A value-sensitive mobile social application for families*

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Abstract. We investigate how to create a mobile social application to support families with elementary school children, assisting them in exploring their social and geographical environment. While existing social applications provide this functionality to some extent, these kind of applications can negatively impact important user values such as freedom and privacy while intending to promote others such as family security. We propose as a solution that users express rules of behavior to the application using *norms* as concretized values. Norms can thus be used to produce tailored behaviour capable of fulfilling certain values while posing minimal risk to others. We demonstrate a prototype of a mobile, socio-geographical support application we built based on this concept.

1 Introduction

Usage of social media platforms such as Facebook, Foursquare and Twitter as well as mobile applications for supporting family life such as Life360[3] have become an integral part of our life. In our research we investigate how to create a mobile social application to support families with elementary school children, assisting them in exploring their social and geographical environment (for example, by helping them staying safe, making new friends or getting to know their neighbourhood).

Existing social applications such as mentioned above already provide functionality that supports these tasks to some extent. However, research in value-sensitive design and ethics in technology has shown that while this kind of applications may promote a number of user values such as family security and comfort, they can negatively impact equally important values such as freedom, responsibility and privacy [3]. For example, when parents use GPS tracking to know where their children are, this may be beneficial for family security, but it negatively impacts children's privacy and freedom. On the other hand, ad hoc sharing of locations such as done through Foursquare does not provide the potential safety benefits that GPS tracking would provide, while it does promote freedom.

We propose to address this issue by making social applications more *adaptive*. Recent works have proposed to make social applications more adaptive through collecting

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[3] An application that allows families to locate eachother 24/7 on a map, see https://www.life360.com.

and analysing user data (for example, see [5,2]). We take a complementary approach, proposing that users can express rules of behavior to the social application using *norms*. Norms have been proposed (see [1] for an overview) to regulate the behavior of autonomous agents for achieving a better overall system performance, inspired by the way social norms regulate people's behavior in society. Research in philosophy and normative systems shows that values can be promoted and demoted by norms [8,4]: since norms are considered action guiding (by obligating or forbidding actions), they can be used to produce a tailored behaviour capable of fulfilling certain values while posing minimal risk to others.

In this paper we describe our prototype of a mobile, socio-geographical support application that we built based on this concept.

2 System description

This prototype runs on the Android platform and it permits its users (elementary school children and their parents) to share *check-ins* in certain locations with other users of the system, similar to Foursquare. This feature was selected based on the analysis of previous user data [6], where values such as *family security*, *social recognition*, and *independence* were found to be most relevant for this target group. Knowing where family and friends are is connected with these values.

2.1 Basic preferences, creating locations, and checking-in

In a similar way as on popular social platforms, with our prototype users can place other users of the system in the user group *family* or *friends* or in neither, in which case the application places them in the group *others*. Users can select with which groups they share their check-ins, and from which groups they receive shared check-ins. Users can add or remove users from either group, and change sharing and receiving preferences at any time.

Users can create locations in two possible ways: 1) through selecting a specific point (corresponding to a GPS position) on an integrated Google map, and then assigning to it a name of their choice, and 2) through detecting the current position automatically if a GPS signal was available, and then assigning a name. In both cases, a location is added to a list of available user locations, defined by a name, a GPS position, and a square area of a side length of 50 meters centred around that GPS point. Locations can be removed by the user at any time.

When a user would like to check-in, the list of locations that fall within a radius of 300 meters (according to the currently detected GPS position) are displayed, with the option of adding a location using the second method described above, in case the current location was not yet on the list. The user then can select a location, and confirm their check-in, which will be shared with the users that belong to the groups which our user is sharing with, according to the basic preferences in the previous subsection. Users who, accordingly, receive this shared check-in, will get a pop-up with the sharer's name and location information (viewable also on an integrated Google map), if they have selected to view check-ins from the group to which the sharer belongs in their own

basic preferences. An "event log" is available, which shows a user's own latest check-in information, as well as the five most recent check-ins seen from others.

2.2 Social commitments

As discussed, our prototype allows for additional, norm-based behavior customization through norms. While basic preferences are set by the user of an application, norms can come from others in the user's social context. For example, a parent may want to make an agreement with a child about when the child's location is shared with the parent and when check-ins can be received by the child. Models for such agreements have been studied in research on normative systems. In particular, we draw from the social commitments framework in [7] to create the following commitment model that we use for expressing agreements between different users about the behavior of the application:

A commitment has a source (creator of the commitment), a target (who is asked to comply with the commitment), a triggering condition that activates the commitment, a normative effect (an obligation or a prohibition of sharing or viewing a check-in, from someone or a group of people), and the deadline by which (in the case of an obligation), this obligation should be fulfilled.

In our prototype, this translates to the following feature: a user can create an agreement (i.e., a commitment) with another user consisting of a specific normative effect (to share or view a check-in from one or a number of users) if a certain condition (based on time or geographical location) is active, and the target of the commitment accepts it. For example, a parent x (source) can create the following commitment with his/her child y (target): 1) I want my child to share his/her check-ins with me (normative effect), if s/he enters school (triggering condition). Another example would be a parent x (source) creating the following commitment with his/her child y (target): 2) I want my child to "not receive" check-ins from the group "friends" (normative effect) after 9 pm (triggering condition).

When the source user creates a commitment, it is sent to the target user, who can either directly accept it, or "decide later". In case the latter option was chosen, the target user can later decide whether to accept or reject the proposed commitment. Users can, at any time, review the list of commitments they created or received, delete commitments they created or received, and accept received commitments that are still pending. A user action such as accepting or deleting a commitment notifies the other user involved with that action.

In this version, conflicts between basic preferences and an accepted, active commitment are solved in favor of the commitment. For example, if parent x is in child y's family list, and child y opted in their basic preferences to "not share check-ins with family", accepting commitment 1) above means the child's check-in will be shared with parent x if they enter school. Similarly, conflicts between two accepted, active commitments would be solved in favor of the commitment most recently accepted. We refer to the literature for research on reasoning with norms, e.g., [9].

In the current version of the prototype, the deadline "as soon as possible" is used for all obligation-type commitments. Also, in this version commitments do not expire automatically, but they can be removed manually by users. In future work we will investigate extensions that add expressivity to the commitment model with respect to

deadlines and expiration of commitments. Moreover, in this prototype commitments are created explicitly. One may also consider adding a component for learning norms, which could for example learn by observing user behavior that no check-ins should be received during dinner.

A 3-minute tutorial video (with subtitles) can be seen at `http://bit.do/ePartner`.

3 Discussion

The use of social commitments places our prototype application somewhere inbetween Foursquare (which is similar to the basic check-in functionality of our prototype) and Life360 (where location information is shared continuously). Its flexible commitment model allows parents and children to make agreements on sharing location information in a targeted way, tailored to that particular family in a particular situation. We hypothesize that in this way, the application can promote family security without violating (or with minimal impact on) a child's freedom and privacy. In future research we will perform a user study to test this hypothesis.

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