Privacy Wedges: Area-Based Audience Selection for Social Network Posts

Frederic Raber
DFKI GmbH
Saarland Informatics Campus
Saarland, Saarbrücken
frederic.raber@dfki.de

Alexander De Luca
DFKI GmbH
Saarland Informatics Campus
Saarland, Saarbrücken
alexander.de.luca@ifi.lmu.de

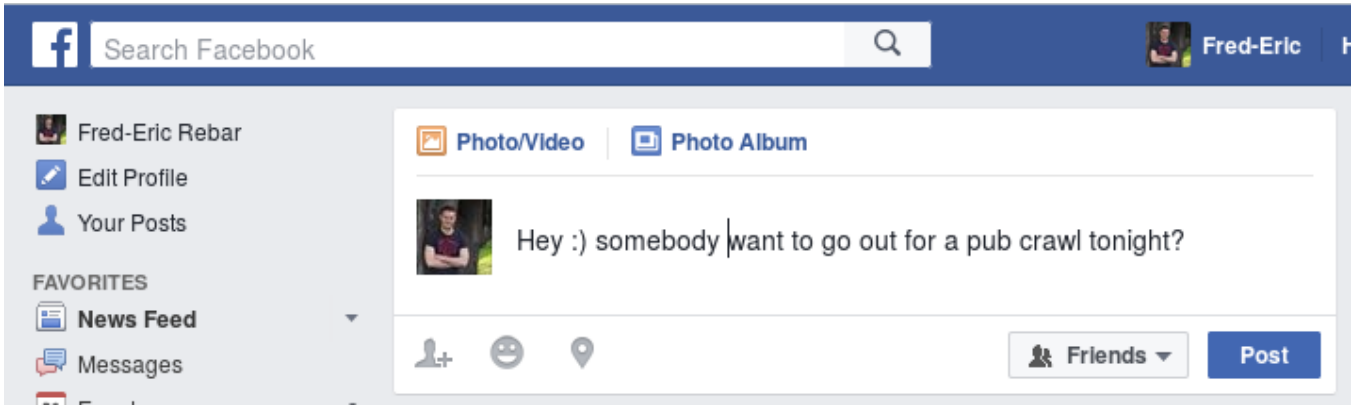
Moritz Graus
Saarland University
Saarland Informatics Campus
Saarland, Saarbrücken
s9mograu@stud.uni-saarland.de



German Research Center for Artificial Intelligence



Motivation


Search Facebook
Fred-Eric
Fred-Eric Rebar
Edit Profile
Your Posts
FAVORITES
News Feed
Messages
Photo/Video
Photo Album
Hey :) somebody want to go out for a pub crawl tonight?
Friends
Post

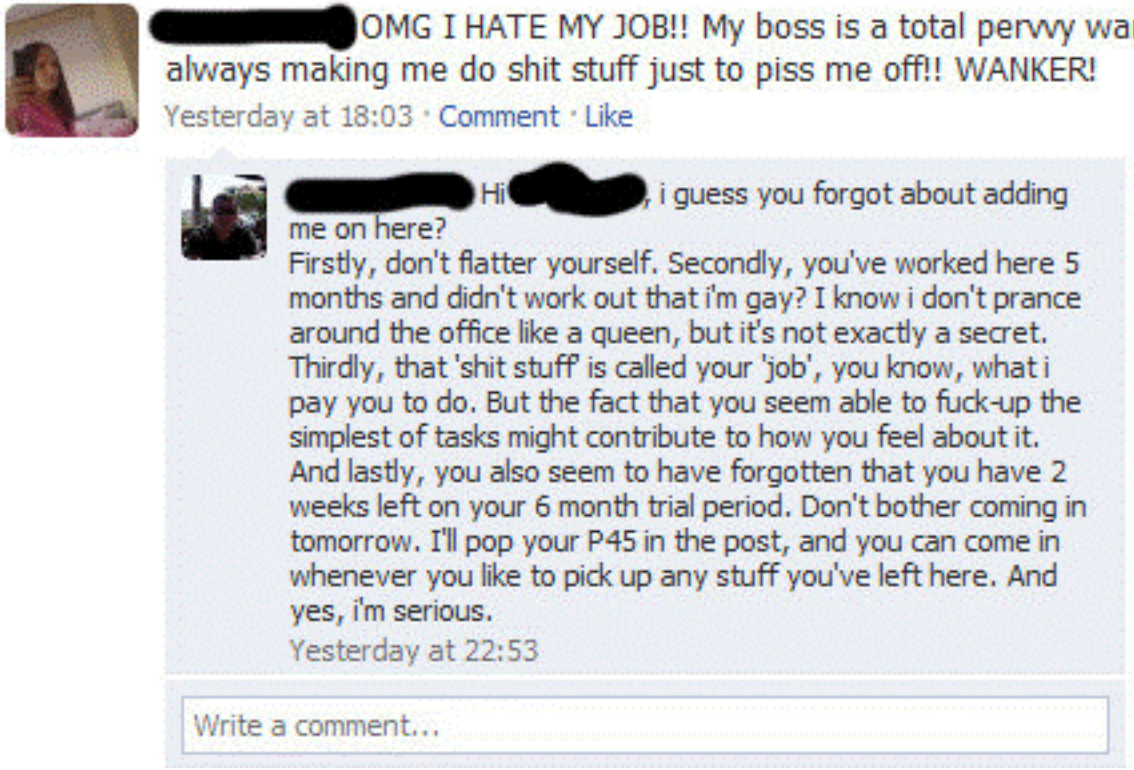
Motivation



[redacted] OMG I HATE MY JOB!! My boss is a total pervvy wanker always making me do shit stuff just to piss me off!! WANKER!

