

Location Privacy Enhancing Tool Study

We are conducting this study to analyze a location privacy enhancing mechanism. This study should take 20 minutes to complete.

To participate in this study, you have to satisfy the following:

1. Own an Android powered device with new android (newer than 4.0)
2. Installed and used Yelp within the last year
3. Have a Google account that allows downloading apps from Google Play
4. Have the Android device handy and connected to the internet to download apps.

Throughout this study, you will be asked to download and run an app that collects no personal information about you. The app's permission list doesn't contain Internet permission. The app has no way of communicating any information outside the device.

If you agree to the above, you can proceed with the study.

* Required

Demographics

First, we are asking a couple of questions to learn more about our participants' demographics. You have the choice not to answer these questions.

1. **What is the highest degree or level of school you have completed? If currently enrolled, highest degree received.**

Mark only one oval.

- High school
- Trade/technical/vocational training
- Associate or Bachelor's degree
- Post Graduate Degree

2. **What is your gender?**

Mark only one oval.

- Male
- Female

3. **What is your age?**

Mark only one oval.

- 15-29 years old
- 30-44 years old
- 45-59 years old
- 60 years or older

Pre-study Questions

4. **Do you think that apps that know your location can pose privacy threats? In the rest of this survey we refer to these apps as location-aware apps. ***

Mark only one oval.

- Yes
- No
- I don't know

5. **Do you care about potential privacy threats that location-aware apps might pose? ***

Mark only one oval.

- Yes
- No

6. **Have you taken any step to try to protect your location privacy? ***

Mark only one oval.

- Yes
- No

7. **Would you install an app or a tool to protect your location privacy? ***

Mark only one oval.

- Yes
- No

8. **What factors would affect your decision to install an app that protects your location privacy? ***

Check all that apply.

- Usability of the location privacy protection app
- Impact on other apps functionality
- Ease of installation of the location privacy protection app
- Impact on battery
- Other:

Do you have Mock locations enabled?

If you don't know what mock locations are, please answer "No" to the question below.

9. **Do you have mock locations enabled on your device? ***

Mark only one oval.

- Yes *Skip to question 11.*
- No

Location Settings

We would like to ask you to enable the location settings on your device for the purpose of the study.

1. Open the "Google Settings" app

2. Tap the location entry, this will open the location settings
3. Toggle the location settings to enable location
4. Tap on "Mode" and select the "High accuracy" option

Preparing your device

In the following, we help you enable mock locations on your Android device. If you have it enabled, please proceed to the next page.

Enable Developer Settings

1. Open the Settings app on your device
2. Open the "About phones" setting
3. Tap the "Build number" 7 times, Developer options will be enabled
4. Go back to the main settings menu.
5. You should see Developers options appearing in the settings above the the "About phone" setting

Enable mock locations on the device

1. Open the developers options
2. Locate the debugging menu
3. Under the debugging menu, you should see the option: "Allow mock locations"
4. Select that option.

Mock locations will be enabled on your device. Don't worry we will ask you to disable them at the end of this survey.

10. **How hard was the above task (enabling both developer options and mock locations on the device) ***

Mark only one oval.

	1	2	3	4	5	
Easy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Hard

Preparing your device

In the following, we will continue preparing your device for the study. This step includes installing our app from Google Play and uninstalling Yelp (temporarily).

Uninstall Yelp

Uninstall Yelp app from your device if you have it installed. Don't worry -- you'll be asked to install it again.

Install LP-Doctor

Install LP-Doctor: https://play.google.com/store/apps/details?id=edu.umich.eecs.rtcl.lp_doctor

Or, you can search for "LP-Doctor" on Google Play and install it.

Task 1

Open LP-Doctor and press the button labeled "run".

The app will check if all the settings have been correctly enabled. It will inform you by displaying the phrase "Completed" next to task 1.

Also, the app will display a string of characters below the phrase above. Please type it in the box below.

11. **Enter the text that appears on the app, next to "Task 1 completed", below ***

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Task 2

Install Yelp again on your device, but please don't run it just yet.

Once installation has been completed, a screen should appear, follow the instructions and then answer the questions below.

For the purpose of the study and regardless of your choice, a notification will appear on the top left of the screen. Please ignore it for the time being. We will get back to it later.

12. **While installing Yelp, did you notice Yelp requesting location permissions? ***

Mark only one oval.

- Yes
 No

Installation Menu

In the following questions, we will ask you about the menu appearing after you installed the app.

13. **How can you describe the menu that just appeared? ***

Mark only one oval.

	1	2	3	4	5	
easy to handle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	intrusive

14. **Was the menu containing the options informative? ***

Mark only one oval.

- Yes
 No
 I don't know

15. **How useful do you think having such options whenever you install a location-aware app? ***

Mark only one oval.

	1	2	3	4	5	
very useful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	no useful at all

16. **Do you think this menu gives you more control as compared to Android's permissions? ***

Mark only one oval.

- Yes
- No
- I don't know

17. **Would you like to have such menu appearing every time you install a location-aware app? ***

Mark only one oval.

- Yes
- No
- I am not sure

18. **Open the LP-Doctor app and enter the text appearing next to "Task 2 Completed": ***

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Interacting with Yelp

Now, we have added noise to your location. Yelp doesn't know your accurate location.

Please go ahead and open Yelp; use Yelp as you would do so every time.

Go to the main menu, tap on nearby. Then click on Restaurants; a list of nearby restaurants will appear. Scroll through them.

At the end of the Restaurants results page, you should find a button labeled "Map".

Tap on Map button and look for you location (blue dot). Also, the results will be displayed as red markers around your location.

19. **Does Yelp function normally? ***

Mark only one oval.

- Yes
- No
- I don't know

20. **Describe the results that Yelp displayed ***

Mark only one oval.

1 2 3 4 5

Very relevant Not relevant at all

21. **Is your Yelp experience different than usual? ***

Mark only one oval.

- Yes
- No
- I don't know

26. **Would you like to have such feature available every time you run an app that pose location privacy threats? ***

Mark only one oval.

- Yes
- No
- I am not sure

Post-study Questions

After completing the tasks above, we would like to ask for your opinion about a few more things.

27. **Would you like the app to prompt you every time you visit a new location. This will allow LP-Doctor to decide whether apps should know you are visiting that location or no? ***

Mark only one oval.

- Yes
- No
- I don't know

28. **Did you feel comfortable that Yelp couldn't access your accurate location? ***

Mark only one oval.

- Yes
- No
- I don't know

29. **Would you now consider using LP-Doctor or a similar tool to protect your location privacy? ***

Mark only one oval.

- Yes
- No
- I don't know

30. **Please open the LP-Doctor again, and enter the text appearing next to "Final Task Completed". Also enter this text in the Amazon HIT question. ***

This will indicate to us that you have successfully performed the tasks.

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Thank you!

Now that we are done with the study, we would like you to perform the following:

1. Uninstall LP-Doctor.
2. Go back to the developer options in the settings menu.
3. Tap the developer options.
4. Toggle the developer options off; this will disable both mock locations and developers settings.

We would like to thank you for your participation in this study. Your feedback is very valuable to us.

31. Finally, please enter your worker ID so that you get reimbursed. Please don't put any identifiable information in this field. *

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