Usable Privacy

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July 2009

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http://cups.cs.cmu.edu/

Privacy is hard to define

"Privacy is a value so complex, so entangled in competing and contradictory dimensions, so engorged with various and distinct meanings, that I sometimes despair whether it can be usefully addressed at all."

Robert C. Post, *Three Concepts of Privacy*, 89 Geo. L.J. 2087 (2001).

Britney Spears: "We just need privacy"

"You have to realize that we're people and that we need, we just need privacy and we need our respect, and those are things that you have to have as a human being."

— Britney Spears
15 June 2006
NBC Dateline

http://www.cnn.com/2006/SHOWBIZ/Music/06/15/people.spears.reut/index.html

Only a goldfish can live without privacy...

Some definitions from the academic literature

- Personhood
- Intimacy
- Secrecy
- Contextual integrity
- Limited access to the self
- Control over information

Most relevant to "usable privacy"

Limited access to self

"Being alone."

- Shane (age 4)

1890: "the right to be let alone"

- Samuel D. Warren and Louis D. Brandeis, *The Right to Privacy,* 4 Harv. L. Rev. 193 (1890)

1980: "our concern over our accessibility to others: the extent to which we are known to others, the extent to which others have physical access to us, and the extent to which we are the subject of others attention.

- Ruth Gavison, "Privacy and the Limits of the Law," *Yale Law Journal* 89 (1980)

Control over information

"Privacy is the claim of individuals, groups or institutions to determine for themselves when, how, and to what extent information about them is communicated to others."

"…each individual is continually engaged in a personal adjustment process in which he balances the desire for privacy with the desire for disclosure and communication…."

Alan Westin, *Privacy and Freedom,* 1967

Realizing limited access and control

- Limited access
  - Laws to prohibit or limit collection, disclosure, contact
  - Technology to facilitate anonymous transactions, minimize disclosure
- Control
  - Laws to mandate choice (opt-in/opt-out)
  - Technology to facilitate informed consent, keep track of and enforce privacy preferences

Privacy concerns seem inconsistent with behavior

- People say they want privacy, but don't always take steps to protect it
- Many possible explanations
  - They don't really care that much about privacy
  - They prefer immediate gratification to privacy protections that they won't benefit from until later
  - They don't understand the privacy implications of their behavior
  - The cost of privacy protection (including figuring out how to protect their privacy) is too high

Privacy policies

- Inform consumers about privacy practices
  - Consumers can decide whether practices are acceptable, when to opt-out
- Most policies require college-level skills to understand, long, change without notice
  - Few people read privacy policies
- Existing privacy policies are not an effective way to inform consumers or give them privacy controls

Cost of reading privacy policies

- What would happen if everyone read privacy policy for each site they visited once each month?
- Time = 244/hours year
- Cost = $3,534/year
- National opportunity cost for time to read policies: $781 billion

A. McDonald and L. Cranor. The Cost of Reading Privacy Policis. I/S: A Journal of Law and Policy for the Informaiton Society. 2008 Privacy Year in Review Issue.http://lorrie.cranor.org/pubs/readingPolicyCost-authorDraft.pdf

Privacy policy format study

- Participants answered reading-comprehension and opinion questions about privacy policies in various formats
- People could accurately answer questions where they could find answer by scanning or key word
  - Does Acme use cookies? (98%)
- People had trouble with questions that required more reading comprehension
  - Does this policy allow Acme to put you on an email marketing list? (71%)
  - Does this policy allow Acme to share your email address with a marketing company that might put you on their email marketing list? (52%)
- Even well-written policies are not well-liked and difficult to use
- Layered notices don't appear to help much

