

PrivMetrics:

Quantifying User Privacy in Smartphones

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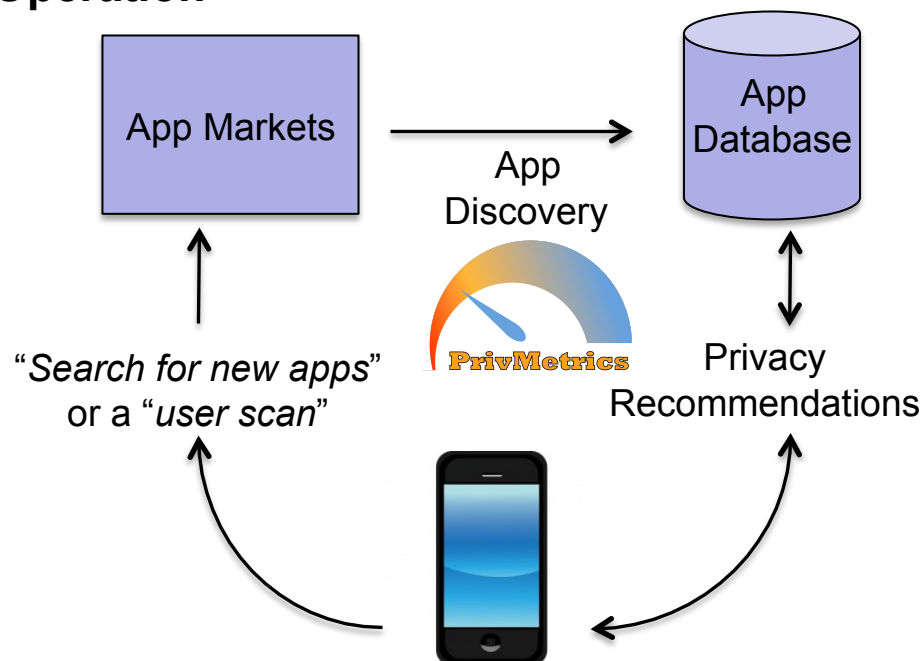
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The Problem

- Smartphone users are being tracked and are prone to “inference attacks” [1], [2].
- *PrivMetrics* is an app which,
 - Measures the current level of user privacy
 - Recommends adjustments to improve user privacy, given the set of apps a user has installed.

Operation



App classification & similar app identification

- Identification of malicious / problematic apps and similar apps using supervised learning

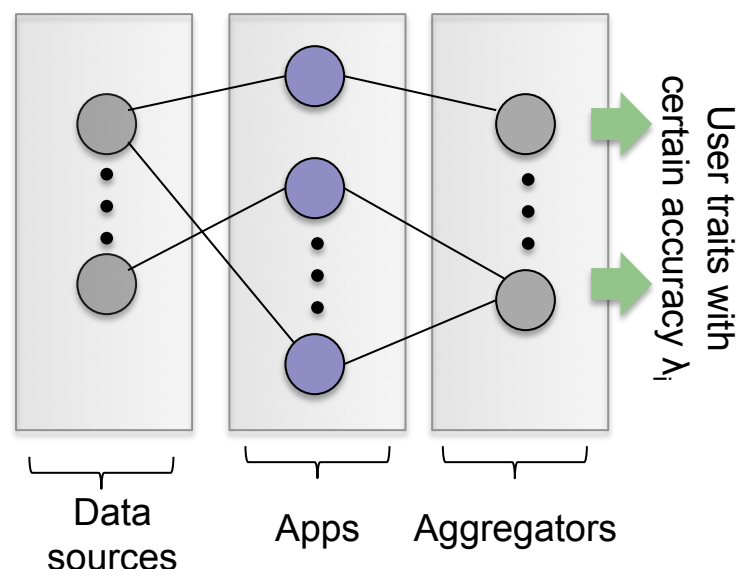
App behavior analysis (static & dynamic)

- Build an app profile on information collected, frequency of collection and connected aggregators.

[1] S Seneviratne, A Seneviratne, P Mohapatra, A Mahanti. “Predicting user traits from a snapshot of apps installed on a smartphone”. In *Proceedings of ACM SIGMOBILE Mobile Computing and Communications Review* 18 (2), 2014.

[2] S Seneviratne, A Seneviratne, P Mohapatra, A Mahanti. “Your installed apps reveal your gender and more!”. To appear in *Proceedings of the 1st International Workshop on Security and Privacy aspects of Mobile Environments in Conjunction with MobiCom 2014*.

Quantifying Overall Privacy (P)



For aggregator i , let

$\Lambda^T = (\lambda_1 \lambda_2 \dots \lambda_p)$, the accuracy vector for user trait p and

$U^T = (u_1 u_2 \dots u_p)$, the vector representing users willingness to share trait p

“Privacy level” w.r.t aggregator i ,

$$X_i = f(\Lambda^T, U^T)$$

Then “Overall Privacy Level”

$$P = g(X_1 \dots X_D)$$

Where D is the number of aggregators and g is the weighted mean function.

Objective: Maximize P , subject to

A_i in $\{A_{i,1}; A_{c1,i}; \dots; A_{cj,i}\}$, $i=1:K$ where

- K is the number of apps

- $A_{i,i}$ is the original application and $A_{cj,i}$ s are the apps providing a similar function to the original.