Understanding the privacy policies of IoT devices helps us convey data handling practices of a company. Privacy policies are the primary medium for conveying data handling practices of a company. Even in cases where smart home policies were available, they do not provide policy that apply to smart home devices, hindering market adoption.

Availability Analysis

- 63/596 vendors do not provide any privacy policy while 225/596 do not provide policy that apply to smart home products. We were able to obtain privacy policies for 292 vendors.
- 160/596 vendors did not post privacy policy links on their homepage marked with “privacy” or similar phrases, which may violate privacy regulations.
- Even in cases where smart home policies were available, they can be very difficult to obtain, with 42/292 requiring us to execute vendor’s apps to obtain policy while 21/292 policy were available only in Google Play Store.

Coverage Analysis

50/292 vendors discuss device data only for a subset of the devices they sell in their privacy policies.

Vendors do not differentiate their privacy disclosures for devices that produce similar data but have vastly different privacy implications e.g., disclosure concerning video doorbell and baby monitors.

Vendors 29/292 vendors describe the collection of device data precisely, but also discuss irrelevant data possibly due to the use of templates.

Broad statements used to describe device data collection may not always denote insufficient precision.

Motivation

- Smart home device usage data can be used to profile users.
- Users have significant privacy concerns about IoT devices, hindering market adoption.
- Privacy policies are the primary medium for conveying data handling practices of a company.
- Understanding the privacy policies of IoT devices helps us gauge the privacy guarantees promised to users.
- We perform the first large-scale evaluation of vendor-provided smart home privacy policies.

Content Analysis

- 74/292 privacy policies do not disclose specific device or device data when discussing data collection. e.g. “service usage information” or “sensor information.”
- 186/292 privacy policies do not discuss sharing practices of data collected from smart home devices while 70/292 do not specify with whom data is being shared.
- Existing state-of-the-art privacy policy analysis tools fail to properly reason about 196/292 smart home device policies due to structural and semantic challenges.
- 8/292 vendors explicitly state they do not collect any information. 6 do not discuss sharing at all.

Impact Evaluation

- Our findings impact vendors whose products are used by millions of users as indicated by our impact metrics.

Takeaway

- Our findings motivate the need to improve precision and completeness at which device data is discussed in smart home privacy policies.
- Our accessibility analysis highlights the user burden in effectively evaluating the privacy repercussions of smart home devices.
- Our study motivates the need for the effective standardization of privacy policies, so that automated tools can be developed to reduce cost and effort for both vendors and consumers.

Responsible Disclosure

We have reported our findings to 506 vendors. We received 113 responses, out of which 71 were automated responses, 6 reported that they are in the process of updating privacy policies and 9 vendors had already updated their privacy policy.