

We put many aspects of our lives on the Internet...



...restricting who can access them is important!

NEW SCRUTINY FOR FACEBOOK OVER PREDATOS

The New York Times July 30, 2007

FACEBOOK POSES PRIVACY ISSUES FOR STUDENTS

THE DAILY of the University of Washington April 25, 2007

"After posting pictures from a Super Bowl party on Facebook, many of which showed his friends drinking from red cups, Beale was contacted by an HFS employee, who claimed he had violated his apartment contract. He was questioned by the employee, who wanted to know what was in the cups, and whether underage drinking had occurred, McCuin said."

OMG MY MOM JOINED FACEBOOK!!

The New York Times June 7, 2007

But managing all these logins, passwords, whitelists, blacklists, groups, and privacy controls is confusing, overwhelming, and inflexible. And formal access controls in social environments can feel rude!

Shared Knowledge Questions for Access Control

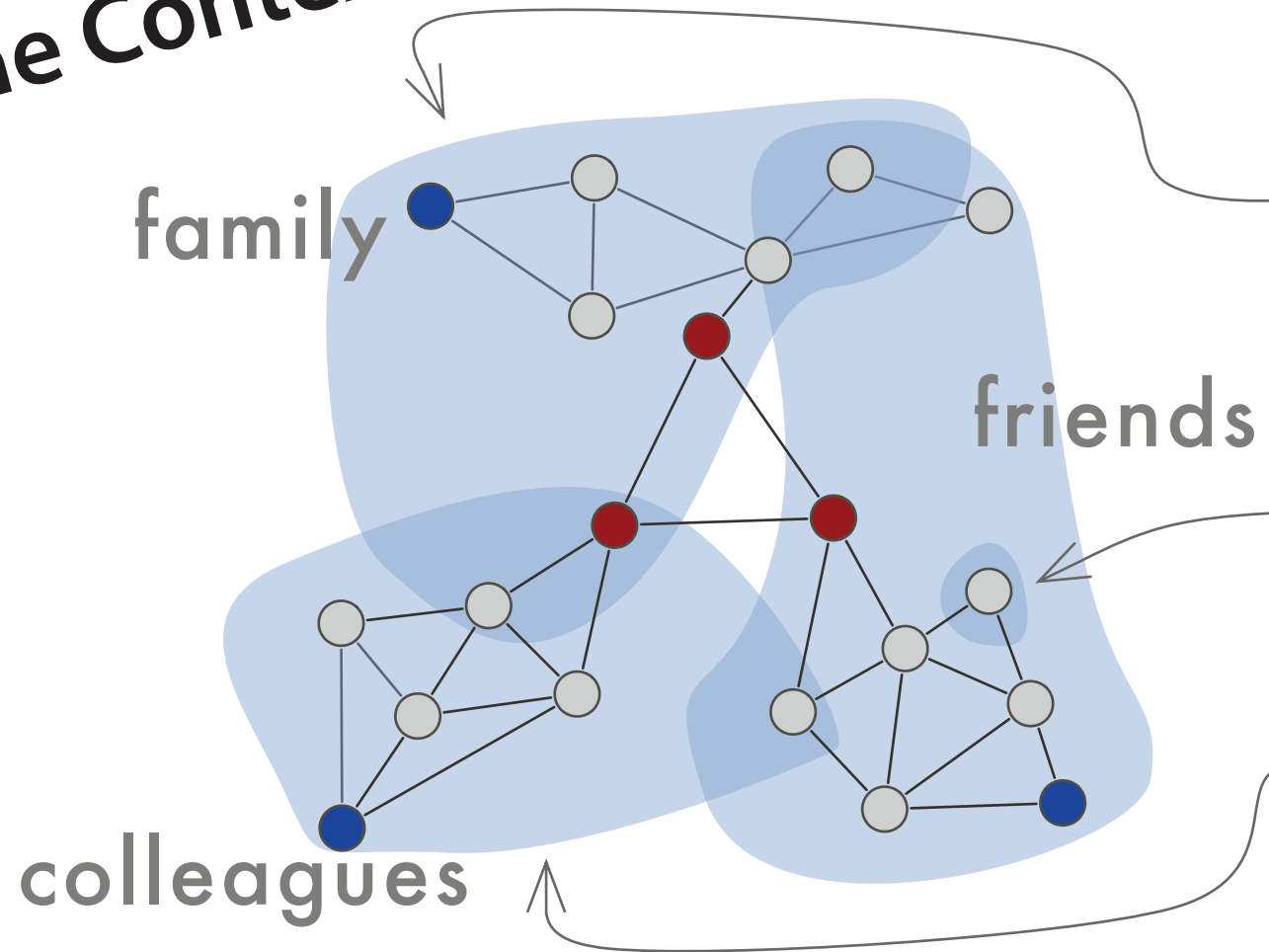
Prioritizing understandability, flexibility, and social tact over cryptographic rigor

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The Idea



The Context



What is cousin Lilly's favorite phrase?

