

# Your Apps Are Watching You



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## Problem Motivation

# You Give Apps Sensitive Personal Information. Then They Tell Facebook.

Wall Street Journal testing reveals how the social-media giant collects a wide range of private data from developers; 'This is a big mess'





A photograph of Donald Trump from behind, standing on a stage and addressing a large, enthusiastic crowd. The crowd is filled with people of various ages, many wearing red 'MAGA' hats and holding up smartphones to record or take pictures. Several individuals are holding signs that say 'TRUMP PENCE KEEP AMERICA GREAT!' or 'Women FOR TRUMP'. The background is a large blue banner with the words 'KEEP AMERICA GREAT!' in white capital letters.

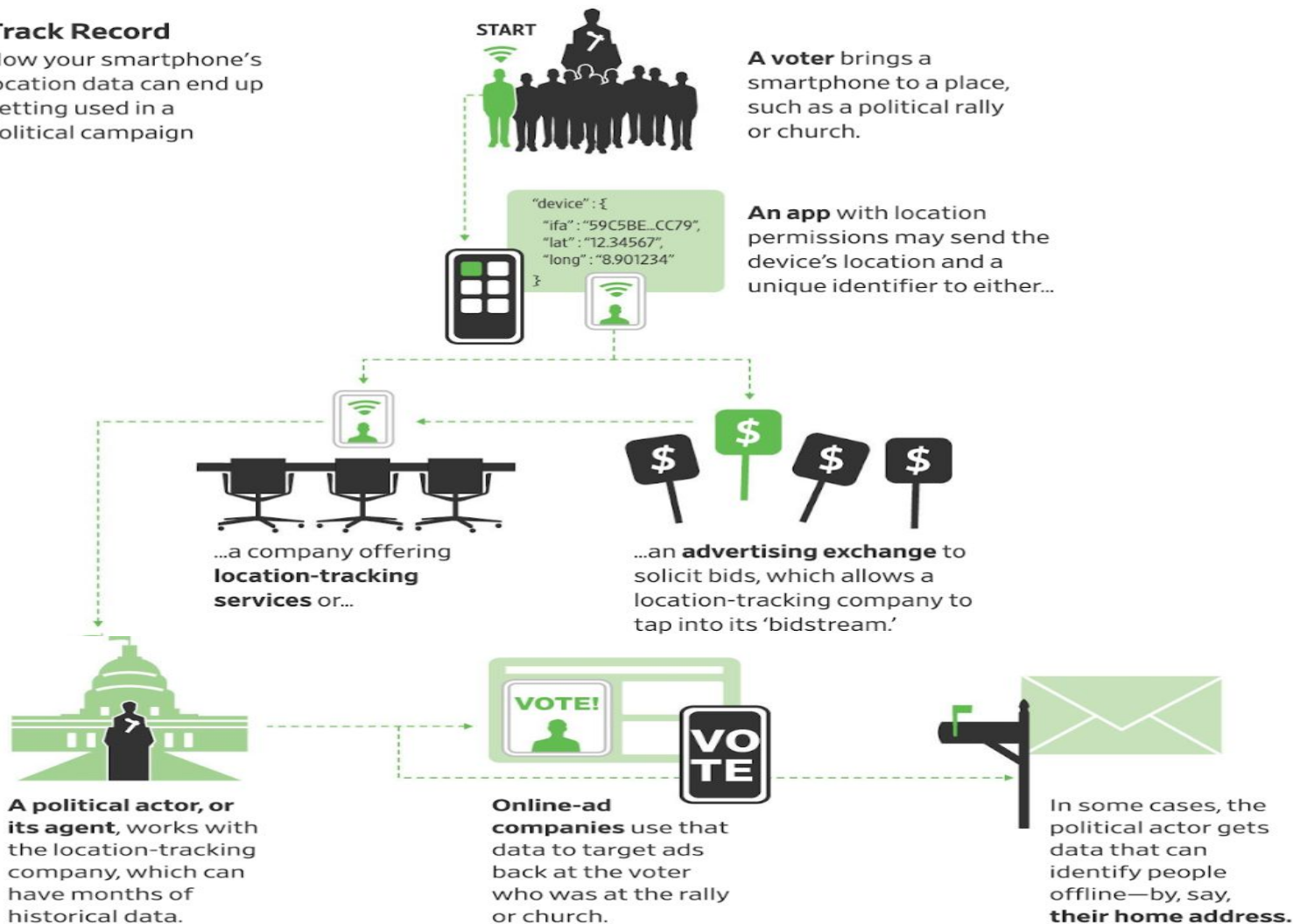
# KEEP AMERICA GREAT!

Political Campaigns Know Where You've Been.  
They're Tracking Your Phone.

