Pitfalls of Shoulder Surfing Studies

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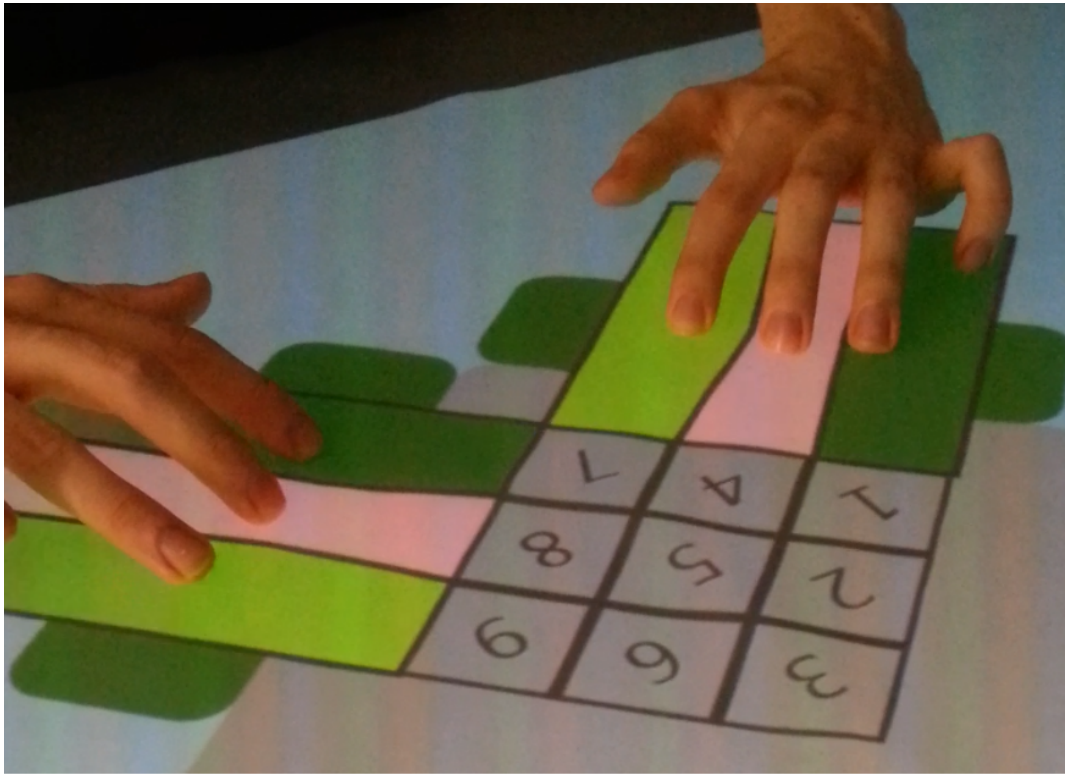
Shoulder Surfer: Scenario

Source: http://www.inthebag.org.uk/wp-content/uploads/2011/12/Shoulder-surfing-MO.jpg