Where did we first kiss?

Where did we hatch plans for our internet startup?

A concise question of shared knowledge can implicitly define a region of friends or cohorts in a social network, without explicitly describing the network or its cliques

Study

39 subjects collected 174 photos they wanted to share with some people, but not everyone

Who subjects desired to see and not to see photos:

Category of person or group of people	Desired		Undesired	
	Freq.	Imp.	Freq.	Imp.
Friends	90%	2.2	41%	3.0
Family	76%	2.4	79%	3.0
Strangers	0%	--	72%	2.8
Specific people by name	46%	2.8	24%	2.4
Common interest group	38%	1.7	41%	3.0
Friends of photographed	34%	2.5	0%	--
Authority figures	21%	3.2	42%	3.0
Ex-friends and romances	0%	--	14%	2.7
Potential romances and employers	10%	3.5	7%	3.6

58% of subjects had privacy preferences that today's photo sharing sites cannot support.

Freq is percentage of responses; Imp. is mean rated importance on a 1-4 ordinal scale.

Subjects designed a shared knowledge question to guard each photo

Question Type	Example Question	Freq.
About themselves	What's my favorite spirit for mixed drinks?	48%
Knowledge of a mutual friend	What was the name of Susan's hairy dog?	13%
About a specific place or event	In what country did I work in Europe?	12%
About the guesser	What river did we float down for Keith's B-Day?	10%
Inside joke or reference	Spiky red hair on the dance floor drink	8%
General Knowledge	The "AP" in AP Stats stands for?	6%

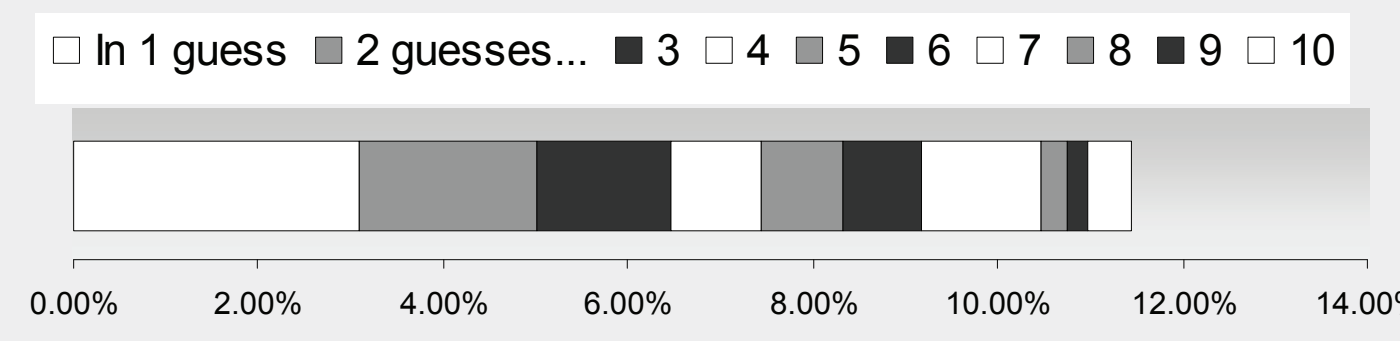
Subjects successfully created questions for 98% of photos, suggesting shared knowledge exists to separate most inclusion/exclusion groups.

Took 8 seconds (median) to design a guard question. Compare with 54 seconds to create a 6-person whitelist.

