

A “Mock App Store” Interface for Virtual Privacy Assistants

Sarah E. CARTER^{a,b,1}, Ilaria TIDDI^c, and Dayana SPAGNUELO^c

^a*SFI Center for Research Training in Digitally-Enhanced Reality (D-Real), Ireland*

^b*Discipline of Philosophy and the Data Science Institute, NUI Galway, Galway, Ireland*

^c*Vrije Universiteit, Amsterdam, The Netherlands*

Abstract. Privacy assistants aim to provide meaningful privacy recommendations to users. Here, we describe a web-based testing environment for smartphone privacy assistants called the “Mock App Store” (MAS). The MAS was developed to test a particular privacy assistant - the value-centered privacy assistant (VcPA) - which assists users in selecting applications based on their value profile. While the MAS was designed with the VcPA in mind, it could also be utilized to test other state-of-the-art privacy assistant technology.

Keywords. Privacy assistant, mobile applications, user studies

1. Introduction

Providing smartphone users with relevant privacy controls remains a formidable challenge. Despite both legislative and sector developments, an overwhelming amount of privacy choices can impact a user’s ability to manage their smartphone privacy. One technology addressing these challenges is the privacy assistant, which provides selective privacy recommendations to a user [1]. Here, we propose a web-based privacy assistant testing environment called the “Mock App Store” (MAS). The MAS was designed to test the value-centered privacy assistant (VcPA) [2,3], which provides recommendations based on user values and app data collection practices. The MAS, however, could be used as a testing environment for other privacy assistants.

2. Mock App Store Design and Privacy Assistant User Testing

The MAS emulates the Apple App Store² and consists of 97 health and fitness apps, with the icon, description, and privacy details displayed [Figure 1]. App metadata, keywords, data collection specifications, and similar applications were collected from the AppTweak API.³ Users can search for apps using a search bar, designed to recognize app keywords, and can download apps to a “virtual smartphone.” The front-end was developed using JavaScript, while all back-end logics for the MAS were done using Python Flask.⁴

¹ Sarah E. Carter; E-mail: s.carter6@nuigalway.ie

² <https://www.apple.com/app-store/>

³ <https://www.apptweak.io>

⁴ Video available at: <https://youtu.be/ziGoowteN6E>

The store was designed to test a prototype system of interest to the research team - the VcPA [2,3]. The VcPA involves assigning users to profiles based on their personal values, such as achievement, benevolence, and security. These in turn are mapped onto acceptable app data collection practices. *Selective notices* are triggered when an app’s practices do not match the profile. Additional notices – called *exploratory notices* – are also utilized to ensure that the user’s profile is still the best match. To provide more user control, the notices *suggest alternative* applications with similar functionality. Value profiles and these notifications were included in the MAS.

Despite these VcPA-specific features, the interface could serve as a testing environment for conducting other privacy assistant user studies. By using a virtual smartphone, the MAS removes the need to access a participant’s smartphone to test a new assistant. This eliminates possible privacy concerns of accessing a participant’s personal device and allows easy sharing with participants. To incorporate their technology, a privacy assistant developer could tune the profiles, apps, and MAS logics to create their ideal testing environment. Other assistants that utilize profiles based on other features, such as app category or specific data collection practice (as in [1]), could modify the profile specifications in the back-end. They could also tune the notices to meet their needs. In addition, while the MAS currently includes app data collection information, icons, and descriptions in a .csv file for a subset of Apple health apps, this could be replaced with any desired app dataset in .csv format,⁵ if needed.

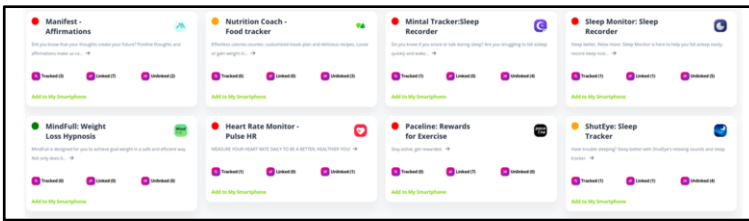


Figure 1. Mock App Store main page. Video demo available at: <https://youtu.be/ziGoowteN6E>

Acknowledgments

This work is financed by the SFI CRT in Digitally-Enhanced Reality (d-real) under Grant No. 18/CRT/6224. For Open Access, the authors have applied a CC BY public copyright license. Additional thanks to Sarah’s PhD supervisors Heike Felzmann (NUI Galway) and Mathieu d’Aquin (LORIA).

References

- [1] Liu B, Anderson MS, Schaub F, et al. Follow My Recommendations: A Personalized Privacy Assistant for Mobile App Permissions. In: Proc. of the 12th Symposium on Usable Privacy and Security; 2016; Denver, CO. USENIX; p. 27-41.
- [2] Carter SE. Is Downloading This App Consistent with My Values? Conceptualizing a Value-Centered Privacy Assistant. In: I3E: Responsible AI and Analytics for an Ethical and Inclusive Digitized Society; 2021 Sept 1-3; Galway, Ireland. Springer, Cham; p. 285-291.

⁵ As each app store has its own manner of categorizing privacy data, the developer may also need to make some small back-end modifications concerning how the privacy information is displayed on the MAS for non-iOS app datasets.

- [3] Carter SE. A Value-Centered Exploration of Data Privacy and Personalized Privacy Assistants. Currently under review.