Voter targeting has grown more invasive with location data that apps can transmit from cellphones

## Track Record

How your smartphone's location data can end up getting used in a political campaign



# This App Helps You Learn About China, While China Learns All About You

Two recent reports suggest increased sophistication by Beijing in harnessing vast reams of information for political ends



The smartphone app Xuexi Qiangguo has become the most downloaded app in China following its January debut. **PHOTO:** JASON LEE/REUTERS



# App That Makes You a Movie Star ‘Will Throw Your Privacy to the Crematorium’

Users can place themselves in scenes from iconic movies by uploading a selfie; ‘I’m scared, and hurried to delete it’



The app uses deepfake technology, which harnesses artificial intelligence to produce doctored photos, videos and audio recordings. **PHOTO:** IMAGINECHINA/ASSOCIATED PRESS

Are users aware of the potential privacy issues associated with mobile applications permissions?

What are the major concerns of our users ?

Are there any solutions for these issues?

Are the users aware of the protective measures?

# Problem statement

Evaluate the awareness among mobile users regarding the potential privacy issues associated with permissions granted while installing applications, and further suggest scalable security usables which can detect application's non-compliance with privacy policies.



# Proposed approach

1. Conduct a survey to understand the level of user awareness

To identify whether the users know what permissions they are setting, why it is required and how the data is being collected

2. Conduct a detailed analysis to evaluate the existing solutions

Solutions analyzed : App Census, Mobo Clean, Privacy Assistant.

3. Identify a single existing solution or a hybrid solution obtained by contrasting various options and propose it to the users

# Survey Setting

## Purpose:

- Necessity of permission management solutions
- Desirable features to be included in these solutions

## Participants:



# Survey Setting

The survey is mainly divided into 2 sections

## User awareness

- Comprehension questions,
- Readiness to research about permissions

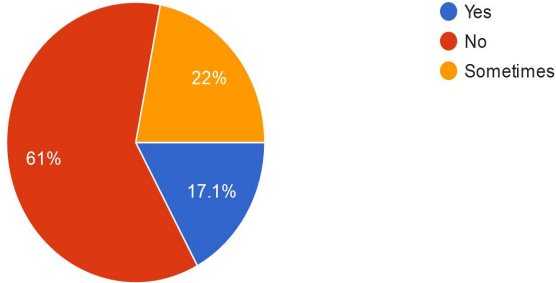
## User Preference

- Requirements and concerns of the users
- Scenario based questions

# Results:

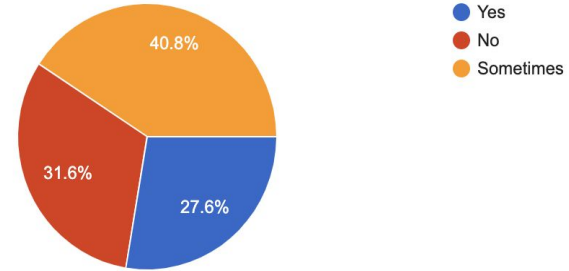
Do you find out about the app (through Google etc.) before you install it to understand the apps potential privacy violations?

82 responses



Do you read through the permissions to understand how much personal information the app is requesting?

76 responses

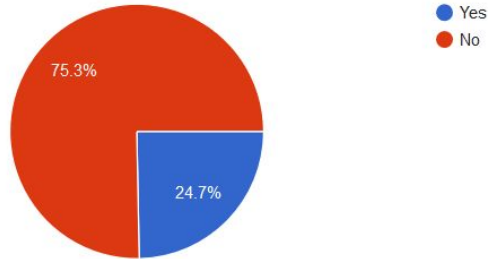




# Reasons: unconcerned?

If your favorite gaming app, requests full access to your Google account, which is absolutely unnecessary for proper functioning of the app, would you still download the app?

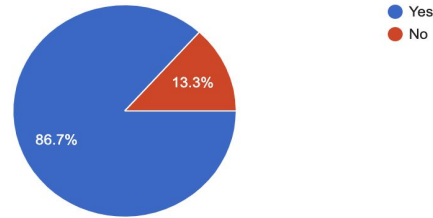
81 responses



Chose privacy over app function

Well maintained modern apps should continue to function if you deny some permissions that you are uncomfortable with (they should also be available to change later). Do you think this should be enforced on application developers?

75 responses

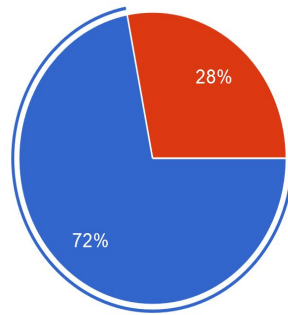


App should function after denying permissions : enforced on app developers

# Reasons: Lack of Danger Awareness??

Have you ever discovered an app has been requesting unnecessary personal information and uninstalled the application?

82 responses



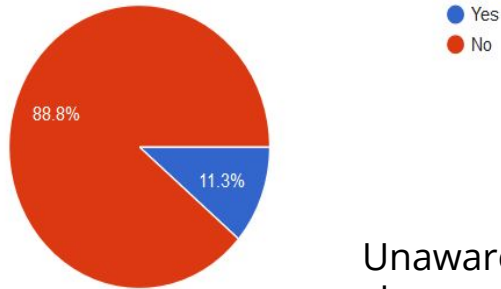
● Yes  
● No

Uninstalled apps requesting  
dangerous permissions

# Techniques of privacy protection

Each user is associated with an advertising ID which if changed, profilers cannot connect data to the same person anymore. Have you ever seen or changed your advertising ID in your phone settings?