Resilience to adversarial attack

Anonymous Amazon Mechanical Turk workers were rewarded to guess answers with 75¢ for a correct guess in first 3 tries, and 25¢ for one in 10

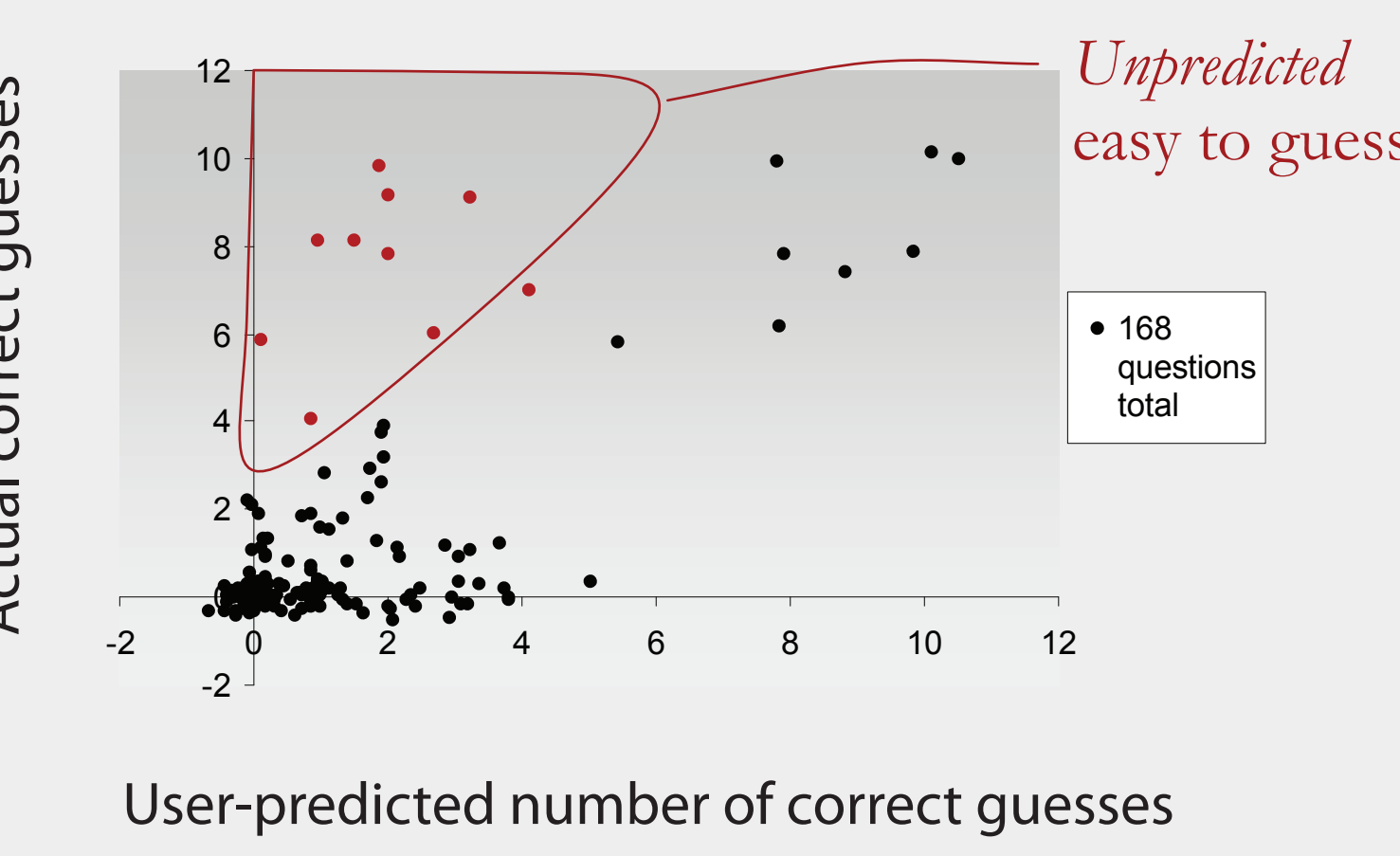
Percent of correct guesses in each of 10 attempts:



If system allows 3 guesses, there is a 6% chance of a random stranger guessing correctly.

Users accurately estimate hardness of most questions

Number of 10 strangers able to correctly guess answers to each question (10 attempts each) compared to estimates



Sharer may just want it hard, not impossible, for internet passers-by to view photos.

The dangerous **unpredicted easy** questions, in upper-left, are only 4-6% of all questions.

Of these seven, five were choices from a small set of options ("What day of the week...") and two were googleable ("What train stops in Seattle and ends at a Winery?")