NIST
National Institute of Standards and Technology
U.S. Department of Commerce

Smart Home Updates

User Perceptions & Experiences

INFORMATION TECHNOLOGY LABORATORY

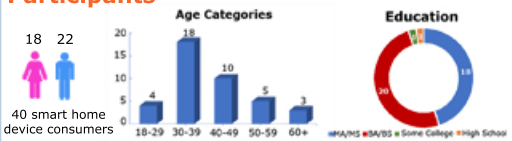
Purpose

- Smart home update mechanisms and user behaviors have not yet been explored.
- We gained insight into user perceptions of and experiences with smart home updates in an initial study.

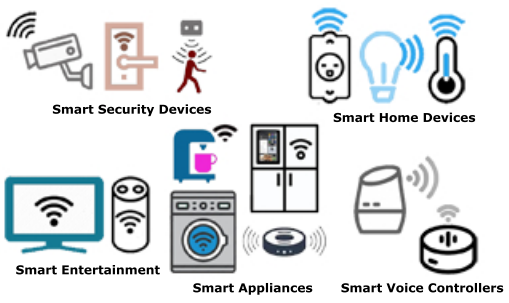
Method

- We conducted semi-structured interviews of 40 users of multiple smart home devices.
- Interviews covered overall experiences with smart home devcies, including privacy and security.
- Observations about updates came from analyzing a subset of data.

Participants



Participant Device Categories



Smart home device updates are important tools for users to remediate security vulnerabilities and protect devices from future attacks.

Preliminary Results

Update Purpose & Urgency

Participants most often viewed updates as fixing or adding non-security functionality, so there were mixed opinions on urgency.

"[Smart home apps have]the highest priorities than any of the other apps on my phone...because that's the security of my home."

"I don't think that the end user actually really cares. As long as the thing works, it

Uncertainty about Update Status

Inconsistencies in update mechanisms may lead to confusion about when and if devices are being updated.

"I'm assuming that updates are being done silently in the background. I don't really know, it sort of gives the impression that you bought this thing and it's evolving...that it's not expanding and getting new updates."

Update Concerns

Participants voiced concerns about updates causing issues or breaking functionality on their smart home devices.

"I've had to reset my TVs many times because the software update didn't work or kind of messed things up."

Update Modes & Notification

Participants observed variability across devices for update installation methods and how they are notified.

"Some of them notify me, others update automatically, and others I'll find out about either through an email or just because I'm kind of monitoring technology news in general."

Device vs App Updates

Participants often confused updates to smart home device companion app software with device firmware.

"I get a notification. It doesn't say specifically which apps need to be updated. It just says 48 apps need to be updated."

Relationship to Security

Participants rarely viewed updates as being related to security.

"I found that I'm updating everything a lot more...just kind of keeping up with the technology because it is so important"

Summary

Update modes and notifications are inconsistent, often leaving users with uncertainty about update availability and status. Our participants rarely viewed updates as being security mitigations. The lack of transparency on update purpose may contribute to this disconnect.

Discussion

- Smart home updates and user behaviors have some similarities to traditional IT updates, but also differences:
  - less mature update models
  - concern over product abandonment
  - ownership of a greater number of devices
- Opportunity for improved updates:
  - more transparency on status and purpose
  - greater user control
  - standard interfaces

Follow-up Study

- Planning a follow-up survey focused on updates for more detailed insight.
- Broader population.
- Per-device updated insights.

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