Civic Technology Policy

Surveillance
- Greenfield (2017)
- Foucault (1977)

Privacy
- ACLU (2011)
- Bay Area Surveillance (2017)

Algorithmic biases
- Winner (1980)
- Garvie and Frankle (2016)

Cybersecurity
- Ghena et al. (2014)
- Kim et al. (2017)

Smart City Initiatives

Organizations
- City Innovate
- MetroLab Network
- Array of Things

Cities
- Chicago
- Oakland
- Seattle

Critical Design

Theory
- DiSalvo (2014)
- Gaver (1999)
- Lukens (2012)

Projects
- Sense Your City (2015)
- San Leandro Lights (2017)
- Hello Lamppost (2013)
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What should privacy on the street look like?

What are uses of public sensor data?

Does that algorithm have racial biases?

What about socio-economic disparity in cities?

Are DIY civic sensors more susceptible to hacking?
What should privacy on the street look like?

What about socio-economic disparity in cities?

Are DIY civic sensors more vulnerable to hacking?

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Array of Things Operating Policies

August 15, 2016

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How can we use a novel, interactive installation to surface the benefits and harms of smart city technology?
Design Process
Surveyed 530 people* across the US on privacy attitudes (35 questions) *over age 18

Interviewed 6 experts and attended 3 conferences in the IoT field

Too many sketches to count

Feedback from local artists who have projects in the city environment

Ran a design focus group with 12 participants from various UC Berkeley departments
While using the internet, have you ever done any of the following things? (2015 v 2017)

- Cleared cookies and browser history: 59%
- Deleted or edited something you posted in the past: 29%
- Used a temporary username or email address: 25%
- Used a service that allows you to browse the Web anonymously: 9%
- Decided not to use a website because they asked for your real name: 23%

Surveyed 530 people online across the US on privacy attitudes (35 questions)
While using the internet, have you ever done any of the following things? (2015 v 2017)

- Cleared cookies and browser history: 83%
- Deleted or edited something you posted in the past: 56%
- Used a temporary username or email address: 42%
- Used a service that allows you to browse the Web anonymously: 32%
- Decided not to use a website because they asked for your real name: 37%

Surveyed 530 people online across the US on privacy attitudes (35 questions)
To what extent do you approve of the use of sensors in public spaces for the following activities?

Surveyed 530 people online across the US on privacy attitudes (35 questions)
Cities have a hard time communicating with the general public about benefits and harms of smart cities.

- City Policy Innovation Interviewee

Interviewed 6 experts and attended 3 conferences in the IoT field
Focus group

Local Artists

Sketching

Survey

Expert interviews

NATIONAL PARKLET

40 years ago, in 2017, Mayor Lee fought to preserve this parklet as a sensor sanctuary.
National Parklet

40 years ago, in 2017, Mayor Lee fought to preserve this parklet as a sensor sanctuary.
Augmented Reality Viewfinder
Repurposed Parking Signs

DATA COLLECTION
9am - 6pm

DATA CLEANING
WED 3-4pm

Privacy + Security Risks. See www...gov for more info.
Darryl Smith, Tenderloin National Forest

Matt Passmore, Park(ing) Day

Ben Davis and Vanessa Inn, Lightrail

Local Artists

Focus group

Sketching

Survey

Expert interviews
Ran a design focus group with 12 participants from various UC Berkeley departments.

Key affordance of newspaper boxes: the act of taking a newspaper.
DATA COLLECTION
IN PROGRESS
DATA CLEANING
Monday 3pm - 4pm
Privacy and security concerns may exist.
The Daily Data

Image Recognition Prevents Flooding

New image recognition software detects early flooding in city and neighborhood streets in light of recent storm weather. By using this technology, the City of Berkeley will be able to respond quickly to unsafe situations and deploy design teams.

Food for the Homeless

Sensors on benches enable real-time detection of the location of homeless individuals in the City of Berkeley. Stamps from on-the-go can now deliver access food to those in need before the food spoils.