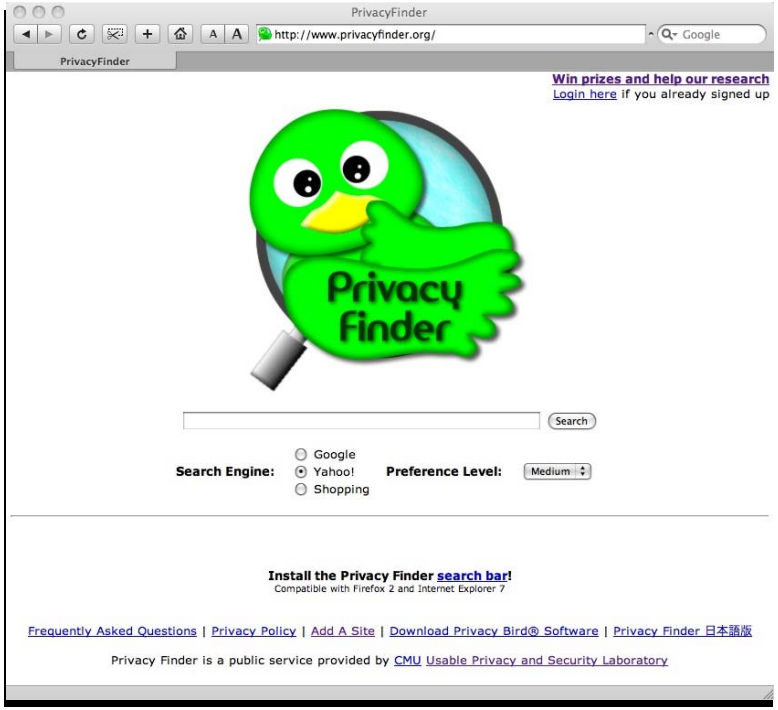
A.M. McDonald, R.W. Reeder, P.G. Kelley, and L.F. Cranor. A comparative study of online privacy policies and formats. Privacy Enhancing Technologies Symposium 2009. http://lorrie.cranor.org/pubs/authors-version-PETS-formats.pdf

Requirements for meaningful control

- Individuals must understand what options they have
- Individuals must understand implications of their options
- Individuals must have the means to exercise options
- Costs must be reasonable
  - Money, time, convenience, benefits

Impact of privacy information on decision making

- Studies demonstrate that when readily accessible and comparable privacy information is presented in search results, many people will pay more for better privacy



http://privacyfinder.org/

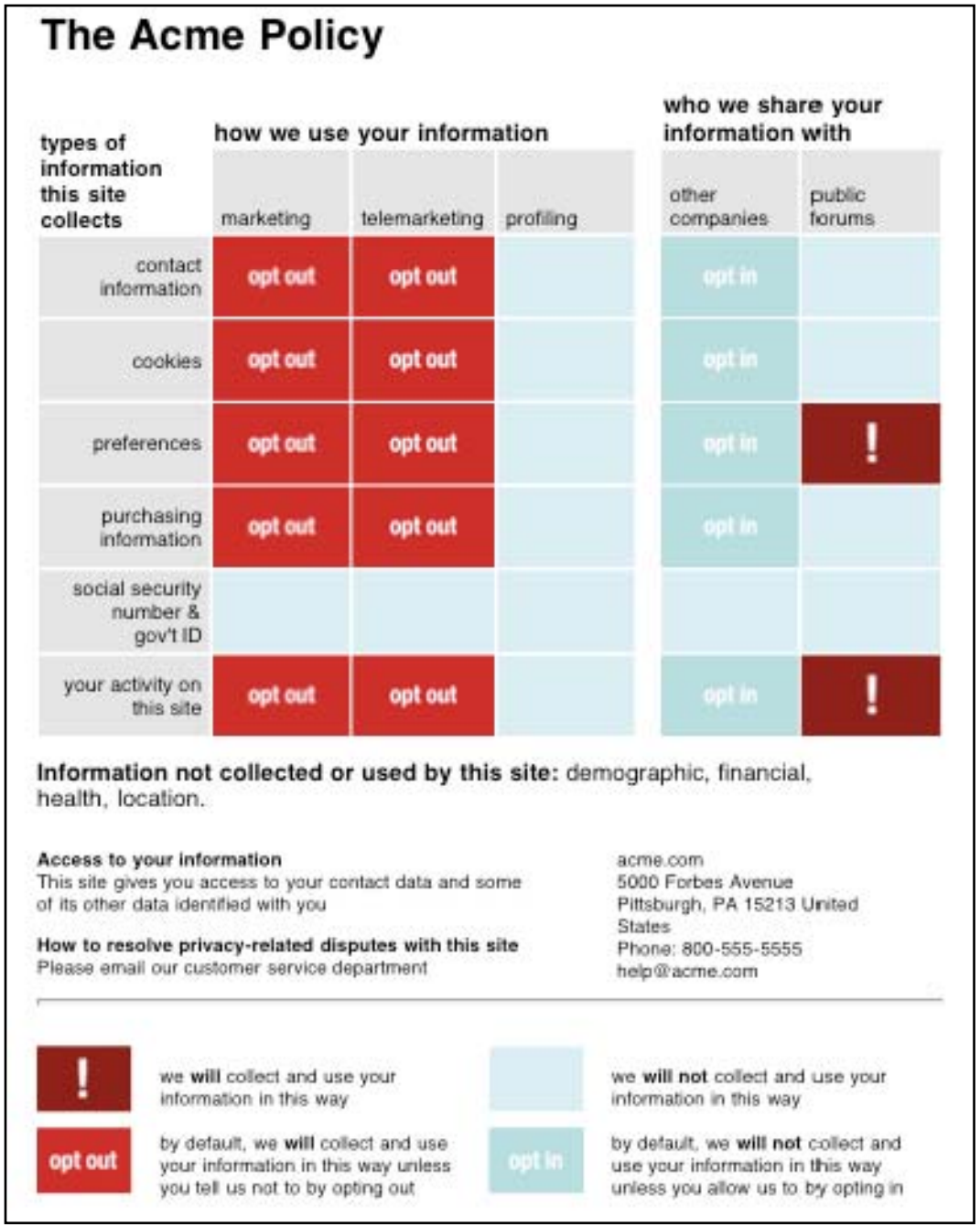
J. Tsai, S. Egelman, L. Cranor, and A. Acquisti. **The** Effect of Online Privacy Information on Purchasing Behavior: An Experimental Study. WEIS 2007. http://weis2007.econinfosec.org/papers/57.pdf

