New Directions in Social Authentication

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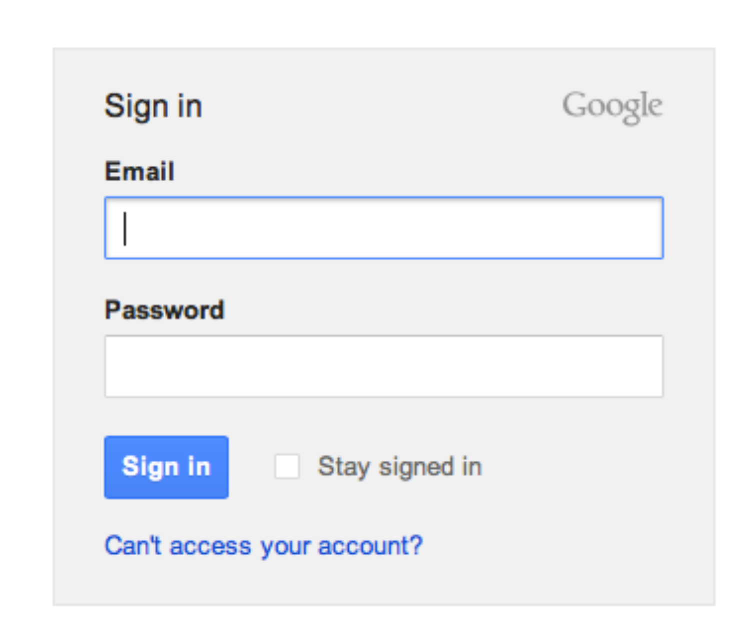
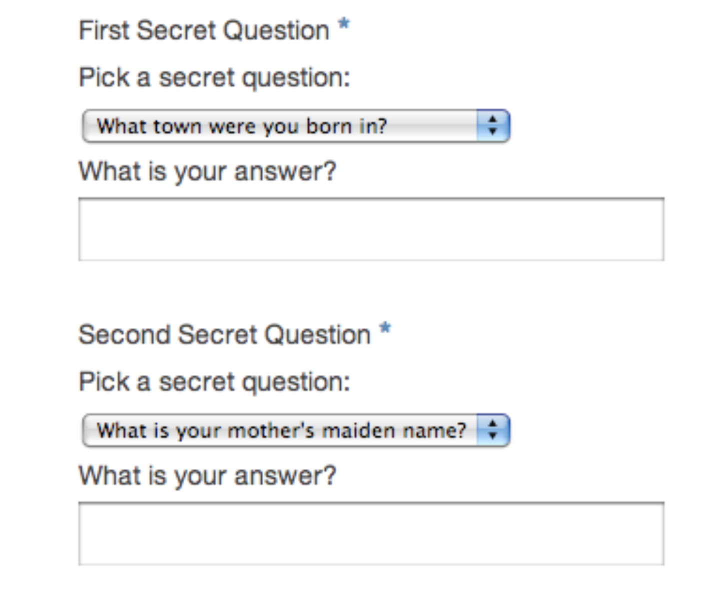
Shortcomings in commonly used authentication systems




First Secret Question *

Pick a secret question:

What town were you born in?

What is your answer?

Second Secret Question *

Pick a secret question:

What is your mother's maiden name?

What is your answer?

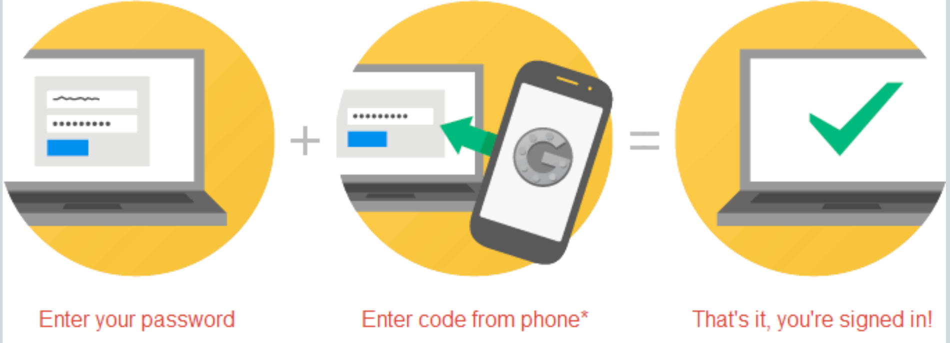
Passwords:

- Same across websites
- Prone to dictionary attacks
- Do not tend to change with time

Secret Questions:

- Users forget the answers to difficult questions
- Answers do not tend to change with time

