Vote With Your Feet: Street-Sourced Answers To Crowd-Sourced Questions

Cheng Xu
1x1.design
cheeriocheng@gmail.com
San Francisco, CA

Chaoyu Yang
1x1.design
paranoyang@gmail.com
San Francisco, CA

Michael Philetus Weller
Emerald Bottery
philetus@gmail.com
Seattle, WA

Ziyun Peng
1x1.design
pengzyk@gmail.com
San Francisco, CA

http://dx.doi.org/10.1145/3027063.3052549

Abstract
We built "Vote With Your Feet", an installation that displays questions crowd-sourced from a web site, and collects street-sourced answers thru the symbolic action of voting by walking through one of two gateways. In this paper, we briefly go over the design and construction of the system, then describe the interactions we observed during a multi-day public deployment. We end with discussion how spatial intervention could be used to shape inter-personal interaction and facilitate community involvement.

Author Keywords
Urban Probes; Embodied Interaction; Installation Art; Public Engagement; Citizen Science

ACM Classification Keywords
H.5.m [Information interfaces and presentation (e.g., HCI)]: Miscellaneous

Introduction
The urban public space is a multi-functional forum that serves as transitional pathway, waiting area, impromptu stage, and many other purposes, defined at any moment by its inhabitants. In the vein of Paulos and Jenkins's "Urban Atmospheres" [1] our gateway installation seeks to use digital tools to enhance the traditional role of urban spaces as a forum for community building.

Figure 1: A tourist looked back on the tally after casting her vote on "Local or Tourist?"

Watching the pedestrians flowing through the urban space raises the questions such as where are they going? What is their purpose? Do they share something alike? What if you could ask them these questions? Better yet, what if they could ask each other these questions? Could people that had viewed each other as strangers move toward viewing each other as members of a community with some shared understanding?

The name of our installation comes from the idiom "vote with your feet" which describes people making their voices heard outside of the formal government polling process by taking direct action. The system consists of a physical installation with a sign mounted above a double gateway (Figure 1) and features several key digital affordances. The gateway displays questions crowdsourced from the project web site, giving people a forum to pose questions to the particular spatially-defined community of people within sight of the gateway. And sensors in the gateway give people a low-friction means to publicly demonstrate their opinion, by simply walking through one of the two gateways.

With Vote With Your Feet we challenge ourselves to intervene in the urban social landscape by giving people a tool to advertise which issues are important, and to publicly demonstrate their opinion on issues to each other. Our hope is to stimulate community involvement and foment mutual understanding.

Urban Intervention

We set off to design an urban intervention with the following goals:

- Site specific - the installation should be part of the pedestrian flow of the site.
- Voluntary - options to participate and opt out are equally available.
- Playful - with the help of technology, provide a fun and engaging experience.
- Reflective - could we pull participants out of their daily routine to take a moment to reflect on bigger questions in life?

- Provocative - could we encourage participants to re-think their role in urban life? Could strangers on the street find common cause with each other?
- Long term effect - could the conversation started at the installation live beyond the interaction and play new roles in community involvement?

We designed Vote With Your Feet with these criteria in mind. From a high-level view it is a physical manifestation of a binary-choice survey for pedestrians (see Figure 1). Two gateways stand in the middle of the sidewalk, with a question displayed on a digital sign above them. Each door stands for one answer option. Walk through the door, and your vote will be counted, viewable both from the local sign and on the live-updated web site. The local system automatically pulls questions crowd-sourced online, rotates questions according to priority, and pushes results back to the web site.

Design Considerations

We chose the gateway form-factor because it is a common analogy for choices in myth and literature (for instance, the three doors of choices in the Magic Flute). In order to make the system self explanatory and easier to engage with, we limited the number of doors to two and constrained the questions to binary choices. Due to the nature of a public installation, the system has to meet a variety of security and accessibility requirements in order to be installed in public space. As it was initially installed outdoors on the sidewalk, we also engineered it to be resilient enough to deal with all kinds of external uncertainties, such as rainy weather or unstable network connections.

We componentized the installation into individual structural and functional parts: the base, three supporting columns, and a lintel containing the display and electronics(Figure 2).