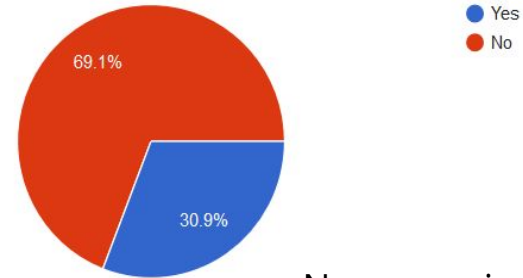
80 responses



Unaware of options to change advertising ID

When manually updating the app, you can review the new permission requests (marked with the word "New" next to it) for a chance to decide if you agree with them or not. Are you familiar with this feature?

81 responses



New permissions on manual updation

# Possible reasons



Time constraint

Incomplete and unclear  
permission requirements





# Summary of Survey Findings

- Clear explanation of each permission and why
- How information collected is used
- Features to deny unnecessary permissions

# Existing Privacy Solutions

- AppCensus - Web application which tags apps as safe/unsafe
- PrivacyAssistant - Android application that uses ML to suggest permissions
- MoboClean - Gives user control to set/deny individual permissions

# Comparison of Solutions

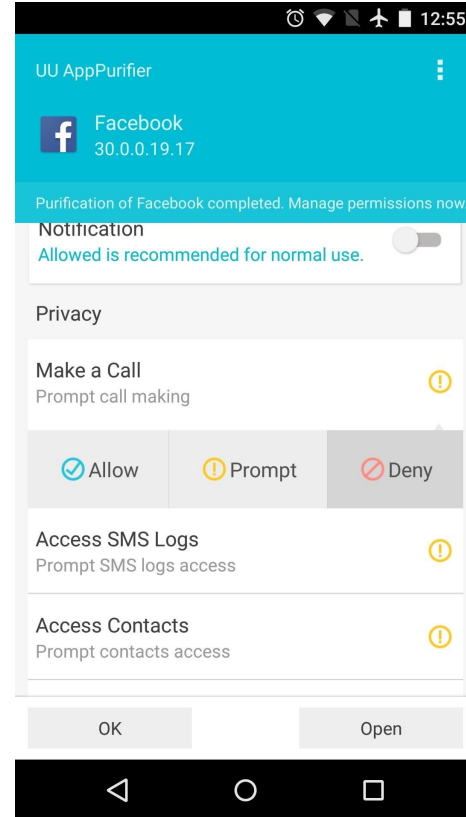
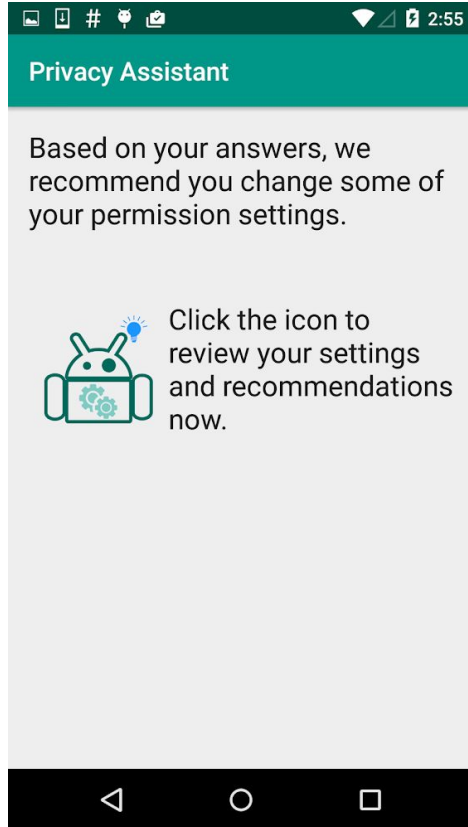
Features	AppCensus	PrivacyAssistant	MoboClean
Platform Specific	No	Yes	Yes
Methods to Control Permissions	No	Yes	Yes
Safety of the Application	Very safe	Unsafe	Moderately safe
Before vs After Download	Before	After	After

# Comparison (contd.)

Features	AppCensus	PrivacyAssistant	MoboClean
Provides Privacy Recommendations	Yes	Yes	No
Recommendation Mechanism	Tags applications as safe or unsafe	Uses ML to suggest privacy settings	-
Testing a New Application	Not always	Independent of popularity	Independent of popularity



# Proposed Solution



# Proposed Solution (contd.)

- Privacy Application - hybrid of PrivacyAssistant and MoboClean
- Privacy suggestions to user, and control without ROOT access
- Explanation for permissions during development

# Discussion

Questions?

# Limitations and Future Work

- Unknown sources allowed to make changes
- Uninstall and reinstall
  - May lose data
  - Not good UX
- More user awareness
- Better ways to give suggestions during installation