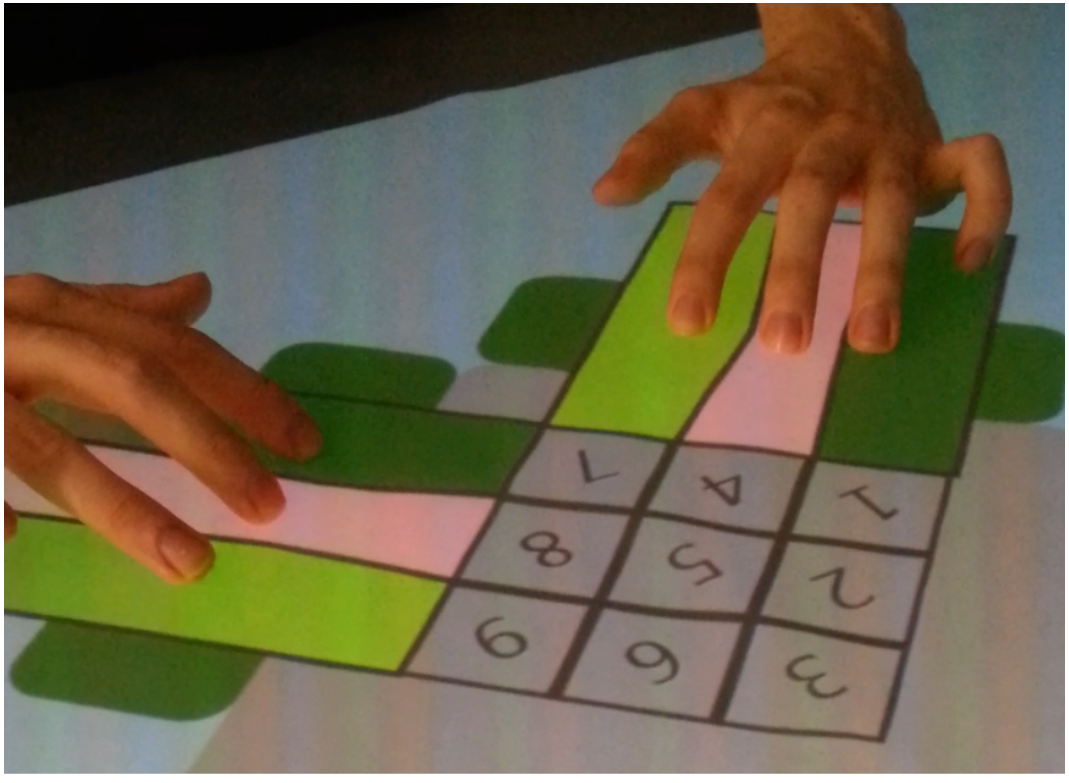
Goals of the adversary:

- Observe an authentication session.
- Authenticate as the user.



User authentication with PressureGrid

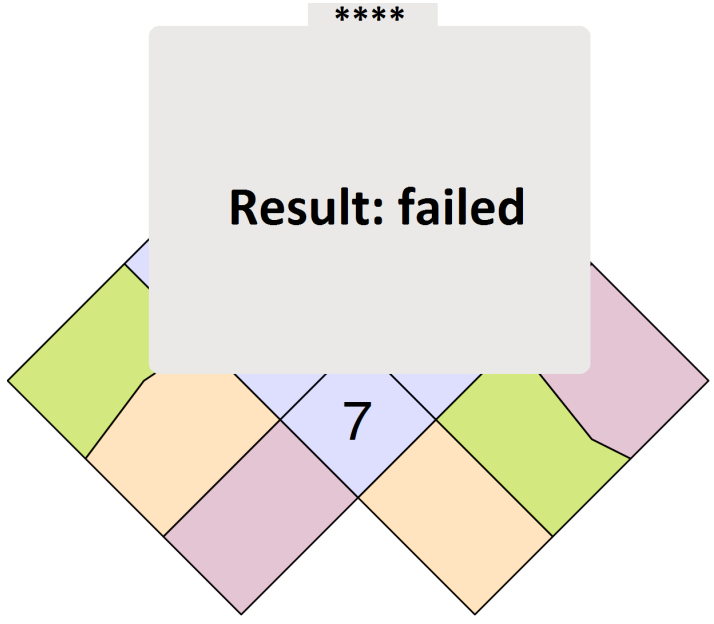
Input Methods and Input Errors



User authentication with PressureGrid

Input Methods and Input Errors

Adversary inputs a guess:



Reasons of failure:

- Guessed the wrong number.
- Inputed the wrong number.