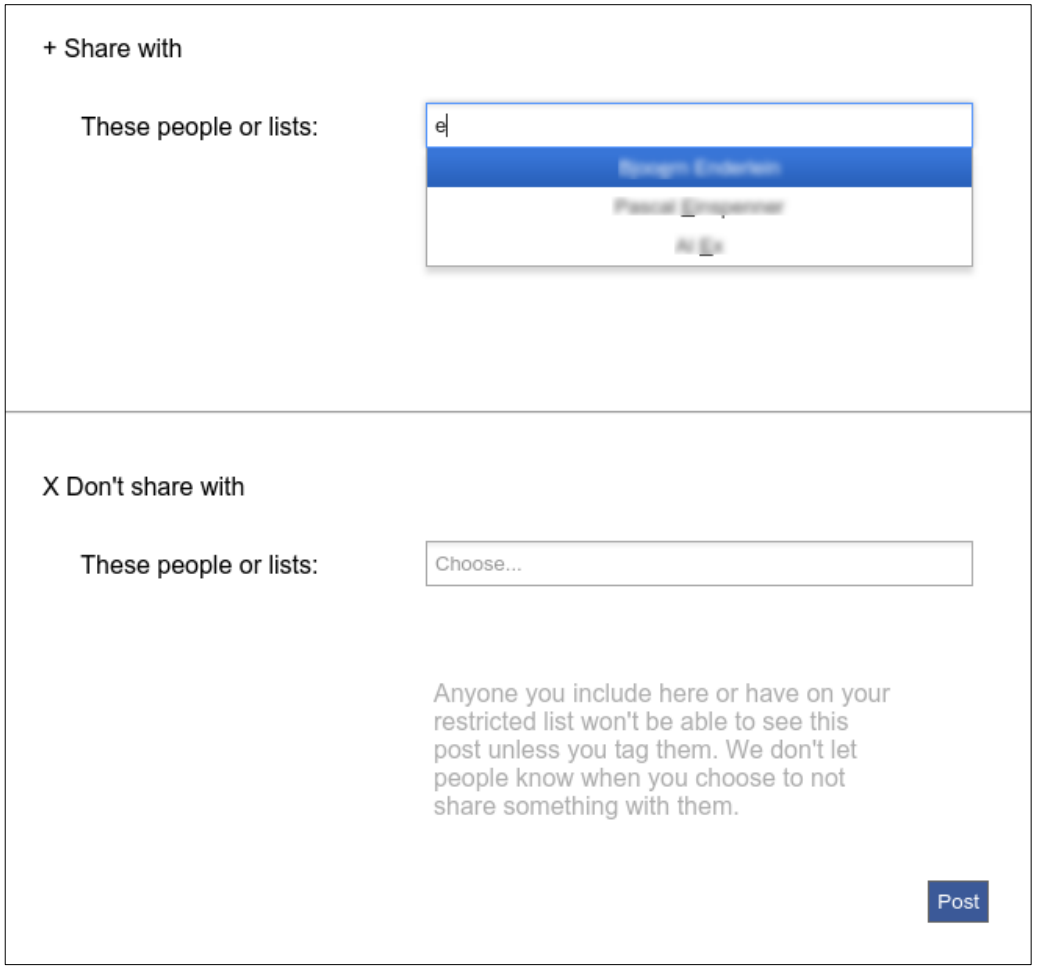
Yesterday at 18:03 · Comment · Like

Motivation

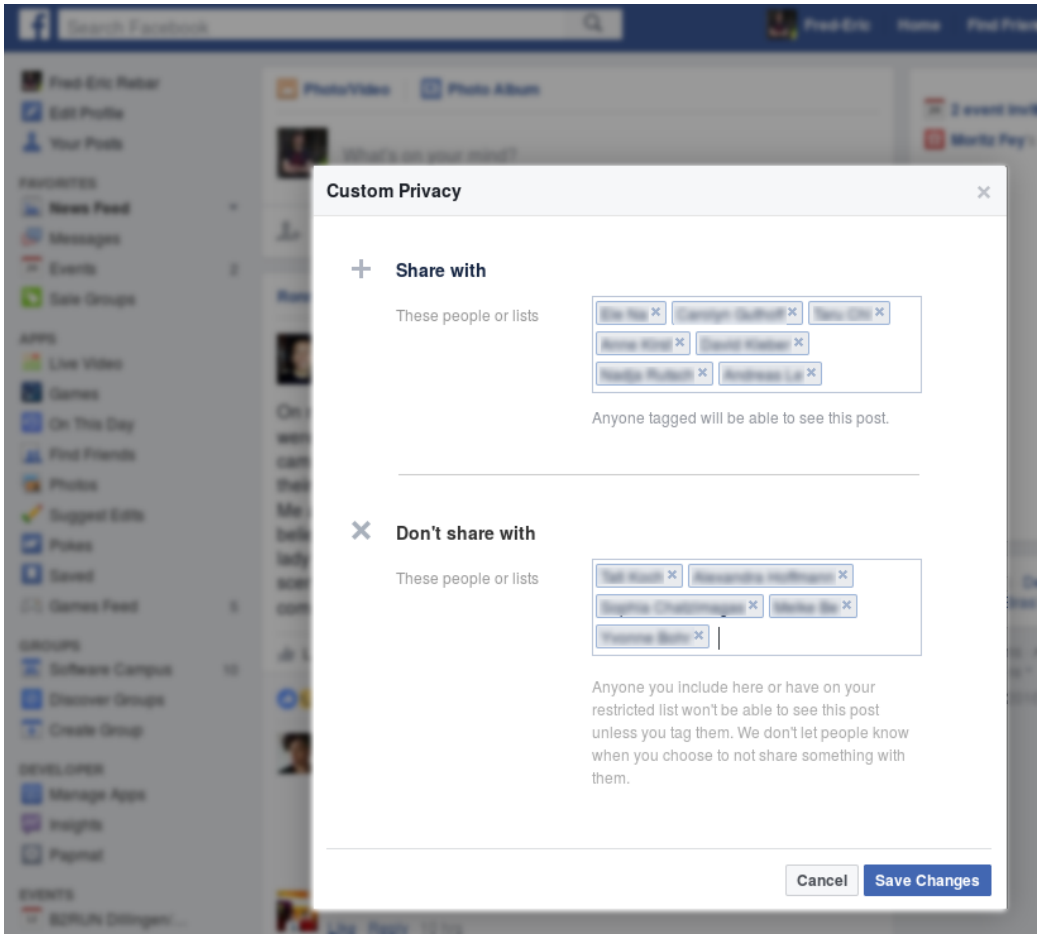


… oops! :(

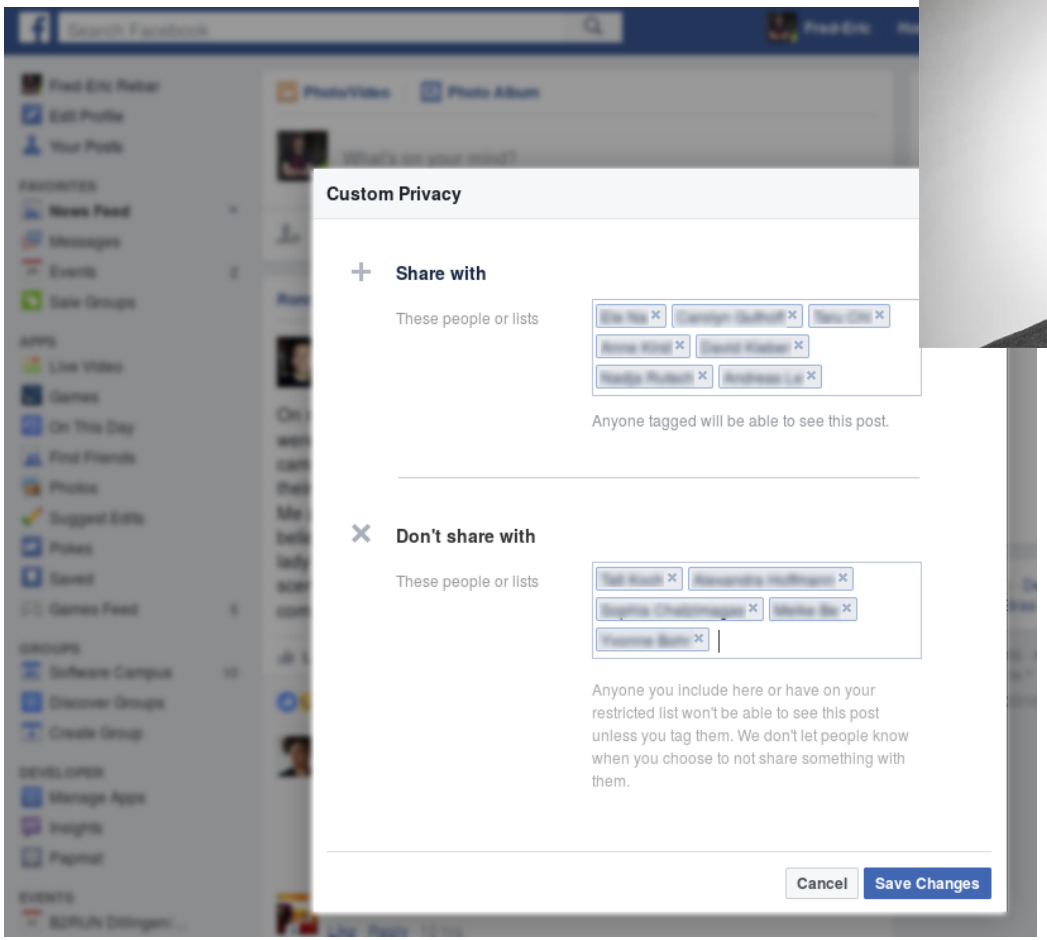
Motivation


+ Share with
These people or lists:
e
X Don't share with
These people or lists:
Choose...
Anyone you include here or have on your restricted list won't be able to see this post unless you tag them. We don't let people know when you choose to not share something with them.
Post

Motivation


Custom Privacy
Share with
These people or lists
Anyone tagged will be able to see this post.
Don't share with
These people or lists
Anyone you include here or have on your restricted list won't be able to see this post unless you tag them. We don't let people know when you choose to not share something with them.
Cancel
Save Changes

Motivation


Custom Privacy
Share with
These people or lists
Anyone tagged will be able to see this post.
Don't share with
These people or lists
Anyone you include here or have on your restricted list won't be able to see this post unless you tag them. We don't let people know when you choose to not share something with them.
Cancel
Save Changes