Shortcomings in commonly used authentication systems

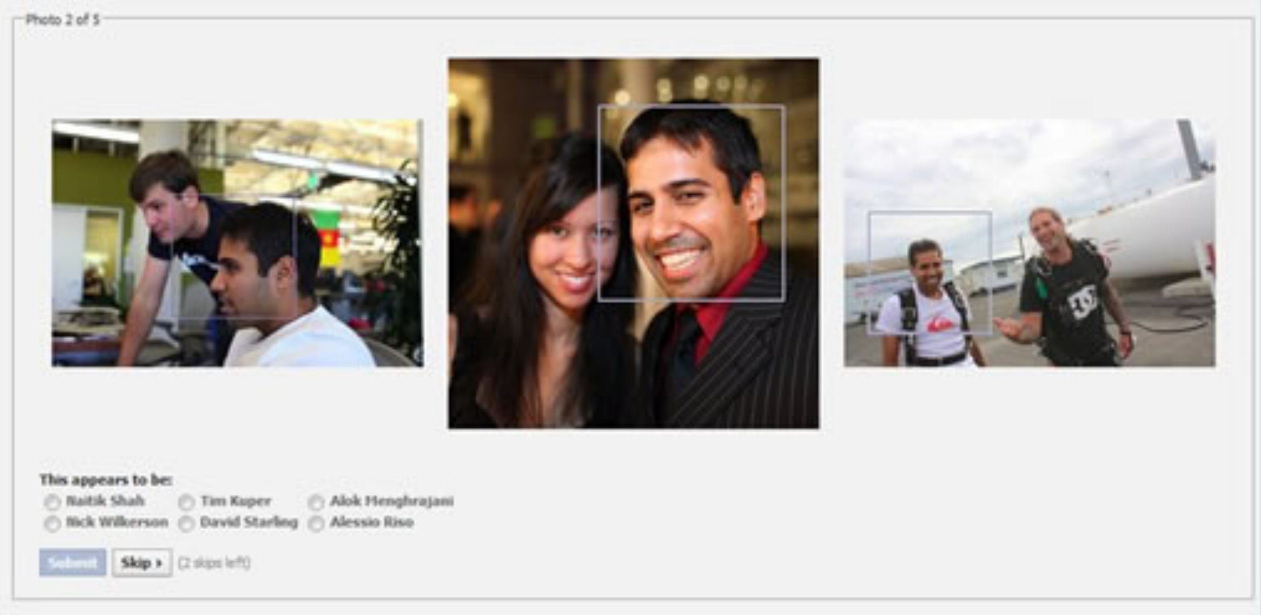


Two Factor Authentication

- Security better than previous two but very inconvenient

Social Authentication

Using information from a user’s social network to authenticate him/her



- Prone to attacks that employ face recognition attacks

[ACSAC ‘12] I. Polalkis, et al. "All your face are belong to us: breaking Facebook's social authentication”

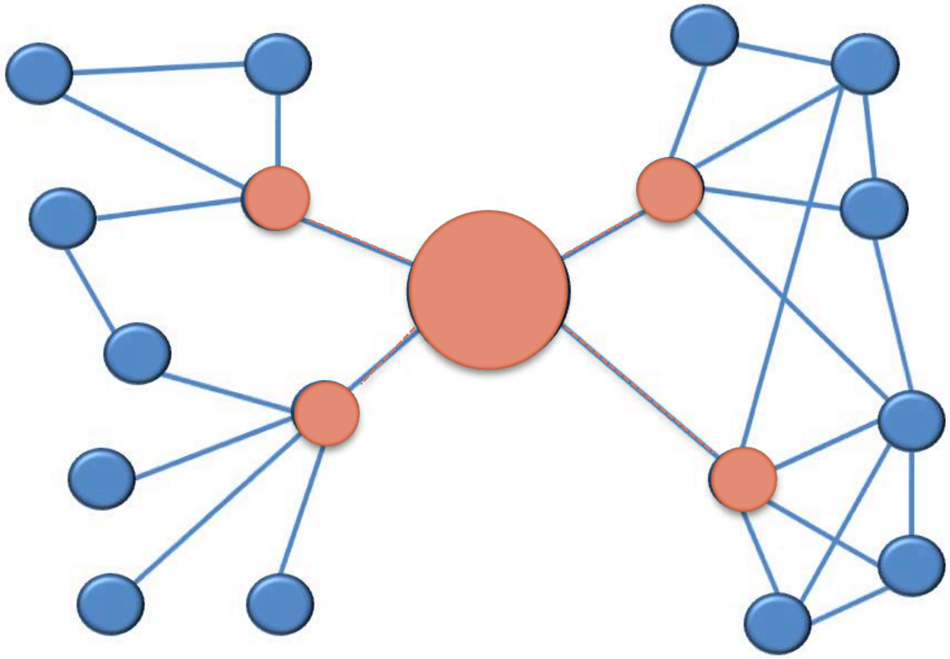
- Attacks by user’s friends

[FC ’12] H. Kim, et. al. “Social authentication: Harder than it looks”

Contributions

Information in a user's social network is ever changing! Can we use this to get rid of static nature of secrets?