S. Egelman, J. Tsai, L. Cranor, and A. Acquisti. 2009. Timing is Everything? The Effects of Timing and Placement of Online Privacy Indicators. CHI2009. http://www.guanotronic.com/~serge/papers/chi09a.pdf

Nutrition labels for privacy

- Standard easy-to-read format
  - Makes it easy to find info and compare policies
- Work in progress: Iterating on design and conducting user studies

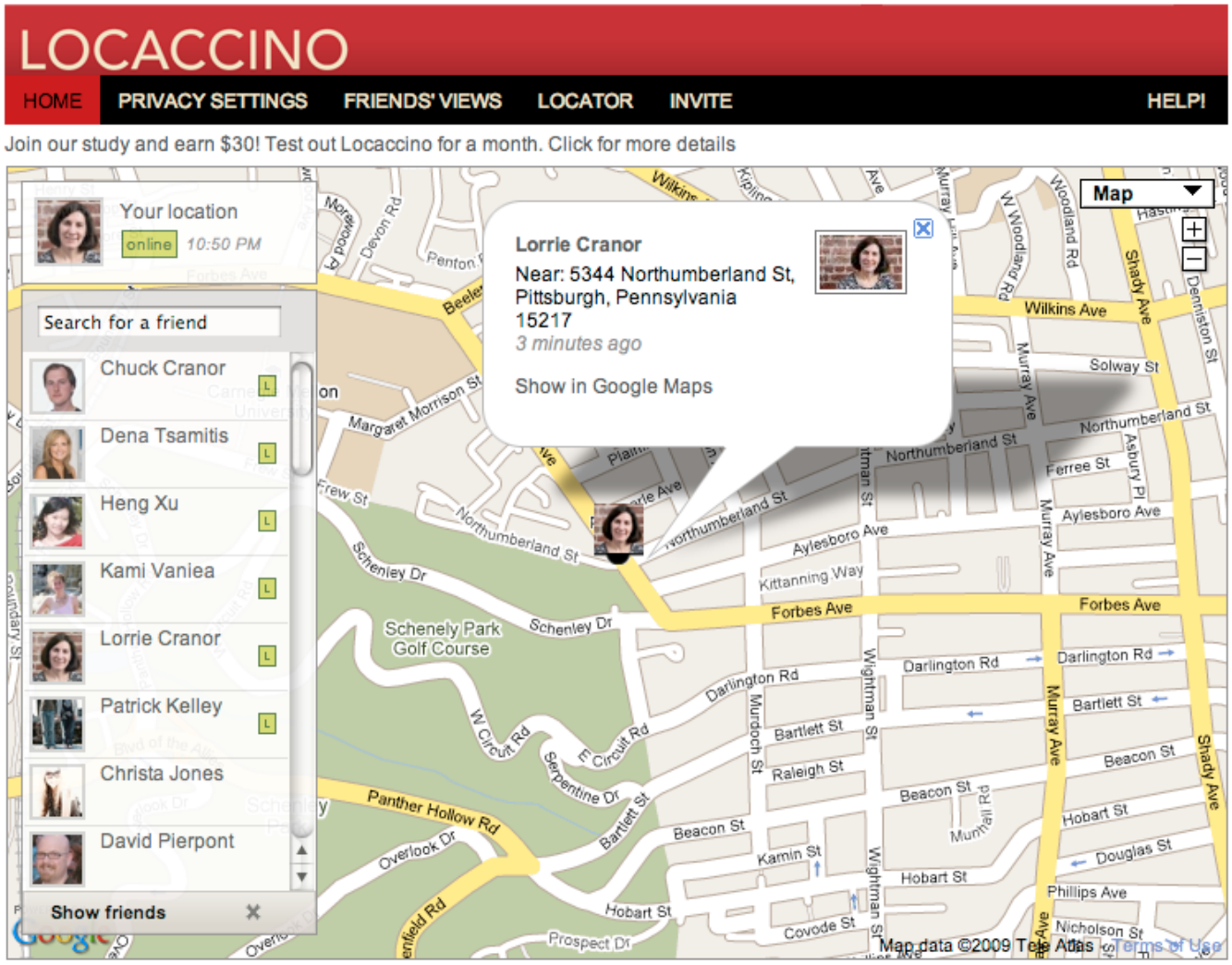
P. Kelley, J. Bresee, L. Cranor, and R. Reeder. A "Nutrition Label" for Privacy. SOUPS 2009. http://cups.cs.cmu.edu/soups/2009/proceedings/a4-kelley.pdf



