Privacy in Social Networks
Existing Challenges and Proposals for Solution

Prof. Dr. Günther Pernul
Department of Information Systems, University of Regensburg

Agenda
- Motivation
  - Privacy Settings in Online Social Networks
  - OSN Stakeholders and Implications for Privacy
  - Enhancing Privacy on the Provider Side
  - Addressing User Awareness
  - Conclusions
Who can really see what I am posting?

Public Tweet of a British woman on the Ukraine crisis
> 45 %

underestimate the visibility of at least one of their items*


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Online Social Network (OSN)

- **Three criteria for Online Social Networks**
  - Create own profile
  - Express relationships
  - Traverse "Social Graph"

- **OSNs in the narrow sense can be further categorized**
  - Topic-specific vs. general-purpose
  - Regional vs. worldwide audience
  - Open vs. Closed OSNs

- **Privacy Paradox**
  - Participation in OSNs requires the disclosure of personal information
  - Increasing usage of OSNs
  - But at the same time: Increased concerns regarding privacy towards service providers and towards other users

Privacy Settings on OSNs

- **Primary means to manage information flow**
- **Determines who can see a shared item**
- **Several options available**
  - Only me
  - Friends
  - Friends-of-Friends
  - Public
  - Custom
3 perspectives to look at Privacy Settings

- Actual privacy setting
  - Lookup using OSN API
    - Lack of awareness
      - Collected from user
    - Lack of control
      - Collected from user

Perceived privacy setting

Preferred privacy setting

Conceptualization of User Study

- **Research questions**
  - Do OSN users understand the visibility implications of an OSN access control model? (Awareness)
  - Do OSN users' preferred visibility settings differ from the actual visibility settings? (Control)

- **Participants**
  - 68 participants (after cleansing)
  - Average age: 23.93 years
  - Mostly academic background (95.59 %)

**Gender distribution**

- Male
- Female

**IT background**

- Yes
- No
User Study Design

Questionnaire on default settings

Questionnaire on item sharing

Hypotheses – Conceptual example

Perceived Default Settings

Actual Default Settings

Preferred Default Settings
Default Settings – Results

Users underestimate the scope of the default visibility settings on Facebook (Awareness)

Default Settings – Results

Users would like to have default visibility settings on Facebook that are more restrictive (Control)
Item Sharing – Conceptual Example

Item Sharing – Results (Awareness)

**Item-oriented results:**
567 items analyzed x 15 contacts = 8,505 stated binary visibility perceptions

**Participant-oriented results:**
N = 68 participants

17.9 % mismatch
(over- and underestimation)

45 % underestimate the visibility of at least one item
Item Sharing – Results (Control)

**Item-oriented results:**
567 items analyzed x 15 contacts = 8,505 stated binary visibility preferences

24.6% mismatch (preferences for both more and less restrictive settings)

**Participant-oriented results:**
N = 68 participants

64% want more restrictive visibility settings for at least one item

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OSN Stakeholders and Dependencies

User

Platform

Service Provider

Means to manage identities, access, and relations

provides

for

has inherent properties

operates

enables

influences

Persistance, searchability, ...

Persistence, searchability, ...
Social Identity Management

24/7

Work, Family, Sports club

Access Control Model
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Protection Against Profiling: Decentralization

- Decentralized / user-centric approach prevents the service provider from accessing personal information
- Example: Diaspora*
Access Policy Grid* - lack of control

- Step 1: Retrieve a user's items as well as their visibility settings and illustrate them in a matrix
- Step 2: Sort this matrix to identify similar contacts and similar users (as well as possible errors)

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Do you know who can see your Facebook profile?

Playfully discover who can see your shared items and get advice to improve your privacy.

www.friend-inspector.org
**Friend Inspector***

- Serious game to enhance privacy awareness on OSNs
- Playfully compare perceived and actual visibility

**Learning objectives:**
- Enhance privacy awareness
- Learn about privacy settings

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* Cetto, A., Netter, M., Pernul, G., Richthammer, C., Riesner, M., Roth, C., Sänger, J., "Friend Inspector: A Serious Game to Enhance Privacy Awareness in Social Networks" (Best Paper Award), In Proc. of the 2nd International Workshop on Intelligent Digital Games for Empowerment and Inclusion (IDGEI), 2014

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**Step 1 – Motivation**

*Do you know who can see your Facebook profile?* Playfully discover who can see your shared items and get advice to improve your privacy.
Step 2 – Personalization

Which item is more personal to you?

Step 3 – Game

Select those people that can see the following item!
Step 4 – Score & Feedback

Dissemination, Media Response and Awards

- More than 550 Likes
- Reports in popular German print media and news portals (e.g. Spiegel, Zeit, Focus, SZ)
- TV report by RTL
- Article in MIT Technology Review
- Wolfgang Heilmann Award
- Best Paper Award at IDGEI’14
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Conclusions

- **OSNs offer many benefits**
  - Keeping alive existing relationships as well as establishing new ones
  - Interactions without any spatial and temporal boundaries
  - Easy sharing of information
  - OSNs as an economically valuable concept

- **But: Privacy research and developments are needed to enable the safe and privacy-preserving usage of OSNs**
Contact Information

Prof. Dr. Günther Pernul
Lehrstuhl für Wirtschaftsinformatik I
Universität Regensburg
Universitätsstr. 31
D-93053 Regensburg

Tel: +49 (0) 941 943 2743
Fax: +49 (0) 941 943 2744
eMail: guenther.pernul@wiwi.uni-regensburg.de
Web: www.ifs.uni-regensburg.de

Relevant Publications

"On Facebook, 273 people know I'm a dog. The rest can only see my limited profile."