THE COUNTY OF SANTA CLARA
1850

Privacy Champions

Privacy and the Internet of Things: Smart Speakers and Beyond

April 26, 2019

Agenda

Background on the Internet of Things

Smart speakers and privacy

What’s in store for the future?

Privacy and security steps to consider

Background

- Background on the Internet of Things
- Smart speakers and privacy
- What’s in store for the future?
- Privacy and security steps to consider

What is the IoT?

- Networked devices that can collect information
- Fitbits, Fuelbands, etc. that can track the steps you take in a day, calories burned, and minutes asleep
- Baby monitors, thermometers, scales, that are connected to a network
- Nest Thermostat; connected ovens, refrigerators, and other appliances; and home electricity and water-usage tracker
- “Smart speakers” such as Amazon Alexa and Google Home
- Additional devices, sensors, data points considered in the future

Numerous devices bring benefits and questions

- 200 billion connected sensor devices will be in use by 2020, with a market size of roughly $2.7 trillion to **$6.2 trillion** per year by 2025.

- A 2017 Gallup poll found that **20 percent** of Americans used smart home devices like thermostats and lighting.

- **Benefits**: Can be very useful, they are fun, they are convenient.

- **Questions**: Who owns the data these sensors generate? How can such data be used? Are such devices, and the data they produce, secure?

Smart speakers and privacy

- Background on the Internet of Things
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What are smart speakers?

"A smart speaker is a type of wireless speaker and voice command device with an integrated virtual assistant that offers interactive actions and hands-free activation with the help of one 'hot word' (or several 'hot words')."*

*Source: Wikipedia

How do they work…

Device monitors for the ‘wake word’ or ‘hot word.’

Once activated, information is sent to company servers for processing.

Third parties can also obtain access, for example, where “skills” or additional functionality is involved.

Where are they and what can they “hear”?

Home: the canonical private space

Conversations: from silly to intimate and everything in between

Society: from workplace and shopping to business uses and transportation

Where else might they be used and what can they “hear”?

Other sensitive locations, such as hospitals

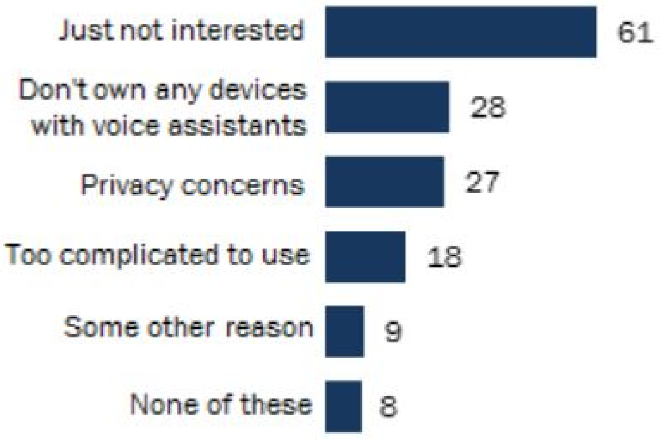
Could be deployed potentially anywhere

Could be used to listen to anything

How do people feel about them?

Many Americans who do not use voice assistants are simply not interested

Among U.S. adults who do not use digital voice assistants, % who say they do not because ...



Note: Figures may add to more than 100% because multiple responses were allowed.
Source: Survey conducted May 1-15, 2017.

PEW RESEARCH CENTER

- **Value**
  - 53 percent of respondents feel that IoT makes their lives more convenient.
  - 47 percent say IoT makes them more efficient, and 34 percent say IoT increases their safety.

- **Trust**
  - Only **9 percent** of respondents say that they trust that their data collected and shared through IoT is secure.
  - Only **14 percent** feel that companies do a good job of informing them what data is being collected and how it is used.

What are the privacy implications?

