Informing the Design of Privacy Awareness Mechanisms in Smart Homes from Users’ and Bystanders’ Perspectives

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Connected Devices Share More Data Than Needed, Study Says
Smart speakers and streaming sticks are among the household gadgets transmitting information to advertising companies and other third parties

Security cameras can tell burglars when you're not home, study shows
Bystanders

User
Bystanders

User
What We Don’t Know?

• What factors influence users' and bystanders' preferences of receiving privacy notifications in smart homes?

• Which modality do users and bystanders prefer to receive privacy notifications in smart homes?

• How do the preferences differ between users and bystanders in smart homes?
What Did We Do?

- Survey: 136 Users, 123 Bystanders (18 to 54 years old)
- Gender: 31% Male, 65% Female, 4% Non-binary

("It would probably turn into a social faux-pas": Users’ and Bystanders’ Preferences of Privacy Awareness Mechanisms in Smart Homes, CHI’22)
What Did We Find?

• Perceived benefits and drawbacks for four privacy awareness mechanisms

• Comparisons between users and bystanders for notification preferences in four scenarios
Privacy Dashboard

(U): Users, (B): Bystanders, (U&B): Users and Bystanders

Benefits
- Provides detailed information (U&B)
- Centralized source of information (B)

Drawbacks
- Lack of control (U&B)
- Violates social norms (B)
Data App

Benefits
- Accessible from private devices (U&B)
- Provides detailed information (U&B)

Drawbacks
- Has security concerns (U)
- Invades user privacy (B)

(U): Users, (B): Bystanders, (U&B): Users and Bystanders
Ambient Light (Demo)

Benefits:
- Easy to understand (U&B)
- Unobtrusive notifications (U&B)

Drawbacks:
- Not informative (U&B)
- Psychological burden (B)

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Encrypted traffic  Regular traffic  Tracking traffic
Privacy Speaker (Demo) (U): Users, (B): Bystanders, (U&B): Users and Bystanders

Benefits
- Is effortless (U&B)
- Reduces social confrontations (B)

Drawbacks
- Not informative (U&B)
- Annoying and intimidating (U&B)

“Your LG smart TV is collecting a large amount of data that could be very privacy-invasive”
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“Your LG smart TV is collecting a large amount of data that could be very privacy-invasive”
Comparing Users’ & Bystanders’

Users tend to prioritize **device utility** over privacy protection.

Bystanders tend to consider **social factors** such as social relationship and power dynamics.
How Do We Move Forward?

Easy and Equal Access

Unobtrusive Modality

Privacy Notice at Smart Home Level

Privacy Choices Along with Privacy Notice
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Have questions? Email us at: yaxingyao@umbc.edu