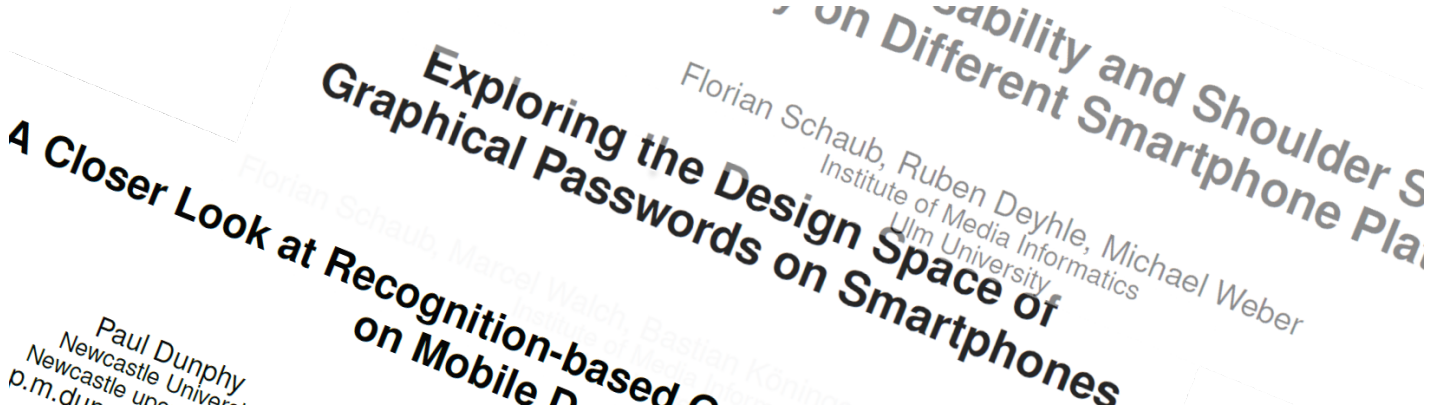
Input Methods and Input Errors

. . . can lead to an under-estimation of risk.

We shall . . .

. . . *verify adversaries report what they intend to report.*

. . . *measure the success without input errors.*



An Approach against Input Errors

One authentication session of four digit pin:

Guess of adversary:

1

~~1~~	2	3
4	5	6
7	8	9

2

1	2	3
4	~~5~~	6
7	8	9

3

1	~~2~~	3
4	5	6
7	8	9

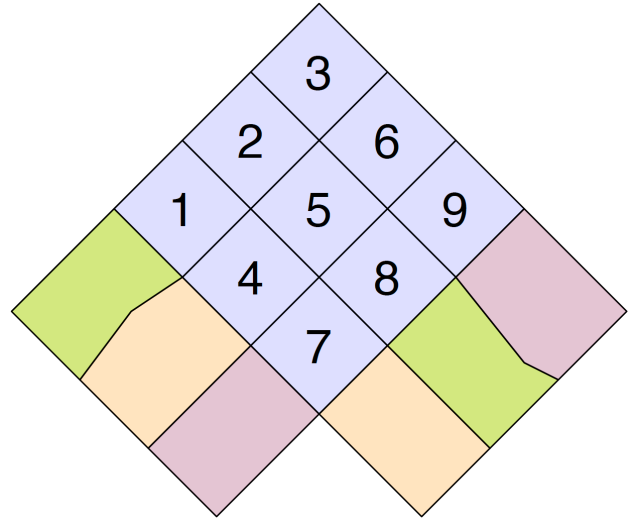
4

~~1~~	2	3
4	5	6
7	8	9

Isolating the Source of Security

Increasing security of PressureGrid through:

- Flickering lights
- Minimizing the finger movement
- The distance between hands
- Two dimension input



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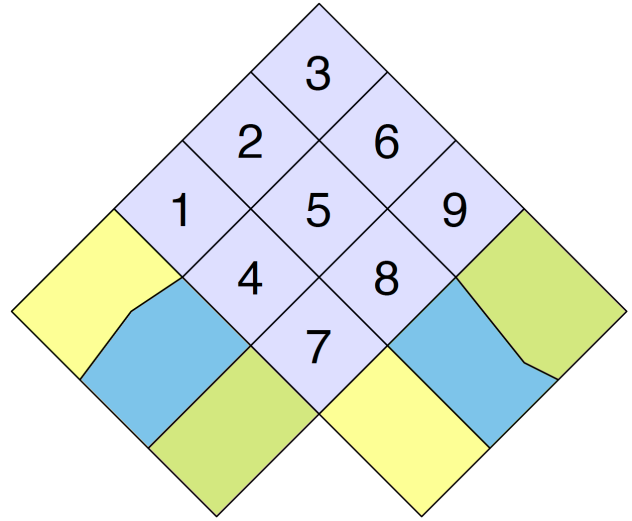