Questions: privacy communication

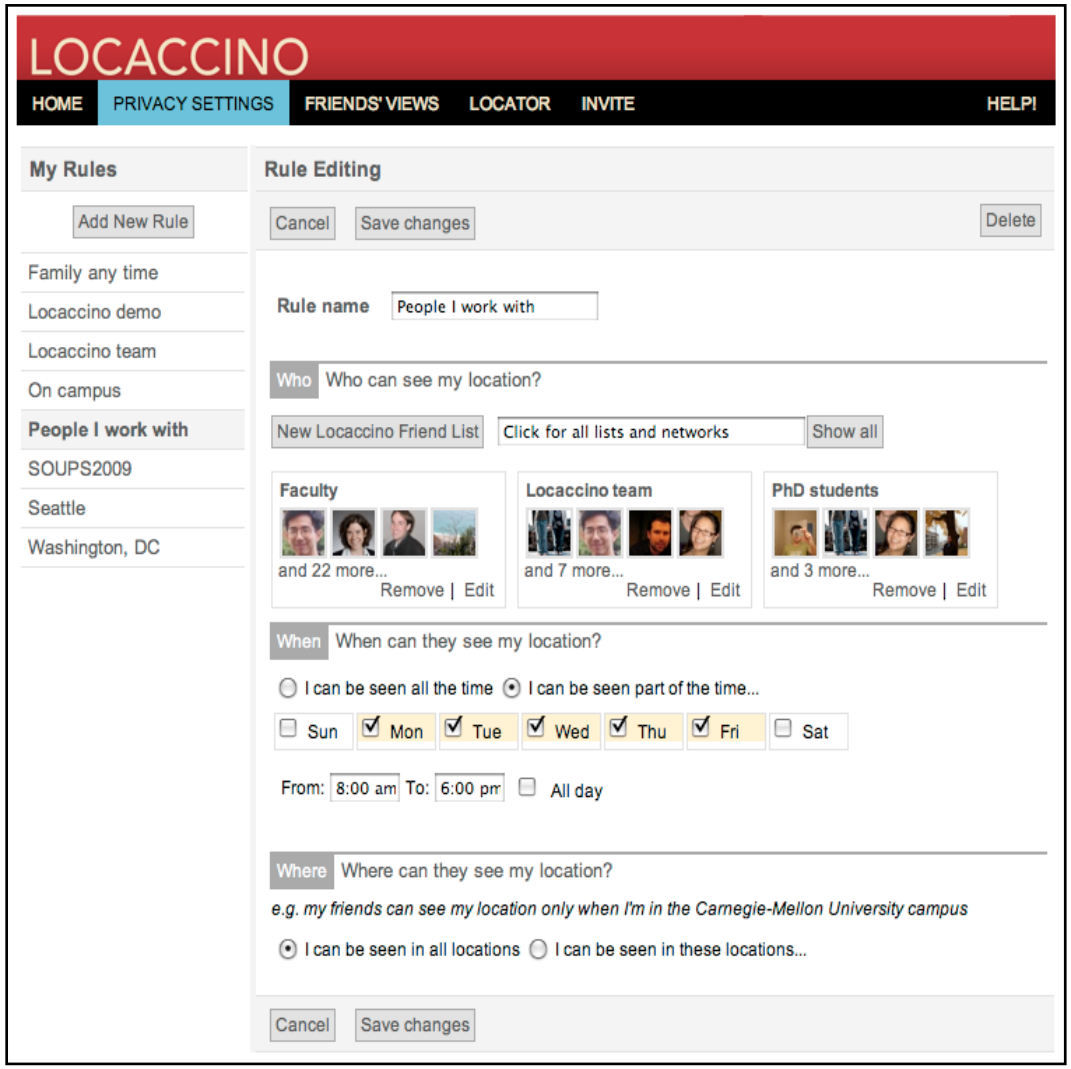
- How do we communicate meaningfully about how technology impacts privacy?
  - Behavioral advertising
  - Social networks
  - Deep packet inspection
  - Log files
  - Location sharing
- How do we help people understand privacy risks that may seem distant or not relevant to them today?
  - We have nothing to hide until it is too late
- Will different types of privacy communications be necessary for people of different cultures? Age? Gender?