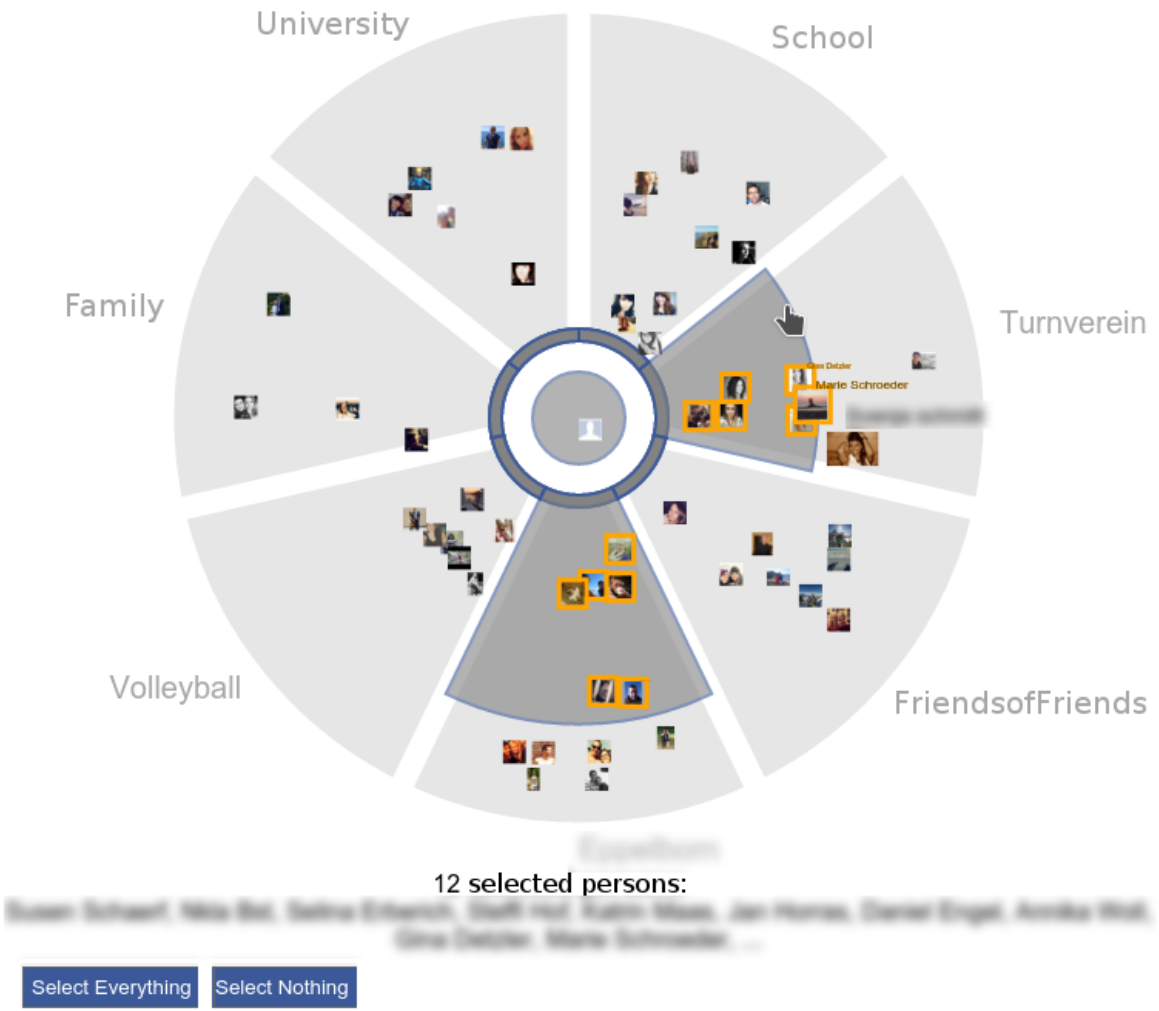
"Privacy Slider"



Selection based on intersocial connectedness

Kauer et al.: Improving Privacy Settings for Facebook by Using Interpersonal Distance as Criterion