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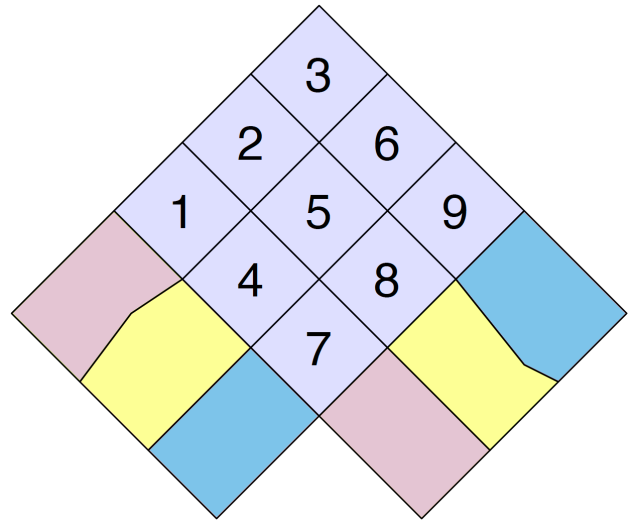

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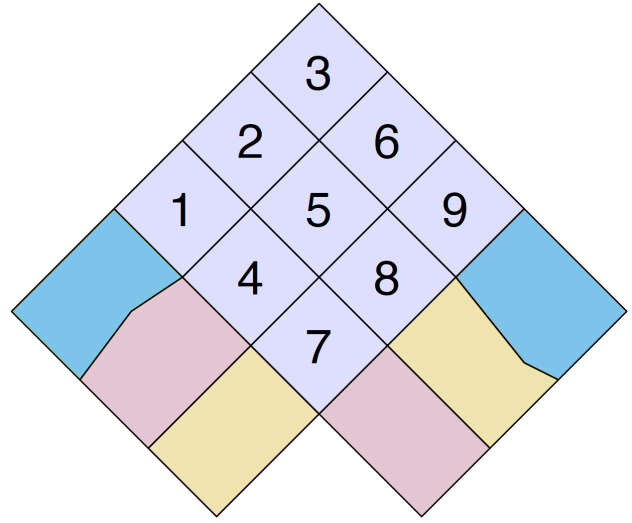


Isolating the Source of Security

Kim et al. studied them jointly.

Which elements have a high impact for the security? Which marginally?

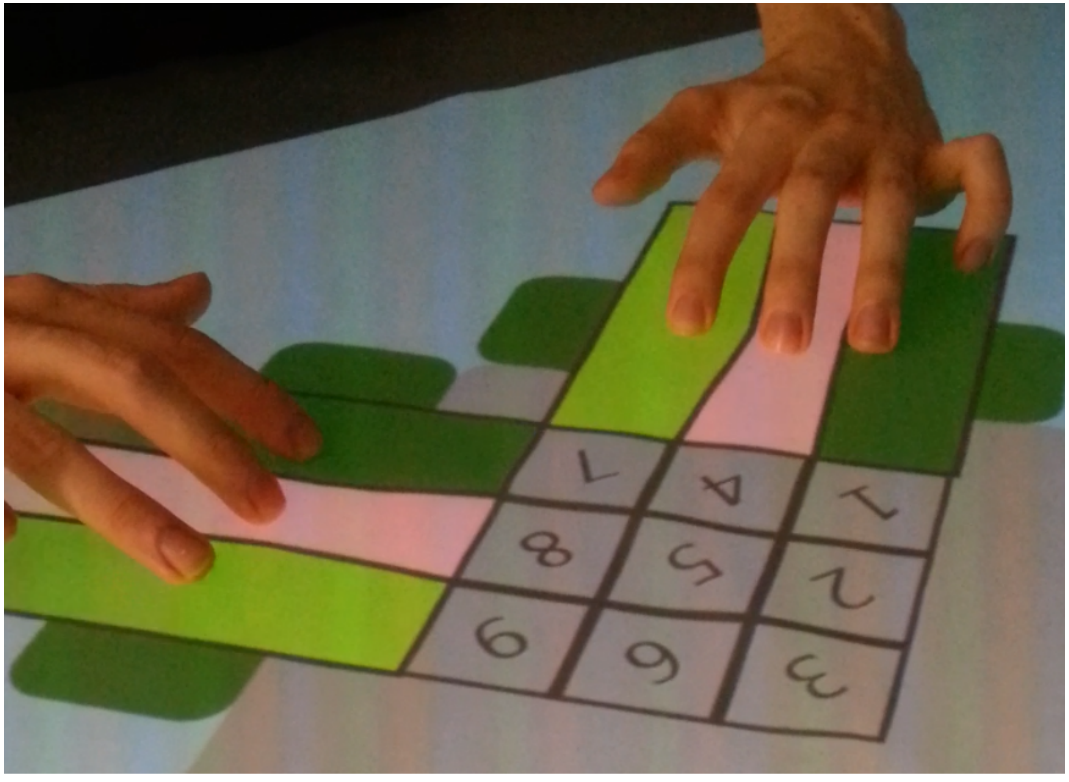
We shall . . .

