inclusive and sensitive to racially and economically-diverse neighborhoods. Our example of a CP technology aims to fulfill three AFs: (1) empower residents to build local support networks, (2) enable technology to adapt to local customs, and (3) provide accessible resources for community engagement. We believe this work can strengthen future CP technology development to ultimately weave a stronger and more connected social fabric.

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