The Price of Free:
Privacy Leakage in Personalized Mobile In-App Ads

In-app advertising allows mobile application developers to generate revenue despite publishing their work for free. The question is, how much data are users giving away to pay for “free apps”? This paper study how much of the user’s interest and demographic information is known to these major ad networks on the mobile platform. It also study whether personalized ads can be used by the hosting apps to reconstruct some of the user information collected by the ad network.

The major contributions of this paper:

1 to determine which demographic information may have been used for advertisement personalization.

2 Seek ground truth regarding user’s demographics and personal interests and to develop a new methodology for leveraging real users in evaluating the quality of mobile ads personalization.

3 Studied the possibility that app developers can extract user’s demographic information merely by observing personalized advertisements delivered to the user by an ad network.

4 Demonstrated that sensitive information could be leaked through personalized mobile in-app ads

So, by collecting both the profile and observed mobile ad traffic from 217 real users in a survey, the authors found that mobile ads delivered by a major ad network are highly personalized based on both users’ demographic and interest profiles. It also demonstrated that personalized in-app advertising can leak potentially sensitive personal information to any app that hosts ads.