. . . *isolate the core contributors in an empirical study.*

Simulation of the Adversary: Strategies

Freie Universität Berlin

PressurePIN:

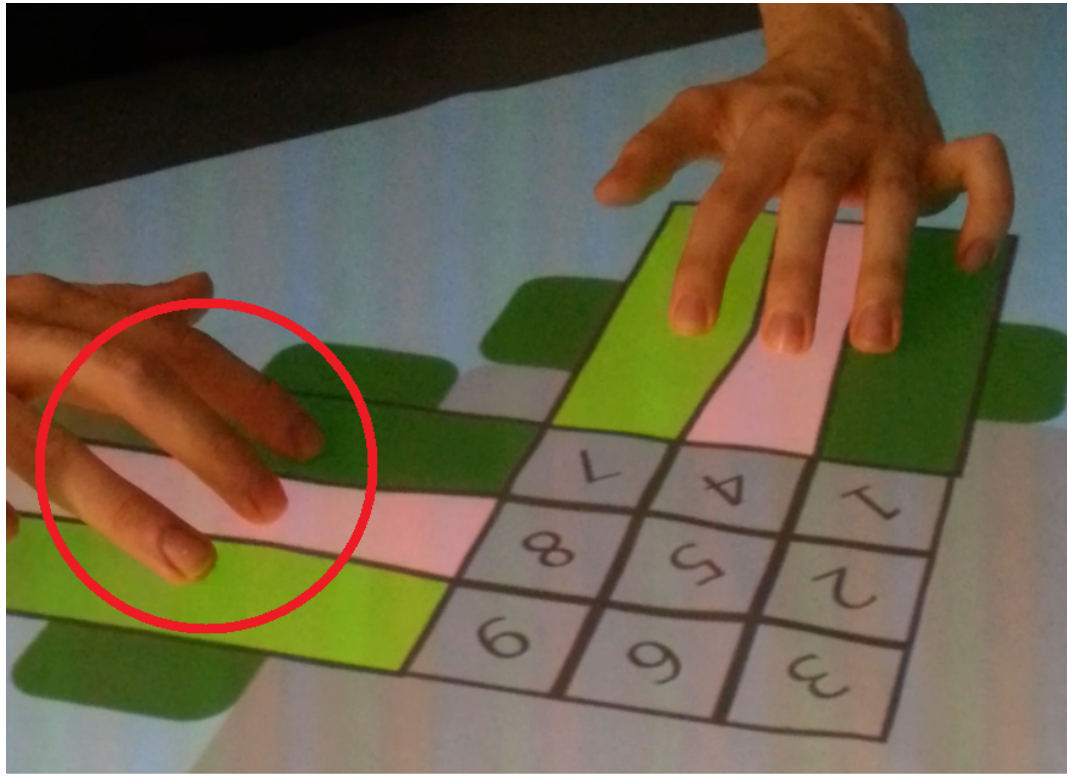


- 2 of 14 adversaries broke PressurePIN.