- Rethink the space of social authentication challenges beyond photographs and provide a systematic way to explore the same
- Proof-of-concept implementation on Facebook users
- Pilot user study and usability evaluation of the Facebook prototype



Challenge Format:

Given some criteria, identify the connection that matches it

Desirable properties of a challenge

Usability:

Reliability: Pr [true user can correctly solve the challenge]

Applicability: Pr [at least one connection matches the challenge criteria]

Security:

Pr [attacker is able to correctly solve the challenge]

Edge

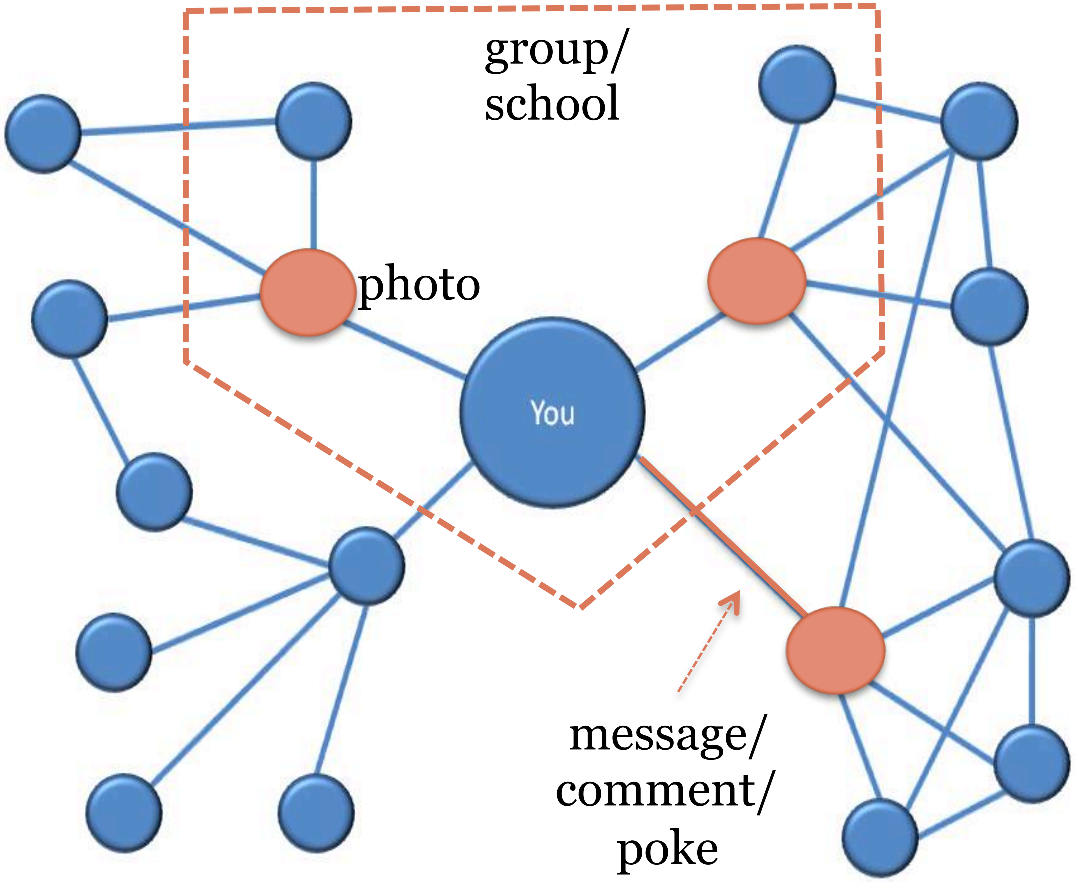
- e.g., message
  - comment
  - poke

Pseudo-edge

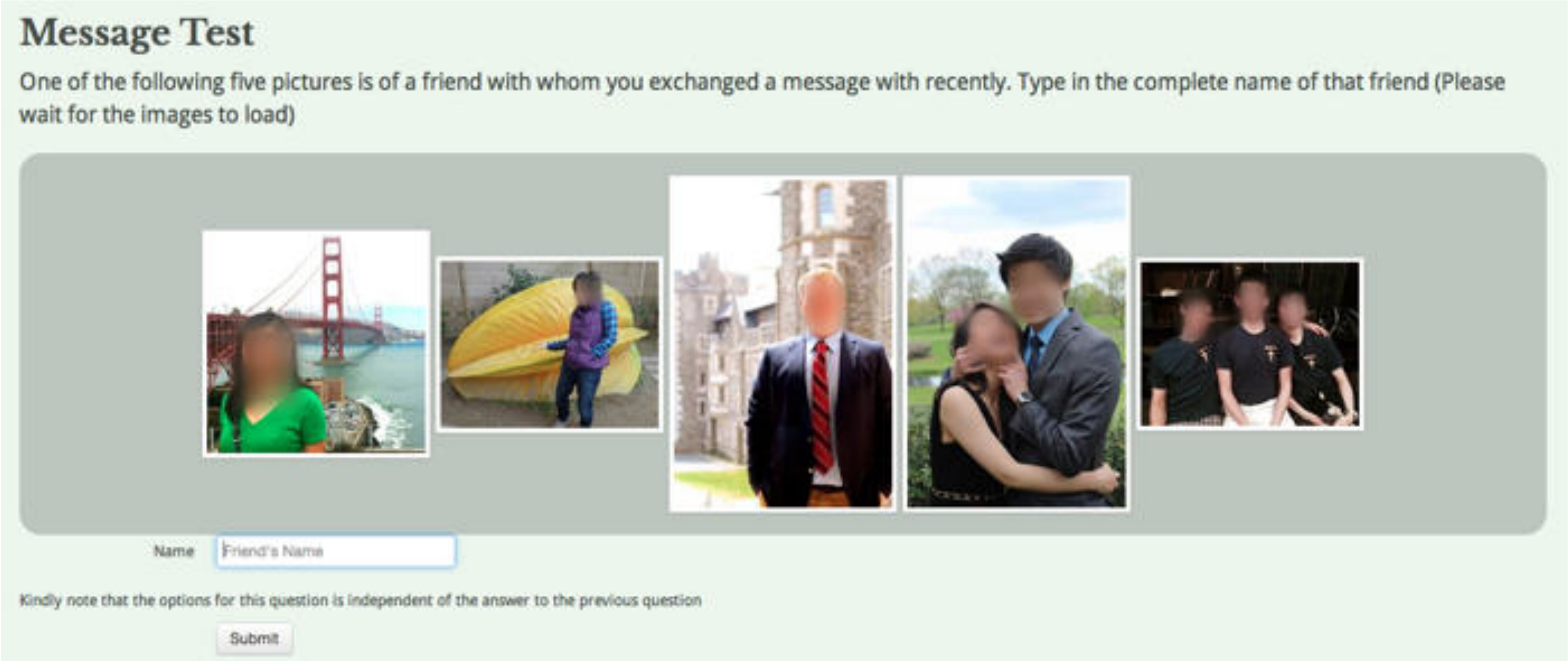
- e.g., group
  - school

Node

- e.g., photo
  - hometown



Facebook Prototype



Message Test

One of the following five pictures is of a friend with whom you exchanged a message with recently. Type in the complete name of that friend (Please wait for the images to load)

Name: Friend's Name

Kindly note that the options for this question is independent of the answer to the previous question

Facebook Prototype

Question	Type
Name the friend tagged in the photo	Node
Name the friend you went to same school with	Pseudo-edge
Name the friend you recently poked	Edge
Name the friend you recently sent a message	Edge

Answer Format: Type in the name of a matching connection *(edit distance used to accommodate for spelling errors)*

User Study

Number of participants: 90

Recruitment:

- Amazon Mechanical Turk
- $5 on completing the survey

Age distribution:

18-24	42%
25-34	39%
35+	19%

Usability Results of Prototype

Type	Question	Reliability	Applicability
Node	Friend tagged in the photo	28% ±9%	77% ± 8%
Pseudo-edge	Friend you went to same school with	54% ± 10%	51% ± 10%
Edge	Friend you recently poked	71% ± 9%	48% ± 10%
Edge	Friend you recently sent a message	66% ± 10%	98% ± 2%

Future Work

- Results are skewed by selection of question criteria. Design a broader set of questions within each category
- Compare our prototype with Facebook's existing social authentication system
- Compare usability and security of various answer types
  - Text box without options
  - Radio buttons

Discussion

- Replacing passwords?
  - Proposed model is intended to be an auxiliary authentication mode, not a primary one
- Privacy Implications:
  - Leakage of information like message exchanges
  - Note that user is confirmed via primary authentication
- Security:
  - Depends on user's privacy
  - Edge > Pseudo-edge > Node

Questions?