

"Recently, research suggested that location privacy is not a relevant problem for today's users, but it is too early to call off investigations of location privacy. We identify seven potential factors that at least influence the perception of location privacy. While some of these factors have been addressed in previous work, others need to be investigated from the ground up."

Location Privacy Revisited: Factors of Privacy Decisions

Our Study on Photo Sharing, Metadata and User Awareness

Online survey practiced with 414 university students; aged 23±4 years; 91.8% privacy pragmatists, 6% fundamentalists, and 2.2% unconcerned according to Westin's privacy segmentation index. In our study, location raises high concerns for users: exact location is found to be the top concern, while broad location is perceived to have at least medium impact (cf. Figure 1).

Why does our data differ from prior related studies?

- 1) Our participants and their perception of privacy may differ from prior work.
- 2) Recent studies of location privacy addressed different contexts of using location information.

Prior Studies on Location Privacy

[Ahern] focused on sharing media. *Ahern et al.: Over-exposed? Privacy patterns and considerations in online and mobile photo sharing. In Proc. CHI, ACM (2007).*

[Consolvo] presented a first formative study on location privacy and disclosure. *Consolvo et al.: Location Disclosure to Social Relations: Why, When, & What People Want to Share. In Proc. CHI, ACM (2005), 81-90.*

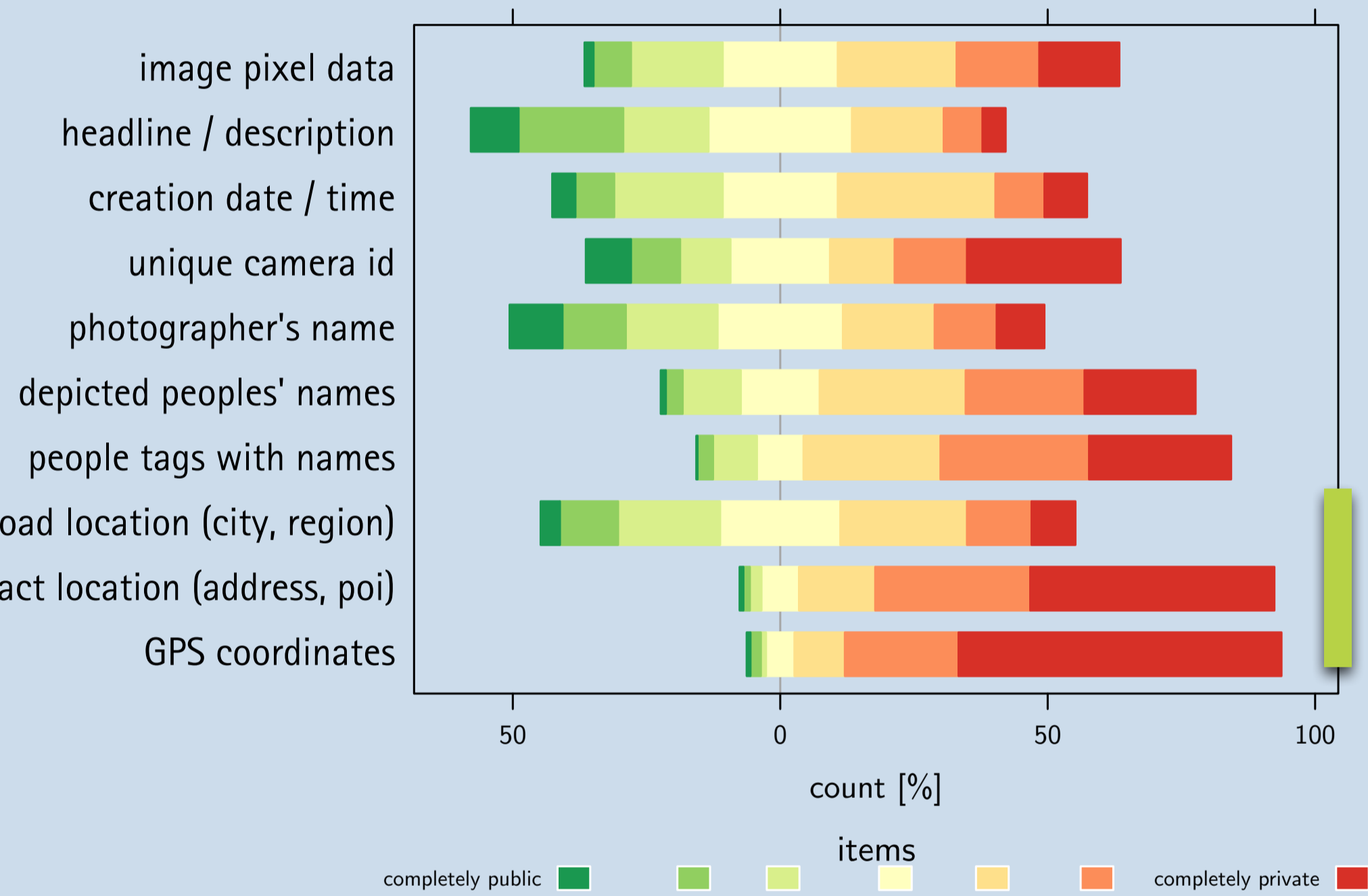
[Fischer] looked at iOS apps' location permissions. *Fisher et al.: Short paper: location privacy: user behavior in the field. In Proc. SPSM, ACM (2012).*

[Krumm] summarizes different results that show that people do not seem to care about location privacy in the context of research. *Krumm: A survey of computational location privacy. Pers. and Ubiquit. Comp. 13, 6 (2009).*

[PorterFelt] compared the impact of location disclosure with other risks on smartphones. *Porter Feld et al.: I've got 99 problems, but vibration ain't one: a survey of smartphone user concerns. In Proc. SPSM, ACM (2012).*

[Wang] compared SNS privacy concerns by culture. *Wang et al.: Who is concerned about what? A study of American, Chinese and Indian users' privacy concerns on social network sites. In Proc. TRUST, Springer (2011).*

Figure 1. General privacy perception concerning different photo metadata. (1 = complete public to 7 = completely private)



metadata added by with impact to	(a) participant others		(b) others participant	
	mean	sd	mean	sd
headline, description, tags	2.94	1.66	3.23	1.75
date & time of creation	3.63	1.70	3.59	1.67
photographer's name	3.49	1.79	3.28	1.83
depicted peoples' names	5.08	1.70	4.76	1.87
broad location (city, region)	3.95	1.62	3.90	1.74
exact location (address, GPS)	5.31	1.68	5.17	1.75

Table 1. Possible privacy impact of metadata in shared photos either added by the user (a) or by other (b). (1 = very low to 7 = very high)

photo audience	feeling mean (sd)	top 2 %
friends	2.24 (1.5)	3.9
indirect friends	3.51 (1.7)	14.3
strangers	5.16 (1.8)	51.9
hosting service	5.23 (1.9)	54.1
privacy service	5.28 (1.9)	57.2

Table 2. Influence of audience when disclosing a photo with location. (1 = very unconcerned to 7 = very concerned)

Seven Factors of Location Privacy Decisions