Simulation of the Adversary: Strategies

Freie Universität Berlin

First observation:



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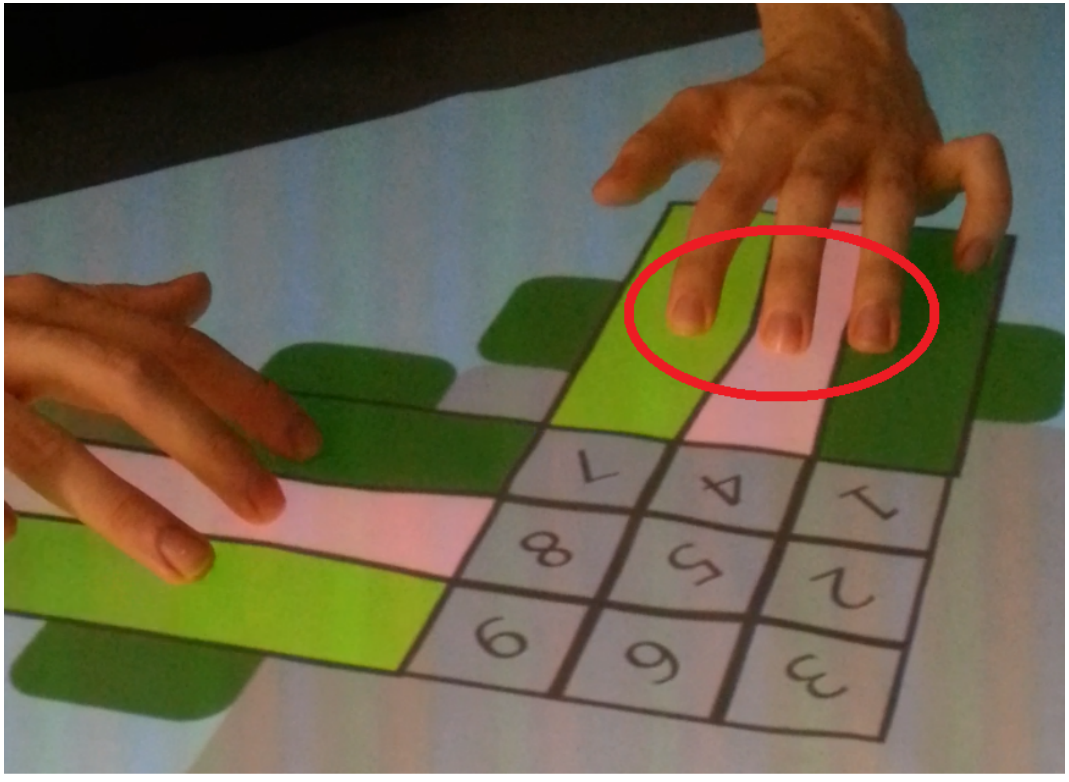
Simulation of the Adversary: Strategies

Second observation:



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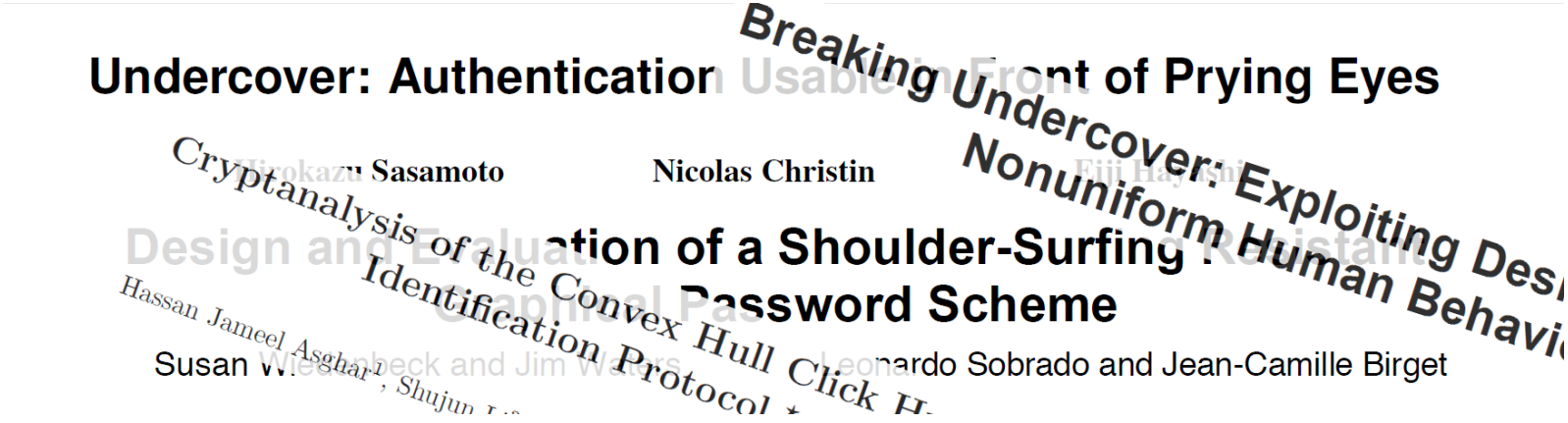
Simulation of the Adversary: Strategies