Pedestrian Safety

Noise level, vehicle detection, and pedestrian counts are being used to automatically adjust speed zones and traffic lights for safety.

THE DATA INQUER

Cameras Detect Immigrants

New facial recognition technology has been tested in surveillance cameras in the city of Berkeley. This testing is incorporating with recent efforts to identify and deport illegal immigrants in the State of California.

Loitering Decreases

New sensors on city-cities and benches allow for real-time detection of pacing and handshakes. This technology can identify this illicit activity and set up a step to fix the issue.

Protest Detection

Latest reporting activity was 11 days ago. New local sensors inform the Berkeley City Public Operations when there is potential activity.
The Daily Data

Image Recognition Prevents Flooding

New image recognition software detects early flooding on city and neighborhood streets. In light of recent climate change, the City of Berkeley will be able to respond quickly to unsafe situations and delay design defects.

Food for the Homeless

Sensors on benches enable real-time detection of the location of homeless individuals in the City of Berkeley. Stamps from an on-the-place can now deliver a free meal to those in need before the food spoils.

Pedestrian Safety

Noise level, vffpass detection, and pedestrian counts are being used to automatically adjust speed limits and traffic lights for safety.

Daily Inquirer

Cameras Detect Immigrants

New facial recognition technology has been launched in neighborhood centers in the city of Berkeley. This system is improving with recent efforts to identify and deport illegal immigrants in the State of California.

Loitering Decreases

New sensors on city streets and benches allow for real-time detection of loitering and harassment. This system is fostering a safer environment and providing a step to the record.
Prototyping & Fabrication
Studies
Pilot Testing
Students gave usability feedback

Study 1 South Hall Lawn
Technical challenges outdoors

Study 2 South Hall Lobby
Improved functionality indoors

Study 3 Qualcomm Cafe
Reinforced preliminary findings
Findings
I feel very 
paranoid
right now."

“I’d like to stay away from this.
It looks 
intimidating.”

Intentionally made this experience 
uncomfortable and provocative.
“There are positive applications for these technologies. But, there’s also a way to abuse. The technology is neutral. The use cases are not.”

Displayed both positive and negative uses of the same technology to build awareness.
"This is cool and it’s creepy. I like that you can see the technology. Almost like a behind-the-curtain look."

Increased transparency of smart city technologies
“I’m trying to understand how my existence here could be used in some way. What’s the purpose of that data? I have more questions than I have answers.”

“There are questions of who is using this. How is the data being interpreted and used.”

“The right one feels scarier than the left, but I’m not sure. The left one seems more positive in a way that may be lying, like it’s hiding things.”

“What if there are false positives in the collected data? What do you do with that?”

“This makes me question the nuances around how we determine whether something is invasive or harmful, and how we determine when it’s beneficial. What goes into that?”
“I’m trying to understand how my existence here could be used in some way. What’s the purpose of that data? I have more questions than I have answers.”

“There are questions of who is using this. How is the data being interpreted and used.”

“The right one feels scarier than the left, but I’m not sure. The left one seems more positive in a way that may be lying, like it’s hiding things.”

“What if there are false positives in the collected data? What do you do with that?”

“This makes me question the nuances around how we determine whether something is invasive or harmful, and how we determine when it’s beneficial.”
Future Directions
How might such interactive installations change the way you think about privacy and public data collection at scale?
Thank you!

Our advisor, Kimiko Ryokai

CITRIS Invention Lab (Chris Myers, Mitchell Karchemsky)

Previous teammates (Emily Witt, Paul Glenn, Jason Danker, Molly Mahar, and Hadrien Renold)

I School Professors (Coye Cheshire, Chris Hoofnagle, Steve Weber, John Chuang)

User testers (Michelle Carney, Nick Doty, Usman Raza, Richmond Wong, Edward Yip)

Berkeley Center for New Media (Greg Niemeyer, Nicholas de Monchaux)

Local artists (Ben Davis, Vanessa Inn, Darryl Smith, Matt Passmore)

Center for Long-Term Cybersecurity Grant

Arts Research Center Fellowship