Personal Informatics for Reflection on Personal Values

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Abstract

In this paper we advocate the use of personal informatics systems for self-reflection on personal values. We describe the role values play as guiding principles in people's lives. We then describe Value-Sensitive Design, an approach to the design of technology that aims to account for values throughout the design process. We subsequently argue that personal informatics, in its focus on self-reflection, is well-suited as a means for discovering and understanding personal values, which can then be used as a starting point for Value-Sensitive Design. Finally, we provide a preliminary description of a mobile application we will implement that will support reflection on personal values.

Keywords

Personal Informatics, Value Sensitive Design, Values in Context, Self-Reflection

ACM Classification Keywords

H5.2. User Interfaces: User-Centered Design. K 4.2 Computers and Society (Social Issues)

Values as guiding principles in people's lives

Most people have some conception of what they consider good, bad, right, and wrong. They have an

idea of what they find important in life. In this general sense, most people have some concept of values. Values play an important role in people's everyday lives. Values are abstract (e.g., [3, 9]), motivational constructs that apply across contexts and time [1]. They convey what is good (e.g., [10, 12]) and important to us (e.g., [1,3]). As Hodges and Baron argue, values are convictions that some things ought to be and others not [4]. The concept of a value can be differentiated from similar concepts, such as laws, rules, goals, norms, standards, and so on (e.g., [9, 10, 11, 12, 13]). Examples of values include human welfare, privacy, trust, autonomy, accountability, identity, and environmental sustainability [3]. Values have a special status due to their importance to their holders (violation of values is seen as deplorable or morally wrong) and the expectations they generate regarding the behavior of the holder and of others. Values create preference for behavior or action that supports them, which gives them a normative character. As Miceli and Castelfranchi point out regarding the normative character of values, "if something is good, it should be pursued" [10, p. 181]. For example, "honesty" is a value which gives rise to a norm "be honest". Moreover, if something is good, it should not only be pursued by the holder of the value, but also by others. However, others do not always hold the same values. This normative character of values is a ground for conflict when people hold different values or different priorities among their values.

Creating more value sensitive technology

Human values have become increasingly important for technology design due to ubiquitous technology included in our work and private lives on a daily basis. In a multitude of technological systems, e.g. medical applications or social networks, human values (privacy, autonomy etc.) play a role and are sometimes violated. System designers are partly responsible for creating socio-technical systems accounting for human values. The value-sensitive design (VSD) framework proposed by Friedman [3] tries to guide designers in this process and forms a good starting point to consider values in technology design. By analyzing which values are relevant for the stakeholders of a system, the design can be driven into the right direction from the beginning. The framework proposes conceptual (conceptualizing a value, e.g. trust), empirical (using quantitative and qualitative methods to understand the context of the system in relation to values) and technical (analysis of how technological properties hinder or support values) investigations to arrive at a set of relevant values. Whereas VSD supports ethical and philosophical deliberations on the design of new technology, applying it to real life design cases is still difficult. Criticism has come, e.g., from LeDantec and colleagues [7], pointing out that designers' reflection on a given set of values will lead to designs of systems aligned with these values rather than systems aligned with values that are relevant for the stakeholders in the context of the design. The authors argue that it is important to integrate the empirical *discovery of local values,* i.e. those relevant to a given design *context* and expressed by the stakeholders in the framework. This brings up the question of how to elicit such values from stakeholders. As acknowledged by [7], there is an "inherent difficulty in talking about values". Meanings, nuances and interactions of values are complicated to express in a simple ranking of abstract values. Many people do not explicitly reflect on their values and are not aware of their importance. Furthermore, people can have different interpretations of abstract values and

even a single person's opinion about the importance of a value can change based on her current context. Whereas Friedman advocates the use of standard data gathering methods (interviews, surveys etc.) in the empirical investigations, we believe, that there is a lack of methods that support the elicitation of values in the real life context. Without a real life context, i.e. situations in which a value serves as a guiding principle for a decision or in which the violation of a value is apparent, elicited value profiles might be based on spontaneous thoughts of a stakeholder and by that be biased. A good tool/method to elicit values in context needs to support a person in reflecting on her values over a longer period of time in order to get a deep understanding of her values.

Personal Informatics to discover personal values

Li and colleagues define personal informatics systems as systems that "help people collect personally relevant information for the purpose of self-reflection and gaining self-knowledge" [8, p. 558]. They identify two core aspects of every personal informatics system, namely collection (collecting information about oneself) and reflection (reflecting on personal information). These systems have shown the many benefits of self-reflection regarding insight, self control and positively changing behaviors. Based on the inherent focus of personal informatics systems on self-reflection, we believe this type of systems is suitable for empowering people to learn about and understand their values. There are two steps that lead to a deep understanding of one's values:

(1) **Discovery:** By this we mean helping a person to make values explicit in the moment when they

influence the person's behavior (mood, choice of action, judgment of the situation or another person).

(2) **Analysis and deeper understanding**: After discovering values in different contexts a deeper reflection looking back on a longer period of time is necessary to understand how values guide a person's live. A personal informatics application can help in this analysis by presenting values to their holder in an intuitive way and visualize patterns of values, i.e. in which situations which values play a role, are violated or influence a decision.

To support these two points, we plan to create a mobile application that detects meaningful moments in a person's life based on biosensor data and asks the user for feedback in the given situation. The feedback as well as the physiological data will be logged to be analyzed and reviewed later. Our envisioned application is inspired by the experience sampling method (ESM) introduced by [6], photo elicitation as proposed by [7] for the purpose of value elicitation and the life-log analysis based on skin conductivity measures by [5]. This approach is similar to existing systems, such as the Affective Diary [14], but allows people to reflect in situ. High arousal as measured by a non-invasive skin conductivity sensor embedded in a wristband, e.g. the Q-Sensor (www.affectiva.com/q-sensor/), could be used to trigger a "reflection moment". Connected to a smartphone, the sensor could send its data immediately to a mobile application on this phone. The application would ask the user to take a picture of her current environment using an integrated camera and tag the picture (e.g. value tags). Furthermore, it would provide a mini questionnaire as used in ESM that elicits the mood of the person, the (task) context and an

evaluation of the situation. Taking into account that some high arousal situations are either sensitive or even restrict the person from giving feedback, any feedback will be voluntary. Besides the system-triggered events based on arousal data, the user can also log her own "reflection moments" whenever she feels that a current or past situation reflects an important value in her life. By logging physiological, quantitative and qualitative data we enable a triangulation of data that can lead to a better self-reflection. The collected data can be reviewed by the user at any point in time to find patterns that reflect the general value system a person holds. An intuitive visualization can help users to find these patterns.

We believe that this approach will augment the process of value elicitation by providing users (and designers) with a better, more concrete understanding of their values in the context in which those values matter. Furthermore, we believe that considering human values in personal informatics will have the added benefit of helping people reflect on what they find important in life.

Acknowledgements

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