"Privacy": An essentially contested concept, like art, freedom, or democracy

Legalistic approach: 4th Amendment – "reasonable expectation of privacy"

Sociological approach:

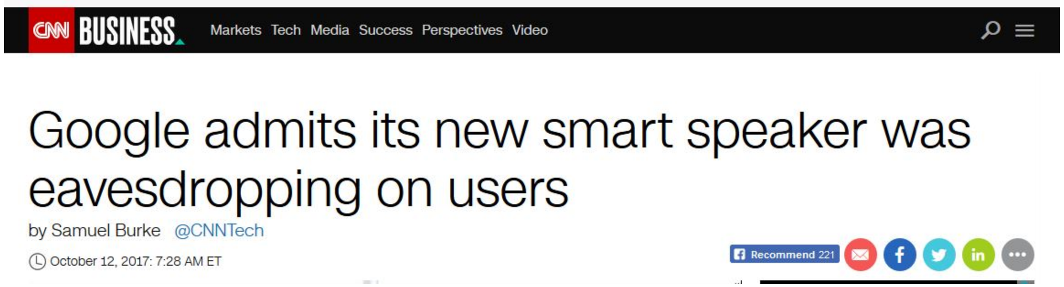
- "Privacy is the claim of individuals, groups, or institutions to determine for themselves when, how, and to what extent information about them is communicated to others." – Alan Westin

- Privacy states: solitude, intimacy, anonymity, reserve.

These **states** are all aspects of being inside a home, and thus smart speakers have the potential to impact all of these states.

How IoT Devices Sometimes do not Work

CNN

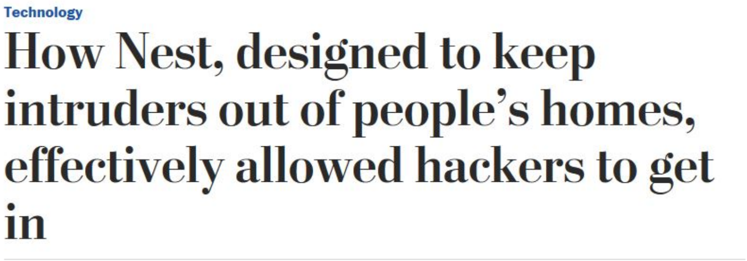


Google admits its new smart speaker was eavesdropping on users

by Samuel Burke @CNNTech

October 12, 2017: 7:28 AM ET

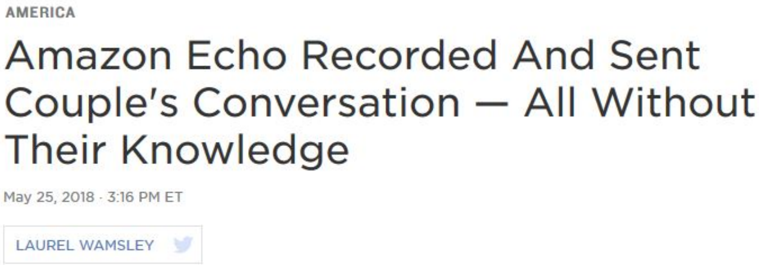
Washington Post



Technology

How Nest, designed to keep intruders out of people's homes, effectively allowed hackers to get in

NPR



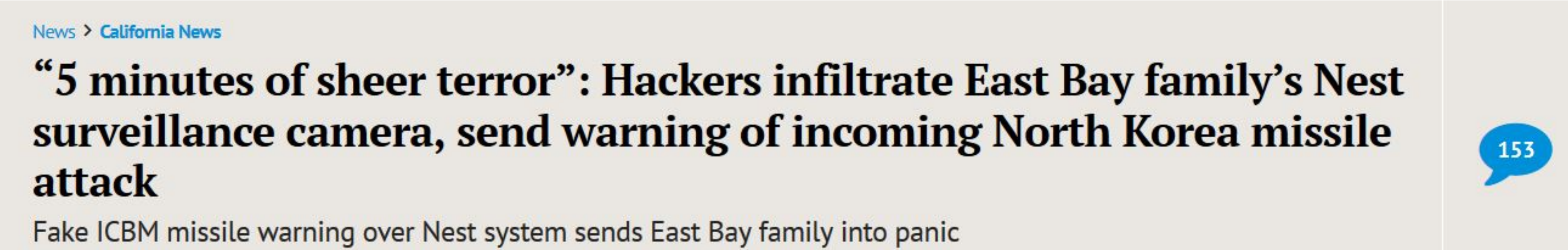
AMERICA

Amazon Echo Recorded And Sent Couple's Conversation — All Without Their Knowledge