Privacy Wedges

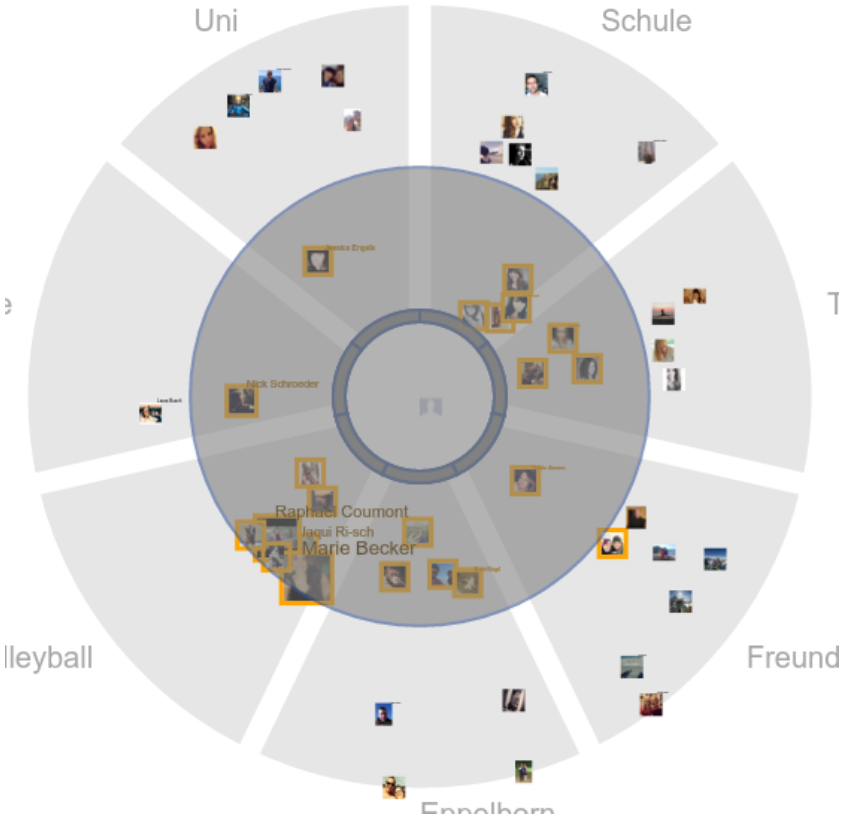


Radar metaphore

Friend groups <=> Wedges

Distance from center
<=>
Tie strength

Privacy Wedges



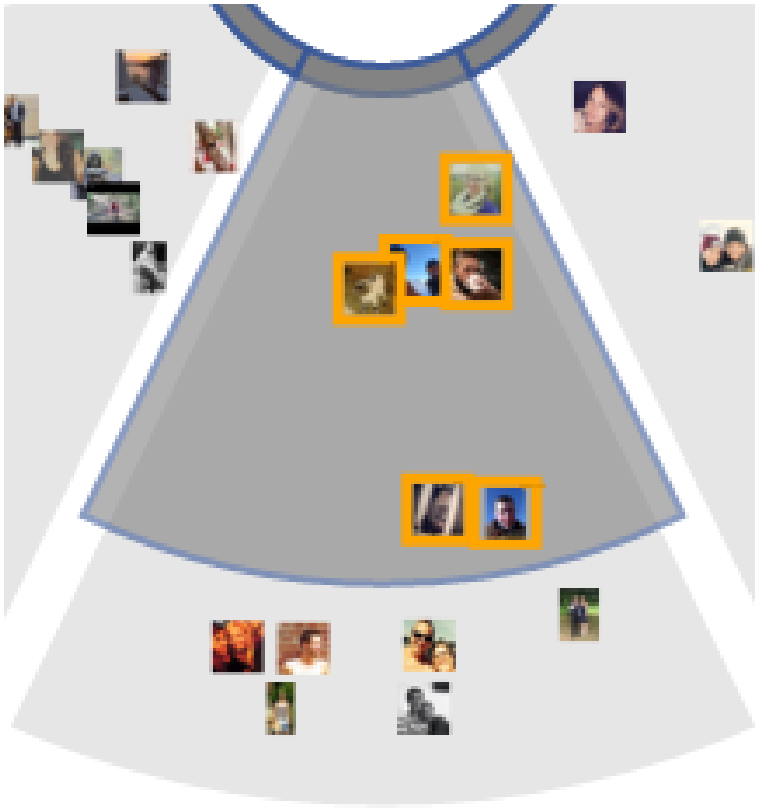
All friends up to specific tie strength are selected, neglecting friend groups

Example use-case:

A family trip to the amusement park

A – Circle selection

Privacy Wedges



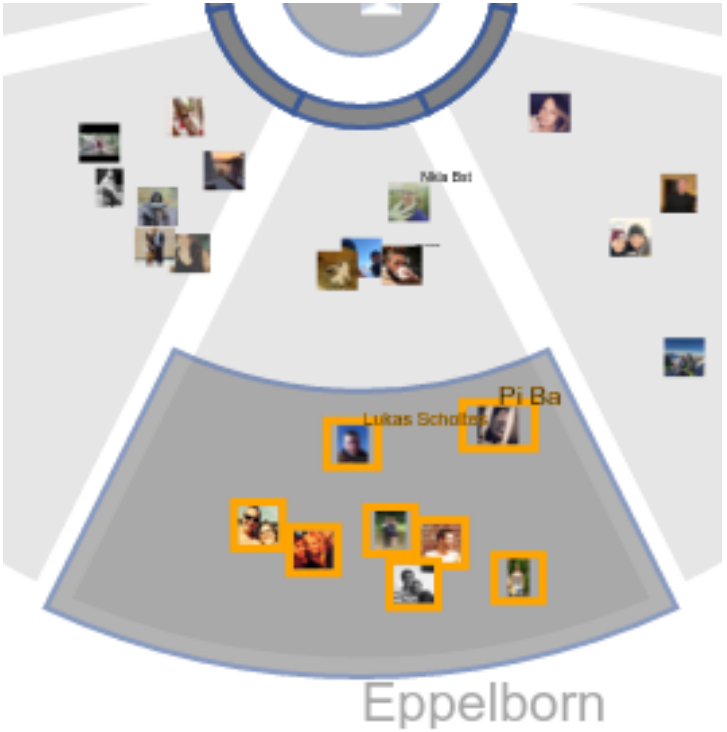
*All friends up to specific tie strength **inside a group** are selected*

Example use-case:

Pictures of me at a university party

B – Wedge selection

Privacy Wedges



*All friends inside a group **beginning at a specific tie strength** are selected*

Example use-case:

A rock band member asks for some nice techno events

C – Excluding selection

Privacy Wedges



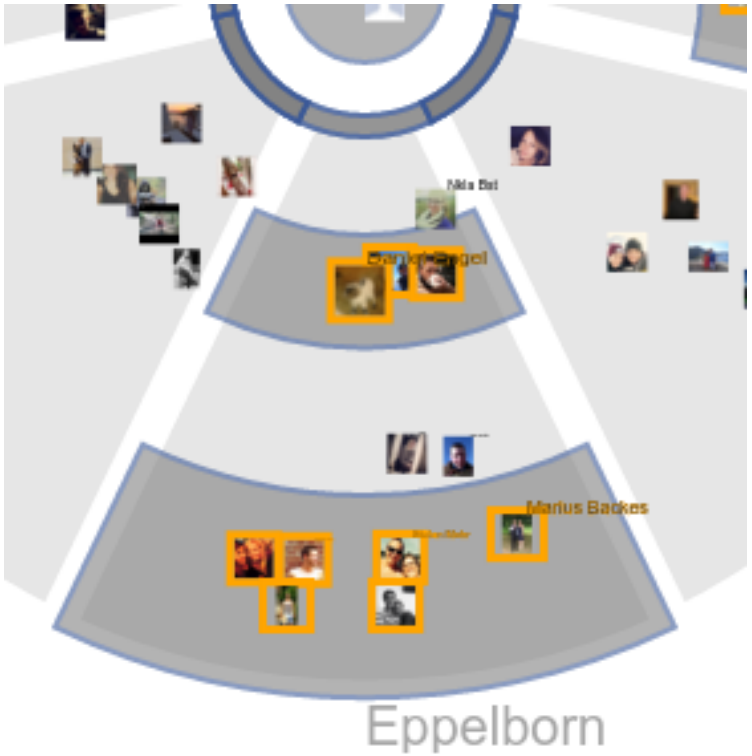
*All friends inside a group **inside a specific tie strength interval** are selected*

Example use-case:

A rock band member asks for some nice techno events

D – Sickle selection

Privacy Wedges



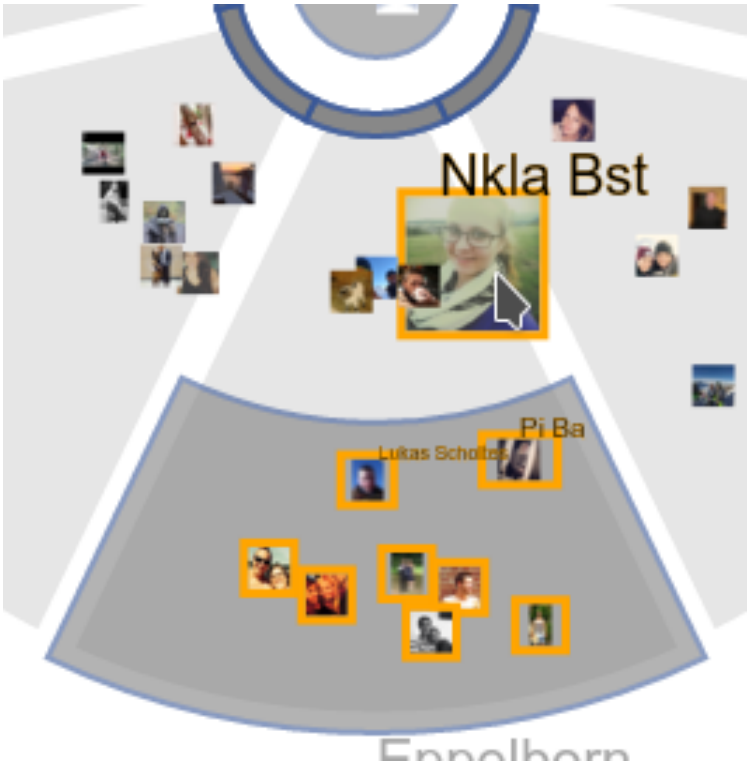
*All friends inside a group **inside multiple tie strength intervals** are selected*

Example use-case:

A picture of illegal fireworks you bought in a foreign country

E – Multi layer selection

Privacy Wedges



*The **clicked friend** is added to the selection*

Example use-case:

A picture of your new girlfriend

F – Single selection

Privacy Wedges – Demo



User study

Goal:

Compare Privacy Wedges to the current standard (e.g. Facebook) in terms of

- *Performance* (e.g. error rate)

- *Usability and user experience*

User study

Goal:

Compare Privacy Wedges to the current standard (e.g. Facebook) in terms of

- *Performance* (e.g. error rate)

  → calculate false positives / false negatives with example posts compared to ground truth

- *Usability and user experience*

  → AttrackDiff questionnaire

Procedure

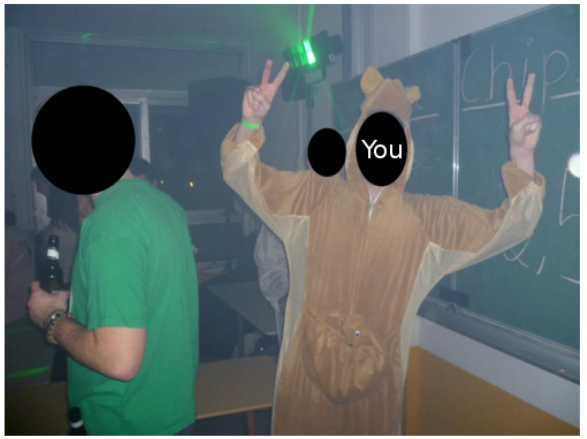
- *1 Week before* experiment: User hands in a list of his Facebook friends, ordered by tie strength and categorized in friend lists

- User has to select the audience using Privacy Wedges or Facebook for 12 potentially dangerous facebook posts, given by the examiner.