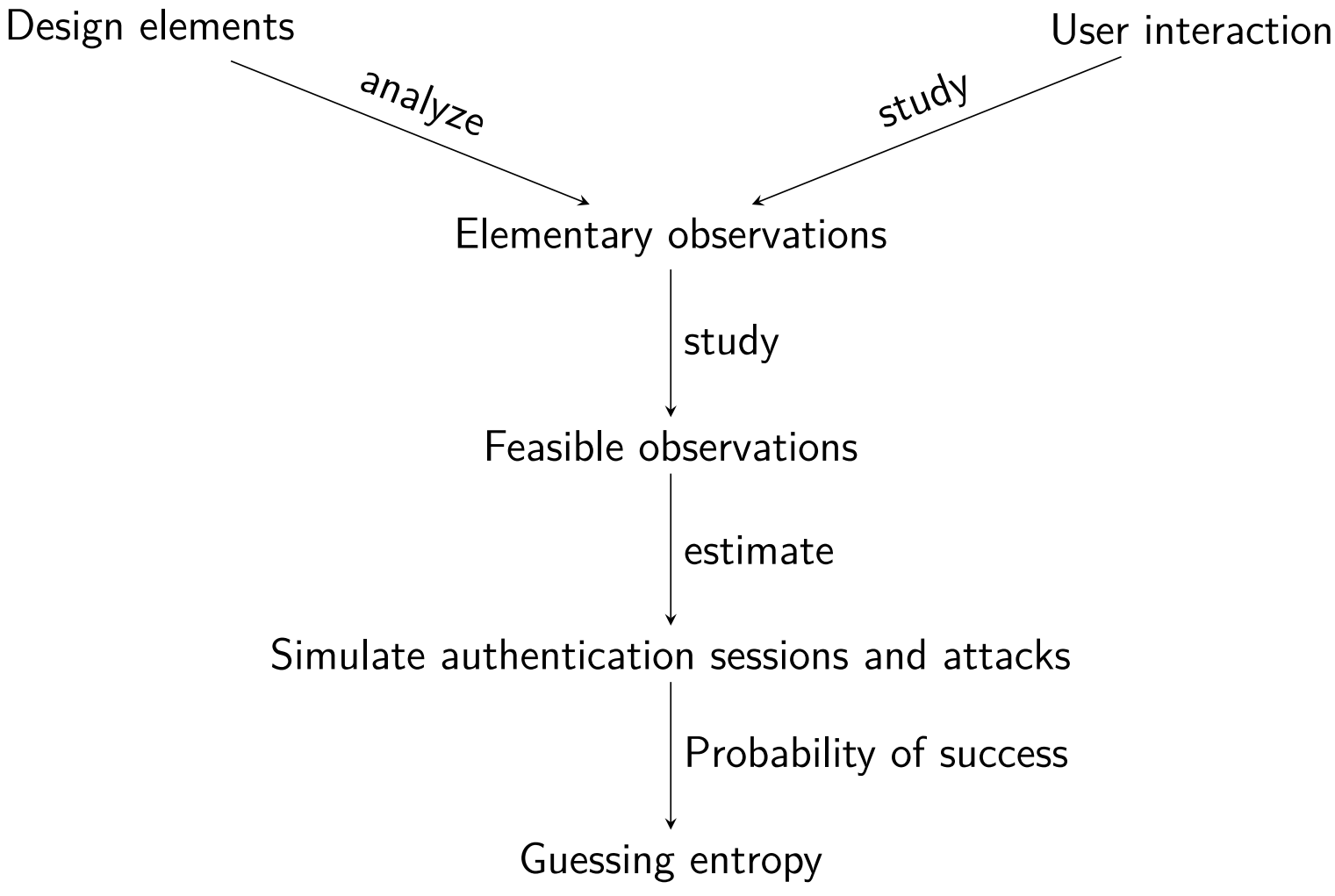
- Participants may not find or use strategies.
- Real adversaries find, learn and use strategies.
- Can lead to an under-estimation of risk.

