Contextual Integrity and Preserving Relationship Boundaries in Location-Sharing Social Media

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Abstract  
Social media allows us to connect with our offline relationships in novel ways. However, Location-Sharing Social Media (LSS) has led to a host of privacy concerns. We identified one root driver of concerns found throughout the LSS literature: Boundary Preservation Concern (BPC). Namely, people want to maintain their existing relationship boundaries with others and inability to do so leads to privacy concerns. BPC lends empirical support to the Contextual Integrity (CI) framework, which pinpoints norm violations as the source of privacy issues. In this paper, we explore how CI can even provide guidance for new behaviors (e.g. location-sharing) where there is no offline equivalent or entrenched norm against which to judge privacy violations. In doing so, we highlight additional challenges for identifying relationship norms. We believe these issues may be relevant for other social media beyond location-sharing services.

Author Keywords  
Privacy; Relationship Boundary Preservation; Contextual Integrity; Location-Sharing; Social Media
Contextual Integrity (CI)

CI framework asserts that privacy violations happen when context-relative informational norms are broken. A Social Context consists of:

Roles. Capacities in which people act (e.g., student)

Activities. Practices in which people in roles engage (e.g., browse shelves at a store)

Norms. Prescribe and proscribe acceptable actions, define relationship among roles (e.g., teachers teach curriculum, students listen)

Values. Goals, purposes and ends (e.g. educational context transmits knowledge)

For a given context, there are Informational Norms which have these parameters:

Actors. Sender, recipient, subject of information.

Attributes (info type). Kind and degree of knowledge.


Ex: My doctor does not give my boss my medical history

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Boundary Preservation

The location-sharing and social media literature is filled with diverse privacy concerns such as informational, interactional, physical, or psychological privacy concerns. Researchers believe that this may explain the slow adoption of social location-sharing services such as Foursquare or Google Latitude [8]. This is despite the prevalence of smart phones [7] and the high use of location-aware services such as location-based search [9]. On the other hand, researchers have been puzzled by counterexamples to privacy concerns such as the large amount of information disclosed on social networks [1] that can pose social, emotional, or even physical threats (e.g. see PleaseRobMe.com). These seeming inconsistencies may be explained by conceptions of privacy as a boundary regulation [2, 6] where one may desire to be more open or closed.

We further discovered that a motivation behind boundary regulation in location-sharing social media is Boundary Preservation, the desire to preserve one’s offline relationship boundaries with others. Through grounded theory analysis (N=21) of interview data, and structural equation modeling of data from a survey administered nationwide (N=1532), we confirmed that Boundary Preservation Concern (BPC) is at the root of eight common privacy concerns in location-sharing and social media [4]. These concerns ranged from informational, interactional, psychological, to physical privacy concerns. People had higher privacy concerns if they thought that using LSS would redefine their offline relationships with others. For example, one interviewee explained how she did not want to use social media with her family for this reason: “I don’t tell them what I do every day and I never have. We just don’t have that type of relationship, even though it’s very close. That’s how I’d want it online as well.” On the flip side, when interviewees expected that LSS would not affect their offline relationships, they were not privacy concerned. This was especially striking in attitudes towards strangers. Many interviewees were not privacy concerned about strangers knowing their location because they did not expect a change to how they would relate to them: “You won’t just go and talk to anyone... Even if you broadcast your location, your name,... that doesn’t mean everyone will come and talk to you.”

Applying the CI Framework

Turning to the framework of Contextual Integrity [3], we draw on it to help us to understand when boundary preservation concerns are likely to abound. The framework states that for any given social context (offline or online), there are informational norms defining appropriate flows for various types of information (see sidebar for overview). Privacy violations result when these norms are broken. Privacy issues introduced by information technologies are often the result of them changing the expected informational flow in a given social context. For example, one would expect to discuss medical information with one’s doctor, and salary with one’s boss, but not vice versa. This social context (e.g. medical and work, respectively) holds whether the interaction takes place on or offline. A technology that shared personal health information in a work context may be deemed problematic, but in a medical context may be fine. This example highlights the importance of social context for predicting whether sharing something is a privacy concern. Context allows
Privacy Break-down Points

In new social media, the social context is not always clear. Thus, an appropriate action in the eyes of one person may appear to be a privacy intrusion to another. We found a number of situations that can lead to these incongruent perceptions of privacy infringement:

**Unknown Context.** People may be worried about how to behave when they are not sure why they are sharing their location.

