Poster: Exploring User Perceptions and Expectations of Privacy in City-wide WiFi Services

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Abstract—This study seeks to understand user perspectives and expectations on privacy practices of city-wide free WiFi services. We conduct surveys with both participants who have used the services and who have not yet, asking questions about city-wide free WiFi services, including their experiences and expectations of privacy from such public services and experiences. We find that participants think that the city-wide WiFi services collect and share user information. Participants want to be informed about what information services collect and the usage, and with whom do the services share information. However, we find that participants usually consider privacy policies confusing and lengthy, and expect a simple, short, and easily obtainable description of data privacy from city-wide free WiFi services before using the service.

I. Introduction

With growing technology and urbanization, smart cities are becoming more popular. Smart city initiatives are contributing to the urban areas by providing public safety, a healthy environment, public transport, and many other facilities. Providing free WiFi in public places is one of the basic smart city initiatives. For instance, New York, one of the top-tier cities in the United States, launched LinkNYC [1] WiFi service aimed at providing city-wide high-speed Internet for free.

Due to the growing uses and popularity of city-wide free WiFi services, it raises privacy concerns among users. A user has little control over how their information is maintained when using free WiFi services. However, according to privacy-focused regulations such as the European General Data Protection Regulation (GDPR) [2], the Californian Consumer Privacy Act (CCPA) [3], and Virginia Consumer Protection Act (VCPA) [4], users have rights to know the data privacy practices of organizations.

This work makes an effort to comprehend users' understanding of privacy practices of city-wide free WiFi services as well as their expectations from these kinds of services. Therefore, we aim to answer the following research questions:

RQ1: *What were the participants' experiences of using city-wide free WiFi services?*
RQ2: *What are participants' perceptions about current privacy practices in city-wide free WiFi services?*
RQ3: *What privacy practices do participants expect from the city-wide free WiFi services?*

In this work, we address these questions by surveying both people who have used city-wide free WiFi services and who have not used them yet.

II. Survey Method

We conducted an online survey to explore user perceptions and expectations of the privacy practices of city-wide free WiFi services.

A. Study Procedure

We want to explore the perceptions and expectations of both those who have used and who have not used the city-wide free WiFi services. To do this, we conducted a screening survey and then the main survey.

Screening Survey. In this screening survey, we asked participants whether they have ever used city-wide free WiFi or not. Based on the responses, we invited participants who have used the city-wide free WiFi services to our main survey which has some questions about experiences of using WiFi services. Expect the questions related to the experiences of using WiFi services, all other questions were the same.

Main Survey. Our main survey has six following sections:

1) User Experience: Participants who have used city-wide free WiFi services, were asked to share their experience of using the services.
2) Data Collection: Participants were asked about their perspective on data collection of city-wide WiFi services.
3) Data Retention/Storage: Participants were asked about their perspective on data retention of WiFi services.
4) Data Sharing: Participants were asked about their perspective on information sharing of the WiFi services.
5) Privacy Policy: Participants were asked questions related to the privacy policy of city-wide free WiFi services.
6) Demographic Information: Finally, we asked participants to provide some demographic information(particularly, age, gender, education, and occupation).

B. Recruitment and Demographics

We recruited participants on Prolific[1]. In the screening survey, we got responses from 707 participants. We got valid responses from 99 participants who have used free WiFi service and 100 participants who have not used the free WiFi service yet. We compensated all of our participants.

In our main survey, 82.91% of participants do not have an education in, or work in, the field of computer science, computer engineering, or information technology. All of our

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[1]https://www.prolific.co/

participants were at least 18 years old and current residents of the United States.

C. Ethical Considerations and Limitations

The study protocol was approved by Institutional Review Board (IRB) on 2021/07/23. Participants were informed about the goal of the study before participating, and they willingly provided their consent to participate in the study.

Our study is limited by the fact that all of our participants are from the United States. However, some participants shared their experiences of using free WiFi services outside of the United States such as in London, Dubai, France, Rome, Madrid and South Korea.

III. FINDINGS

A. User Experience of Using the WiFi Services

When participants were asked to share their experience with the city-wide free WiFi services, most of the participants stated that they have a satisfactory experience. They also stated that the connection was slow.
"It provided what I needed, but it wasn't as fast as my home internet."

Participants noted 75 unique places where they have used city-wide free WiFi services. Among all places, the most (28 out of 99) mentioned place is New York City.

B. User Perception of Privacy in the WiFi Services

When participants were asked about their understanding of the data privacy practices of city-wide free WiFi services, most of the participants think that the WiFi services collect personal information from users and share it with others. However, they are not comfortable with the city collecting information as a part of WiFi services.
"I don't like the idea of my information being collected by a free city service."

Whereas, some participants think that the city needs some information for their service. According to the participants' responses, *location* is the most collected information by the services.
"I am somewhat comfortable due to the fact that it's free so they're needing some kind of information to receive the data that they need to know how many people are using their service in the demographic of those people using the services of free WiFi."

When participants were asked about storing information by the WiFi services for later use, most participants mentioned that they feel uncomfortable about it. However, nearly half of the participants agreed that the services may store the information for one month. Among other participants, the majority of participants are not sure about the time frame of data retention.

When participants were asked about data sharing, most of the participants think that they are uncomfortable with information sharing. In addition, most participants mentioned that they would not provide consent to the WiFi services to collect information if the information be shared with third parties.
"I would not want my information shared with third parties because I do not know what it will be used for."

C. User Expectation of Privacy in the WiFi Services

Most participants strongly agree that they should have the right to know about what information services collect and their usage and with whom do they share with, the right to delete the information, and the right to opt-out of selling/sharing of personal information. That is, they expect to have more control over the information collected by the services.
"I would need to know what was being collected, what it would be used for, and why."

Although participants know that the information is collected by the services, they do not expect services to share information with others. Nearly half of the participants stated that no information should be shared with others.

The two most common reasons for not being interested in reading the privacy policy are long and confusing documents and requiring a long time to read. Therefore, they expect a simple, short, and easily obtainable description of data privacy from city-wide free WiFi services.
"The privacy policy is often long and full of jargon. It seems they are intentionally written that way so that people do not want to take the time to read and understand them before agreeing."

IV. DISCUSSION

Based on the findings from the study, we have recommendations for WiFi service providers and users.

- Participants are aware of the privacy of their information and want to be informed while using public services. Therefore, we recommend service providers to inform users about data privacy and ask for consent from users. That is, they should make the privacy practices more transparent to users.
- Participants find privacy policies are often confusing and lengthy, and they expect a simple, short, and easily obtainable description of data privacy from city-wide free WiFi services. Therefore, we recommend that service providers should make a short and comprehensive summary of privacy policy so that users can easily understand within a short time.
- Our last recommendation is for users. Although the WiFi is free, users should read the privacy policy properly before agreeing with all terms and conditions.

V. ACKNOWLEDGMENT

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