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Usable Transparency for Enhancing Privacy in Mobile Health Apps

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Abstract

We report on our research on usable transparency in the context of mobile health (mhealth) tracking. Usable transparency refers to the usability of transparency-enhancing tools (TETs), which seek to aid users of online data services in improving their privacy. Focusing on fitness tracking scenarios, our research addresses the conceptual and technical demands of such tools in terms of usability.

Author Keywords

Data privacy; GDPR; mobile health; notification; transparency; usability.

ACM Classification Keywords

H.1.2 [Models and Principles]: User/Machine Systems;
H.5.2 [Information interfaces and presentation]: User Interfaces; J.3.3 [Computer Applications]: Life and Medical Sciences; K.4.1 [Computers and Society]: Public Policy Issues

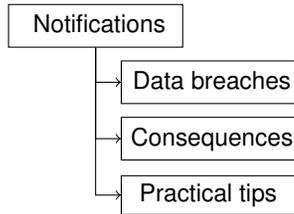
Research Goal

Our research focuses on privacy-enhancing transparency tools that enable users to review the data that they have disclosed in the larger context of mhealth. Our work aims to improve the control of users of mhealth services over their privacy by providing them with meaningful information about how their personal data are processed by data con-

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Types of notifications



Research questions

1. What kind of information are required by users of mhealth services to make informed decisions about the processing of their personal data?
2. How can such information be visualised to convey meaningful decision support?
3. How can users be guided in their decision-making processes to satisfy their individual demands?

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trollers and third parties. Having access to such information enables users to make informed decisions about how best to protect their privacy and how to exercise their legal rights pursuant to the European Data Protection Regulation (GDPR) [1]. Such rights include, e. g., the right to withdraw their consent for the processing of their personal data. Ultimately, our research aims to provide users with a usable prototypical artifact, an ex post transparency-enhancing tool (TET) [4]. The TET will not only visualise how and by whom mhealth data are processed, but will also provide users with customised notifications about (1) personal data breaches, (2) consequences of the processing of a user's personal data and (3) practical tips about how to improve their privacy.

Approach

The design of the prototype pursues the ISO 9241:210 software life cycle of human-centered design [2]. Conceptualisation, specification, implementation and evaluation are conducted under the premise of working towards the demands of a particular target audience – the users of mhealth devices who seek to review the personal data that they have disclosed previously.

Previous Studies

Our research on ex post TETs started in the form of a systematic review of the literature [5]. An analysis of the body of knowledge led to a survey [4] that classified existing usable ex post TETs in terms of their conceptual, functional and technical characteristics. Based on these findings, it pointed out gaps in the literature, some of which we hope to fill via our own research. As the usefulness of any tool will depend on the individual user's predisposition and attitude, we are particularly interested in providing users with more transparency and control about the judgemental statements made and the guidance provided by a TET.

Current Work

As far as the user propensity to disclose their personal data are concerned, it has been pointed out in the literature that the 'one size fits all' approach will unlikely satisfy the needs of all users (see e. g. [6]). We therefore believe that clustering users based on their principal attitudes is key for functionally reflecting their collective needs. In the context of usable data privacy, the segmentation of users is sometimes referred to as 'privacy personas' (see e. g. [3]).

We are currently conducting an online study that seeks to determine whether users of online mhealth services can be clustered with respect to their preferences for judgemental statements made by ex post TETs. In that regard, we are investigating to what extent these preferences are related to the privacy persona as which individual users primarily classify. Drawing upon the derivative of a quantitative method presented by Morton et al. [3], participants of the study will be clustered based on their attitude towards online mhealth services.

Moreover, the study seeks to elicit to what extent the participants would like to be notified about various circumstances expressed in the form of thematic scenarios. We will examine how the participants' preferences for different types of notifications correlate with the privacy persona resulting from the aforementioned clustering process.

Future Work

Based on the findings of this study, mockups of user interfaces that provide respective types of notifications will be designed. Each design will be user-tested iteratively in terms of its actual usability. Ultimately, we hope to present a prototypical software artifact that implements a usable ex post TET and aids users of online mhealth services to improve their data privacy.

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