**Conflicting Context.** People may understand the value of using LSS differently. Ex. One person may feel that they should be able to meet up with others (unannounced) while another feels it is just for keeping in touch.

**Inferred Context.** People may infer that because someone is sharing their location, a different social context must apply. This can lead to their redefining their own and others’ role to match the new context.

.. note:: us to know the norms and so evaluate whether they are being violated. However, for new social technology, context is not always fully defined. Here we expand on the CI framework it in order to explain why privacy concerns also arise in an ambiguous LSS context (see sidebar for summary):

**Conflicting Context.** For location-sharing social media, the values of the social context, at a high level, consist of maintaining and enhancing one’s personal relationships through sharing location. However, our study finds that people interpret these values differently and thus diverge in what they consider appropriate activities and norms associated with using LSS [5]. This may be because it was and still is a relatively new technology. Some see it as a way to meet up with others (unannounced). Others perceive LSS as a way to keep in touch. Still others use it as an indicator of availability. Because people interpret the values differently, they also do not agree upon the norms and consequently the informational norms. Norms that support dropping in on people are different from ones that support keeping informed. For example, sharing location continuously and in real-time may help someone meet up with people, but is less suited to keeping in touch. This could explain why some of the interviewees feel bombarded with more information than necessary for keeping in touch, and regard those who constantly shared location as inconsiderate. On the flip side, other interviewees complained about bad LSS users who do not share enough location information to be able to locate them in real time. Few interviewees recognized that others are operating from a different social context. Those who did were concerned about acting on conflicting informational norms. Conversely, those interviewees who do not expect others to have different social context and norms, or who otherwise do not expect a violation of information flow, were often not privacy concerned.

**Unknown Context.** Some people had no idea of the social context and what the norms could be. They avoided using LSS because they “didn’t want to do anything weird.” They do not want to bother others, offend someone, or otherwise call into question the relationship. Their boundary preservation concerns center on not knowing where the boundaries should be.

**Inferred Context.** Norm-breaking concerns are also problematic in another way. Interviewees worried that the information flows would actually dictate the roles and relationship between themselves and the person with whom they are sharing. For example, one interviewee believed that sharing real-time location with someone she is dating would have implied to him they had progressed to a relationship phase where a large amount of mutual awareness is appropriate. This would change the existing relationship boundary and thus be a privacy concern. These types of concerns occurred less often when relationships were well defined (e.g. spouse) and less likely to be called into question.

One aspect needing further study in all of these scenarios is the reach of a given norm. The CI framework references existing, commonly accepted norms for a given social context. However, our studies indicate that the sphere of people upholding a given norm may be as small as a pair of specific persons; The type of relationship one man has with his mother is different from the relationship another man has with his own mother and demands different norms around
information flow. What needs further investigation is whether there may be more generalizable categories of relationships (e.g. “Constantly sharing my status with” type mom, vs. “Don’t keep tabs” type mom) that can be used to create a finite set of relationship types and norms. This would enable us to evaluate norm violations more generally than going on a case-by-case basis.

Furthermore, research is needed to understand how differences in norm perception arise from situational factors versus individual disposition. For example, we noticed that some individuals confidently hypothesized social contexts for various new technologies while others seem to approach new technologies as a blank slate with no presumption of social context. Dispositional influences would mean that a given type of individual is more likely to experience a certain type of privacy breakdown. Situational factors such as exposure to existing users may be mitigated with technology design.

**Conclusion**

We showed how the Contextual Integrity framework can be applied to location-sharing social media to identify sources of privacy concern, even when the social context is not well established. Drawing on CI, we are able to point out how an ambiguous social context can lead to privacy concerns. We are actively working on follow-up studies to probe whether we can design technology to disambiguate social context and norms and consequently alleviate privacy concerns. Services that more explicitly identify roles and social context (e.g. LinkedIn asks members to specify their relationship to others for networking purposes) may pose fewer boundary preservation concerns than more open-ended technologies (e.g. Facebook) used for many activities and goals.

Boundary preservation of offline relationships proves to be one significant driver of privacy concerns in location-sharing social media. This may be because location-sharing integrates offline directly with online presence. Nonetheless, our data points to boundary preservation concerns in many other social media such as Facebook and Twitter, which also often tie online relationships to offline ones. Insights from this work can shed light on why people may have privacy concerns towards new behaviors enabled by various social media.

We note that while boundary preservation and privacy concerns do have a significant impact on frequency of use and non adoption, other factors (e.g. utility, communication style and other predispositions) also come into play. We are actively investigating the relative impact of these other factors in comparison to privacy concerns.
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References