- Number of selectable friends is increased after each task

„Share the post with the eight closest university friends“

While attending a costume party, a friend takes a photo like the one below with your mobile phone. Share the photo on facebook and select the recipients.



Procedure

- Attrakdiff questionnaire after each condition.

- *1 Week after experiment*:
  - Examiner asks for each post in the experiment, and each friend in the friend list, whether this friend should actually have received the post or not (ground truth)
  - For each post, participant is asked to score the *severity* of an unwanted disclosement (false positive) or missed opportunity (false negative)

Participants

- 26 volunteers

- 18 to 54 years old (mean 24)
- 9 female, 15 male
- Different occupations (Business / Finance, Engineers, students..)

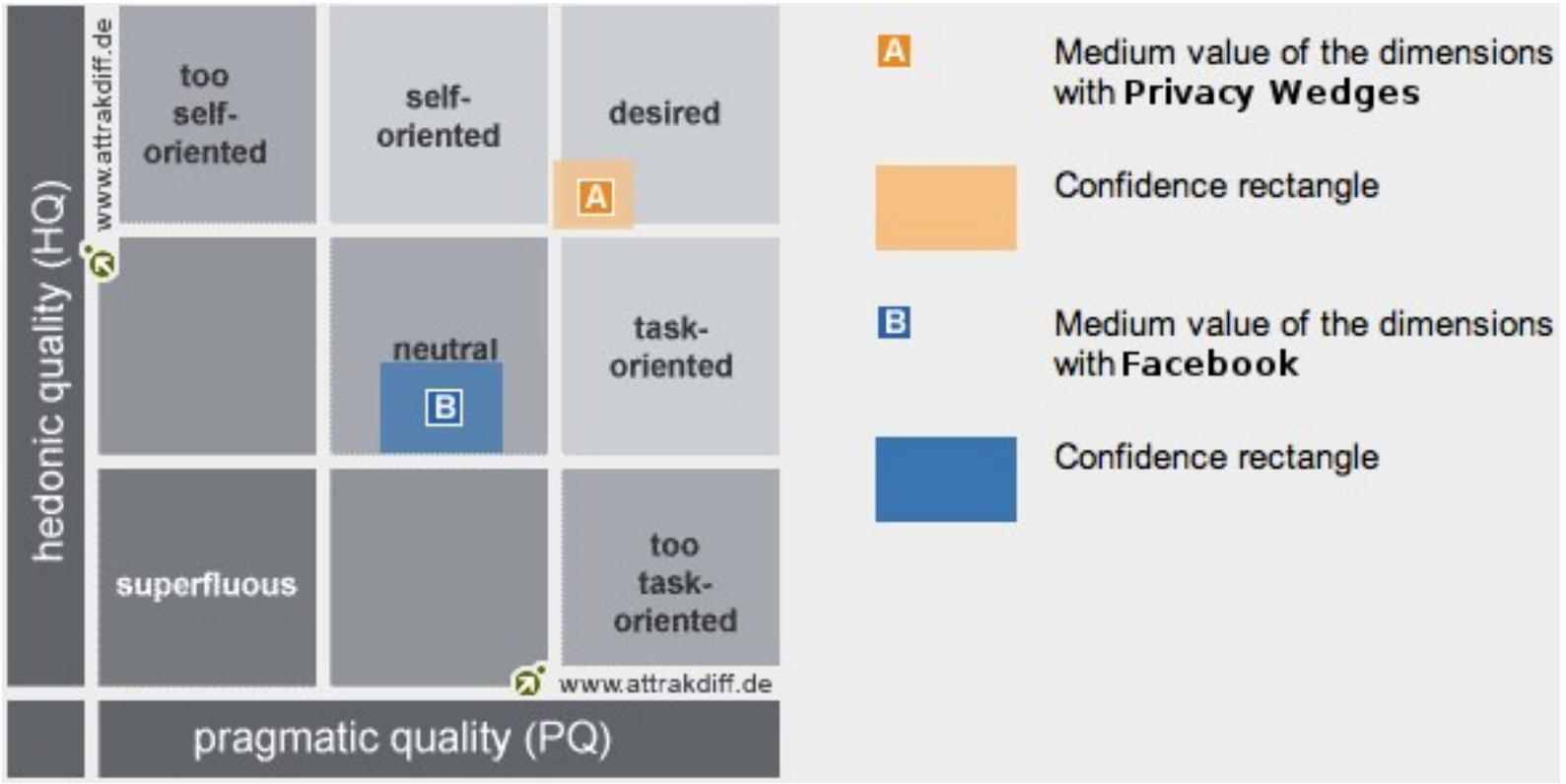
Results – error rate

Phase	**Wedges**		**Facebook**			
Measure	*Mean*	*SD*	*Mean*	*SD*	*T*	*p*
Explicit						
FP	.14	.43	1.25	2.81	4.50	$< .001$
FN	.15	.44	1.59	3.92	4.62	$< .001$
Complex						
FP	1.92	5.31	3.47	7.56	2.26	.025
FN	7.08	10.70	4.53	8.38	2.28	.024