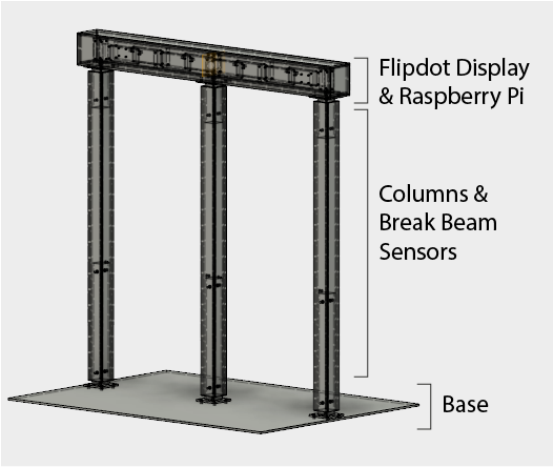

Figure 2: Vote With Your Feet Doorway Components

A few metal brackets connect and stabilize the system. The infrared break beam sensors for both doorways are mounted in the middle column. The sensors are wired to a Raspberry Pi in the lintel component that performs all of the local computation and communicates with the server over wifi. With this design we were able to pack all the parts in a medium size SUV or minivan, and 3 people can install or disassemble the whole system in about 30 minutes.

The action of walking through a gateway triggers the counting sensors. We display the current tally (as a bar chart showing the current ratio) on the sign after the voter walks through, to offer immediate gratification and encourage participation.

We use flip-dot panels [2] to build the digital sign on the doorway that displays the question and associates each gateway with an answer. We chose a flip-dot display for

several reasons: the physical flipping dots made it easily readable even under sunshine or low light environment; flushing the display makes interesting sound that provides another feedback channel; and the aesthetic is noticably distinct from other forms of digital signage which we hoped would catch people's attention.

One subtle detail of the sign implementation is that to enable interaction with the installation from both sides, we reversed the order of the two answers on each side of the installation. For example, on one side the sign reads "CATS OR DOGS?" and on the other it reads "DOGS OR CATS?" so that "CATS" is over the same gateway on both sides.

In order to experiment with different kind of questions and collect data, we rotated the questions automatically through out the day, with a new one every 5 minutes. We also gave different questions different weight in order to give interesting questions or newly added questions more visibility. Both the rotation interval and questions' weight are configurable via our web UI (http://votewithyourfeet.org) , which allow us to experiment with different settings without shutting down the system.

On the software side, we created a classic client-server mode application. The Raspberry Pi installed in the gateways is configured to run a client side application that drives the display, polls the sensors, periodically syncs questions and configurations from server, as well as uploading collected data to the server via REST APIs. The server application, in addition to providing the API endpoints, also exposes a web UI that serves two purpose. Participants can submit questions for the display or view live update vote results from the web UI, the system manager can make changes to the configurations or questions on the fly.

Figure 3: "No no no you want to vote for Lyft!" - a group of viewers trying direct the 'correct' choice.

Case study: Market Street Prototyping Festival

On Oct 6-8, 2016, we set up the Vote With Your Feet gateways on Market Street, a main street with local commuters and tourists in downtown San Francisco for the Market Street Prototyping Festival[1] (Figure 3). The gateways are located near a subway entrance, with the path aligned to the natural flow of pedestrians. We were hoping to observe several levels of engagement:

- Will people pause and think about the questions?
- Will people share their opinion in public?
- Will people or even strangers start conversations based on the questions?

The answers were all yes. Over three days we received more than 10 thousand votes on about 100 diverse topics (Figure 5), with a constant crowd of observers taking photos

[1] http://marketstreetprototyping.org/

Figure 4: Participants receive "I VOTED" stickers, which help spread the word.

and conversing around it. We stayed with the installation 24 hours a day and observed all levels of interactions. Below we discuss some key features that contributed to its popularity.

Lightweight Interaction
The installation invites a simple, quick, and predictable interaction. Consider the experience of being asked to fill a survey by a person on the street. Many concerns arise. How long would this take? What will I need to do? Would they ask for money? The gateways, on the other hand, have no hidden agenda. Its 10-second interaction is transparent. As a result, we observed many pedestrians that were willing to engage with the gateway but unwilling to stay and talk with us. We also observed the gathering of spectators, usually standing in a circle around the doorways. They chose a more passive way to engage, but nevertheless participated in the process.