We shall . . .

. . . take observation strategies into account in an empirical study.



Outlook: An Approach to handle Strategies



Summary

We talked about:

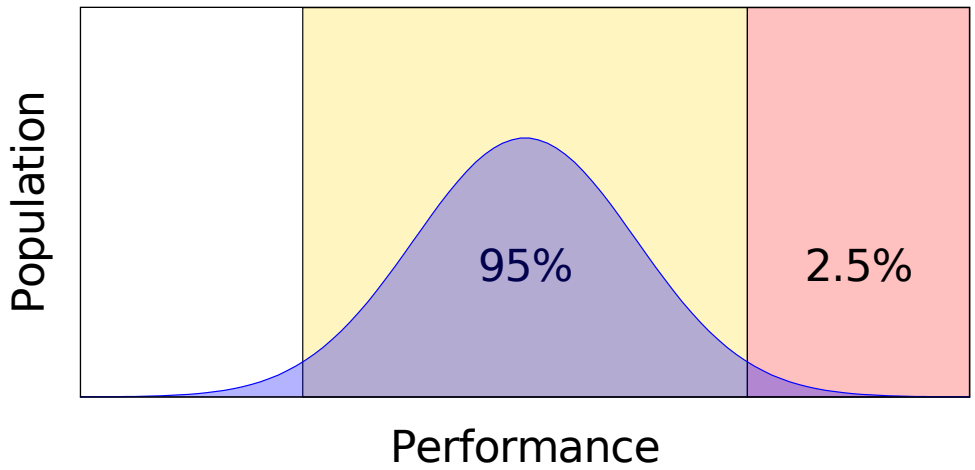
- Input methods and input errors of the adversary
- Isolating the source of security
- Strategies in studies

More in our paper about:

- Side-Channels due to user behavior
- The adversary
- ...

Conclusion

- Study design and report is important.
- Studying security is different from usability.



In security we are also interested beyond the mean.

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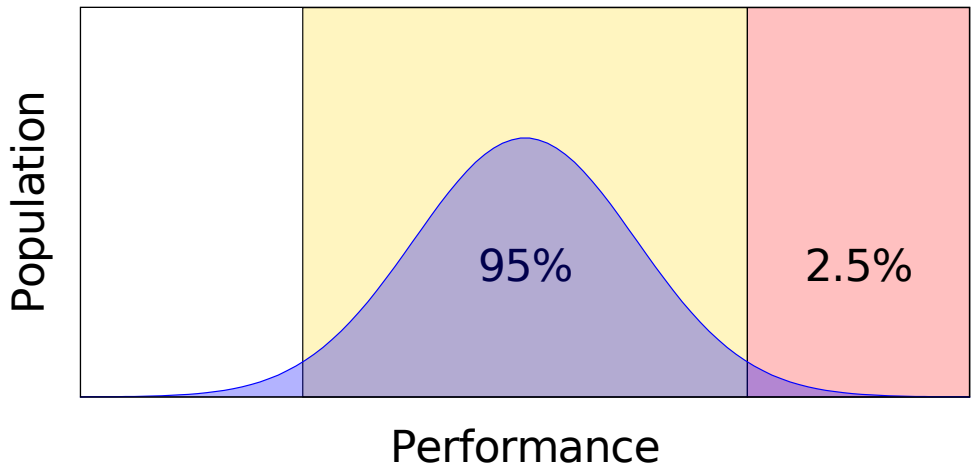

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Future work: Finding new ways of security analysis

Questions and Discussion

Thank you for your attention!

What are your experience with security and usability studies?

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