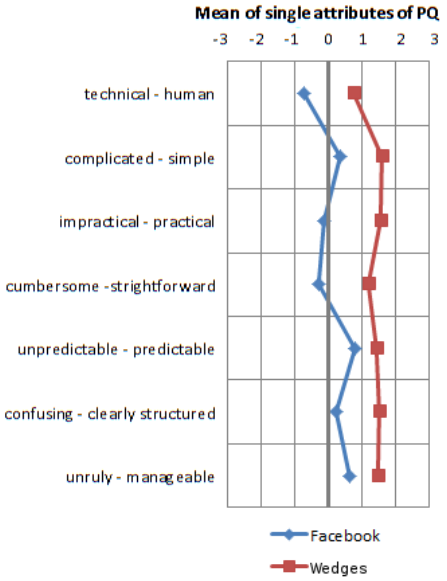
Mean FN severity: 6.03 (1=highest, 10=lowest)
Mean FP severity: 2.48 (1=highest, 10=lowest)

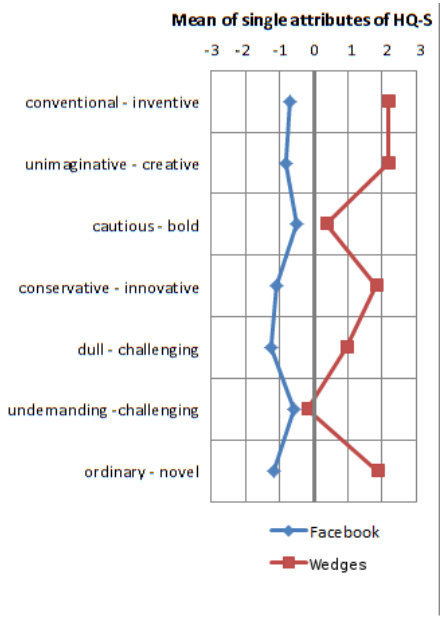
- *Significantly lower false positives for Privacy Wedges*
- *Significantly lower false positives for Facebook!*
- *But: FP scored more severe than FN*

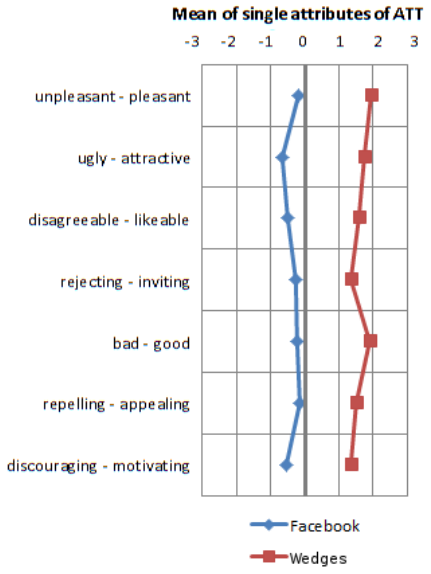
Results - UX

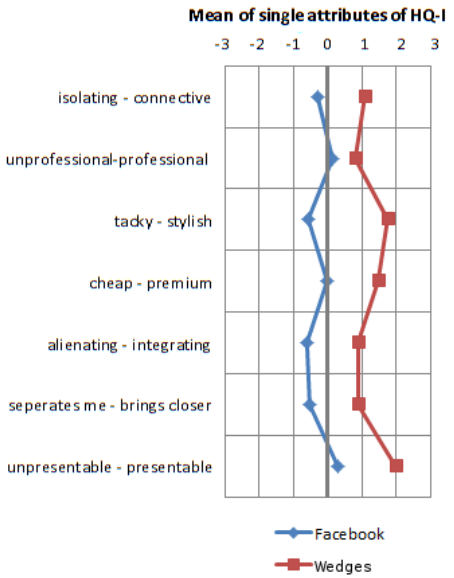

too self-oriented
self-oriented
desired
A
neutral
B
task-oriented
superfluous
too task-oriented
www.attrakdiff.de
www.attrakdiff.de
hedonic quality (HQ)
pragmatic quality (PQ)
A
Medium value of the dimensions with Privacy Wedges
Confidence rectangle
B
Medium value of the dimensions with Facebook
Confidence rectangle

Results - UX


Mean of single attributes of PQ
-3 -2 -1 0 1 2 3
technical - human
complicated - simple
impractical - practical
cumbersome -strightforward
unpredictable - predictable
confusing - clearly structured
unruly - manageable
Facebook
Wedges


Mean of single attributes of HQ-S
-3 -2 -1 0 1 2 3
conventional - inventive
unimaginative - creative
cautious - bold
conservative - innovative
dull - challenging
undemanding -challenging
ordinary - novel
Facebook
Wedges


Mean of single attributes of ATT
-3 -2 -1 0 1 2 3
unpleasant - pleasant
ugly - attractive
disagreeable - likeable
rejecting - inviting
bad - good
repelling - appealing
discouraging - motivating
Facebook
Wedges


Mean of single attributes of HQ-I
-3 -2 -1 0 1 2 3
isolating - connective
unprofessional-professional
tacky - stylish
cheap - premium
alienating - integrating
seperates me - brings closer
unpresentable - presentable
Facebook
Wedges

Limitations

- Small sample set , used convenience sampling
- Limited scalability due to limited space in the UI

Future work & Other applications

- Use incremental magnifying to place all friends in the UI
- Visualize audience of already published posts with Privacy Wedges

Conclusion

- Proposed UI for audience selection for facebook posts, using a radar metaphore and tie strength as a criterion.
- Results show that unwanted disclosures are reduced at the cost of missed opportunities
- Future versions should address the scalability issue.