Gratification
Participants who vote get the instant gratification of seeing the tally. An animation showing the current ratio validates the contribution of the voter. It also informs the voter of 'what percentage of people think like me'. To add to the playfulness, we also gave out "I VOTED" stickers to participants (Figure 4).

A deeper level of gratification happened when the participants submitted a question on-site (thru our mobile website on their phone). Some of these participants would stay with the installation and would wait with great enthusiasm for their questions to show up, vote, and observe others' reactions.

Crowd Sourced Questions
The key to an engaging experience is a list of good questions. Using our goals earlier as guideline, we define 'good' as:

- popular - eliciting a lot of participation, or
- provocative - causing people to pause and think, or have further conversations

In our experience, the 'popular' questions can be funny (nice ass or badass?), debatable (pro life or pro choice?), or speak to specific sub-culture (star wars or star trek?). It is worth mentioning that site specific questions have its particular charm. A good example is 'tab or space', referring to indentation conventions in computer programming. Being in San Francisco with a dense population of tech workers, the question evokes an 'insider joke' pride and proved to provoke strong reactions within the group.

While popular questions elicited large group of participants, some provocative questions are more daunting to answer publicly. At the time of the exhibition, the presidential election was one month away. The 'Trump or Hillary?' question received over one thousand votes, while the 'Trump or Hitler' one made many gasp and pause and quietly walk away. The latter question, although it didn't elicit many votes, still managed to elicit discussion among bystanders. About half of the questions on our list (and many of the best) were contributed on-site.

Reflections

While we used sensors to count each vote and published the tally online, our goal was not to generate a normatively valid statistical analysis, for several reasons. One reason is self-selection. While cats are very popular on the internet, dogs received many more votes during our Market Street deployment (even despite a concerted effort by one member of our team to carry the day for cats). Are there more dog lovers than cat lovers? Or are the dog lovers more

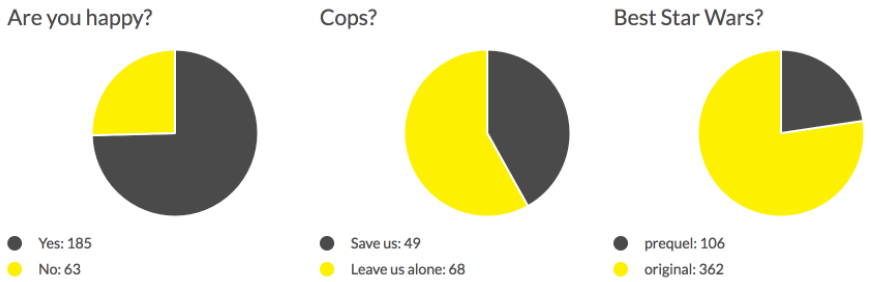

Figure 5: A range of questions asked and answered during the exhibition.

likely to go on a walk and vote with their feet? Also in this context every answer is an opportunity for a public performance: we applaud those who voted yes to 'would you dance through the door?', and acknowledge that most of the people who didn't dance didn't vote either. Most importantly, the goal of the installation is not primarily to collect data, but to foster people's interest in other people's opinions and build understanding where before there were strangers.

Conclusions & Visions

We created a metaphorical voting doorway to foster a community that poses questions to itself. Through answering those questions in public, we create awareness of the community and stimulate social involvement. In our case study, we observed various level of interactions and summarized what features is crucial to the success of such a system.

We envision that such voting mechanism could be incorporated into other existing physical spaces that have a flow of pedestrians, such as subway and building entrances.

Sourcing Questions for CHI

To continue to engage the community and keep the questions as relevant as possible, we'd like to open the question submission to the CHI community, both before CHI via online survey and during CHI, collected on-site thru our mobile web page.

Acknowledgments

We thank Autodesk Pier 9 for the support in constructing the doorways, and the Market Street Prototyping Festival and San Francisco Asian Art Museum for the opportunity of bringing the installation to the public. We thank Eric Paulos for his 'Activating Environment' class, where the idea was first conceived.

References

[1] Eric Paulos and Tom Jenkins. 2005. Urban probes: encountering our emerging urban atmospheres. In *Proceedings of the SIGCHI conference on Human factors in computing systems*. ACM, 341–350.

[2] Wikipedia. 2016. Flip-dot display. (December 2016). https://en.wikipedia.org/wiki/Flip-disc_display.