Privacy in a location finding service

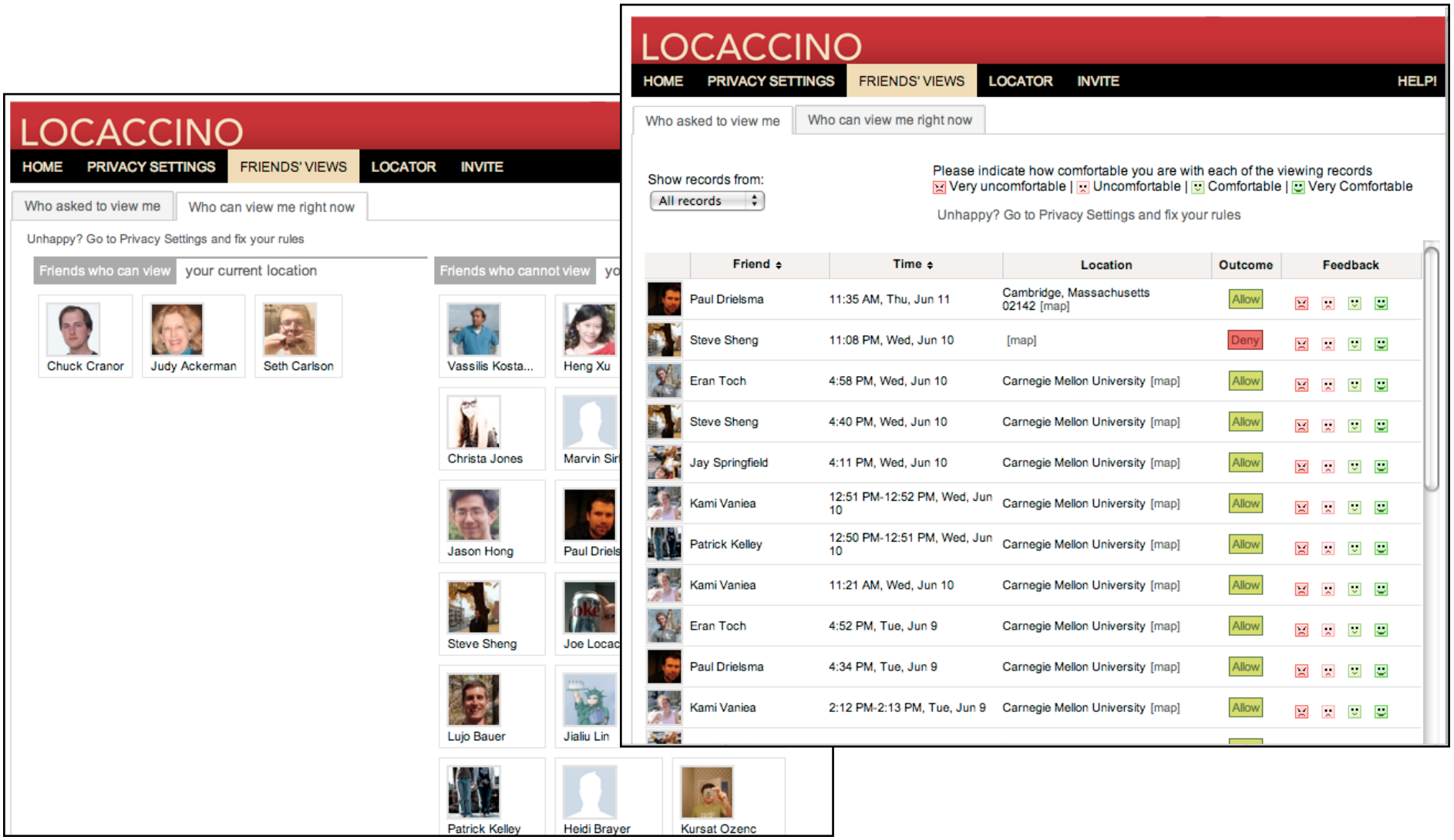


http://locaccino.org/

Privacy rules



Feedback


LOCACCINO
HOME
PRIVACY SETTINGS
FRIENDS' VIEWS
LOCATOR
INVITE
HELP!
Who asked to view me
Who can view me right now
Show records from:
All records
Please indicate how comfortable you are with each of the viewing records
Very uncomfortable | Uncomfortable | Comfortable | Very Comfortable
Unhappy? Go to Privacy Settings and fix your rules
Friend
Time
Location
Outcome
Feedback
Paul Drielsma 11:35 AM, Thu, Jun 11 Cambridge, Massachusetts 02142 [map] Allow
Steve Sheng 11:08 PM, Wed, Jun 10 [map] Deny
Eran Toch 4:58 PM, Wed, Jun 10 Carnegie Mellon University [map] Allow
Steve Sheng 4:40 PM, Wed, Jun 10 Carnegie Mellon University [map] Allow
Jay Springfield 4:11 PM, Wed, Jun 10 Carnegie Mellon University [map] Allow
Kami Vaniea 12:51 PM-12:52 PM, Wed, Jun 10 Carnegie Mellon University [map] Allow
Patrick Kelley 12:50 PM-12:51 PM, Wed, Jun 10 Carnegie Mellon University [map] Allow
Kami Vaniea 11:21 AM, Wed, Jun 10 Carnegie Mellon University [map] Allow
Eran Toch 4:52 PM, Tue, Jun 9 Carnegie Mellon University [map] Allow
Paul Drielsma 4:34 PM, Tue, Jun 9 Carnegie Mellon University [map] Allow
Kami Vaniea 2:12 PM-2:13 PM, Tue, Jun 9 Carnegie Mellon University [map] Allow
LOCACCINO
HOME
PRIVACY SETTINGS
FRIENDS' VIEWS
LOCATOR
INVITE
Who asked to view me
Who can view me right now
Unhappy? Go to Privacy Settings and fix your rules
Friends who can view
your current location
Friends who cannot view