May 25, 2018 · 3:16 PM ET

LAUREL WAMSLEY

Mercury News



"5 minutes of sheer terror": Hackers infiltrate East Bay family's Nest surveillance camera, send warning of incoming North Korea missile attack

Fake ICBM missile warning over Nest system sends East Bay family into panic

Legal frameworks

Constitutional	
4th Amendment: “The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated … .”	• Applies to government • 3d party doctrine
Statutes related to electronic communications	
Federal: ECPA: Wiretap Act, Stored Communications Act	All deal with transmitting and storing voice recording
State: California Wiretapping Law (Cal. Penal Code s. 632)	California makes it a crime to record or eavesdrop on any confidential communication, including a private conversation or telephone call, without the consent of all parties to the conversation.

Legal frameworks

Consumer Protection	
Federal and state consumer protection statutes	Requires companies to abide by their terms of service
Children	
Children’s Online Privacy Protection Act (COPPA)	Requires verifiable parental consent before collecting a child’s personal information.
Proposed	
AB-1395: Smart Speaker Privacy Act	• Would change preference for storage and exchange of recordings from **opt-out** to **opt-in**. Consumers would have to affirmatively consent to storing their recordings. • Scheduled for a hearing on April 30 in the CA Assembly Privacy and Consumer Protection Committee

What's in store for the future?

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Advertising

- **Patent applications**
  - Amazon envisions the next wave of Alexa-enabled devices using information collected to build profiles on anyone in the room to sell them goods.
  - Amazon describes how a “voice sniffer algorithm” could be used on an array of devices, like tablets and e-book readers, to analyze audio almost in real-time when it hears words like “love,” bought” or “dislike.”
- **Targeted ads based on IoT information**
  - E.g. smart thermometers

State (emotion, health etc.) detection

- **Mischief**
  - One application details how audio monitoring could help detect that a child is engaging in "mischief" at home by first using speech patterns and pitch to identify a child's presence, one filing said. A device could then try to sense movement while listening for whispers or silence, and even program a smart speaker to "provide a verbal warning."*

- **Mood**
  - Voices could be used to determine a speaker's mood using the "volume of the user's voice, detected breathing rate, crying and so forth," and medical condition "based on detected coughing, sneezing and so forth."*

*New York Times

Additional issues to consider

Oversharing

Some fitness trackers/wristbands share large amounts of data by default.

Subject to hacking/hacked passwords

Home security cameras accessed using hacked passwords allowed intruders to warn homeowners of a fake missile attack or threaten to kidnap a child.

Potential for abuse

Improper or unexpected internal access to personal information.

Secondary uses of information

Fitness tracker data shared with/sold to insurers?

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If you own a smart speaker or other IoT device – privacy and security steps to consider (1 of 2)

- Use different passwords for different accounts.
- Enable two-factor authentication.
- Make sure devices are running the latest software updates.
- Make sure your WiFi network is secure and be sure to protect it with a strong password (e.g., passphrase or eight character alpha-numeric with at least one special character).

If you own a smart speaker or other IoT device – privacy and security steps to consider (2 of 2)

- Review recordings and consider deleting them.
- Require a PIN for purchases (if an option).
- Consider using it for things that are unlikely to be risky. “Play me some jazz” is less problematic than “let my sister know we’re away for a week and don’t need the car back.”
- Review privacy settings and set them in ways that align with your expectations.

Questions & Answers (open)

Privacy Office Contact

Email: PrivacyOffice@ceo.sccgov.org
Internal website: https://sccconnect.sharepoint.com/sites/cpo
External website for constituents: https://www.sccgov.org/sites/cpo