Chuck Cranor
Judy Ackerman
Seth Carlson
Vassilis Kosta...
Heng Xu
Christa Jones
Jason Hong
Steve Sheng
Lujo Bauer
Jialiu Lin
Patrick Kelley
Heidi Brayer
Kursat Ozenc

Privacy configuration

- How do we simplify the creation of privacy rules?
- How do we allow people to easily set their privacy preferences up front for a range of applications?
- How do we help people realize when adjustments to these settings are needed and adjust them easily (or automatically?)

Privacy conflicts

- How do we balance the need to store information with the need to discard information to protect privacy?
  - Information used to provide feedback to users, automate privacy configuration, improve application functionality
- How do we balance the need to store access data for audit purposes with the need to protect employee privacy?
- How do we balance the need to discard information to protect privacy with the needs of law enforcement?
- Can we use technology to preserve privacy and enable all of the above?

Evaluating informed consent UIs

- Typical UI metric is successful completion of task
- Informed consent experiences result in fewer people completing task
- What metrics should we use?

Anonymity tools

- Anonymity tools typically hide users in cover traffic or send traffic via a circuitous route
- Users typically give up speed, convenience, functionality for anonymity
- Turning anonymity tools on and off is cumbersome and requires user action
- Can we provide anonymity without deteriorating user experience?

More questions

- As today's youth grow up with their lives online, will they come to expect less privacy?
- As we increasingly tradeoff privacy for convenience and functionality, are we doomed to a slow erosion of privacy that eventually leaves us with minimal expectations of privacy?
- Can "usable privacy" be designed into technology to provide convenience and functionality without sacrificing privacy?

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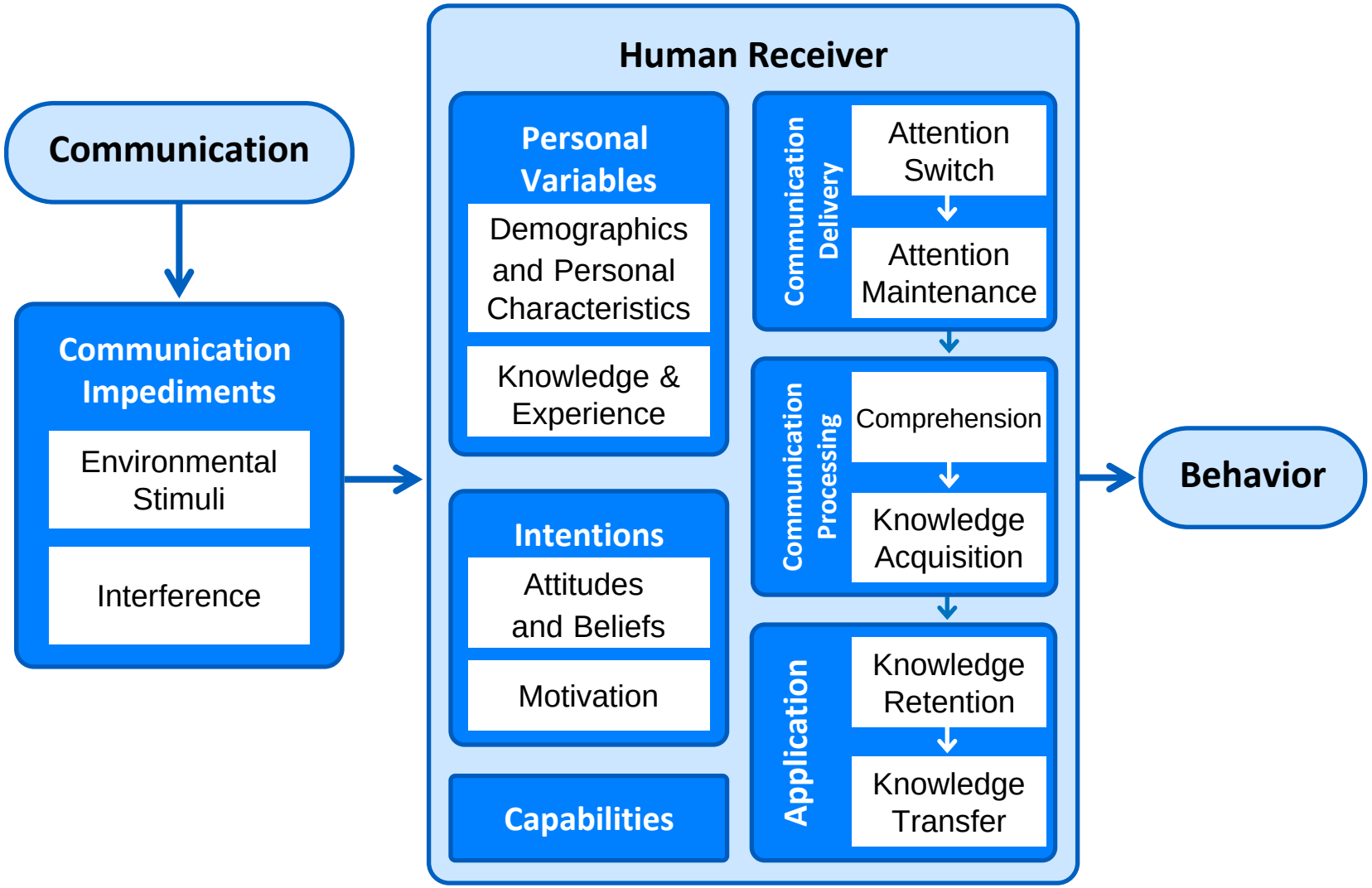
The human in the loop framework

- A model of all the ways that humans may fail to perform the actions expected of them when using a secure system

Human-in-the-loop framework



Human threat identification and mitigation process