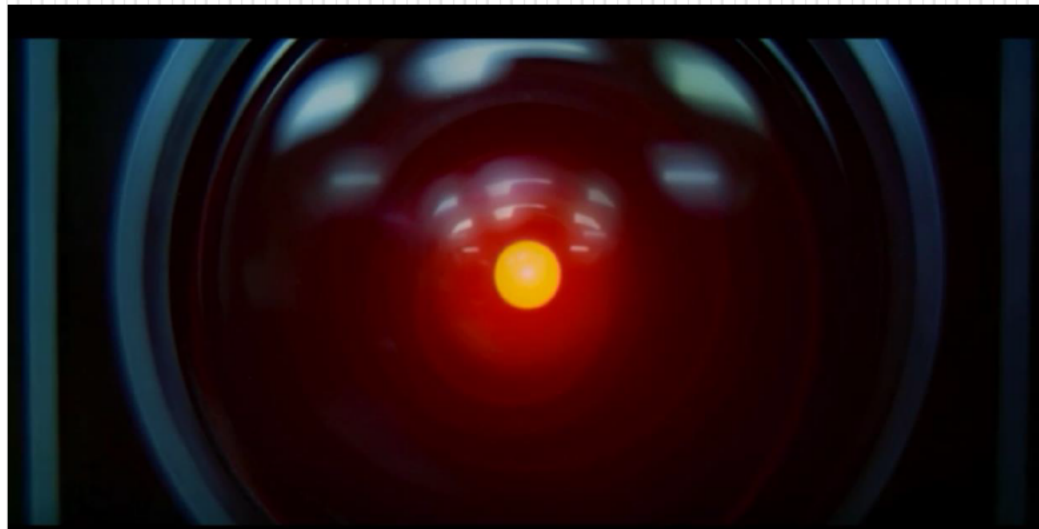


# The Dark Side of Personalisation: AI, voice recognition and beyond



Ediz Akcay, Bournemouth University


# Outline

- Industry overlook
- Marketing Ethics
- Personalisation, Voice Recognition, AI
- Helpful Examples
- Potential Problems
- Your Examples? Q&A

Do you have any of these devices  
at home?



# bit.ly/buvoice

 **STRAW POLL**

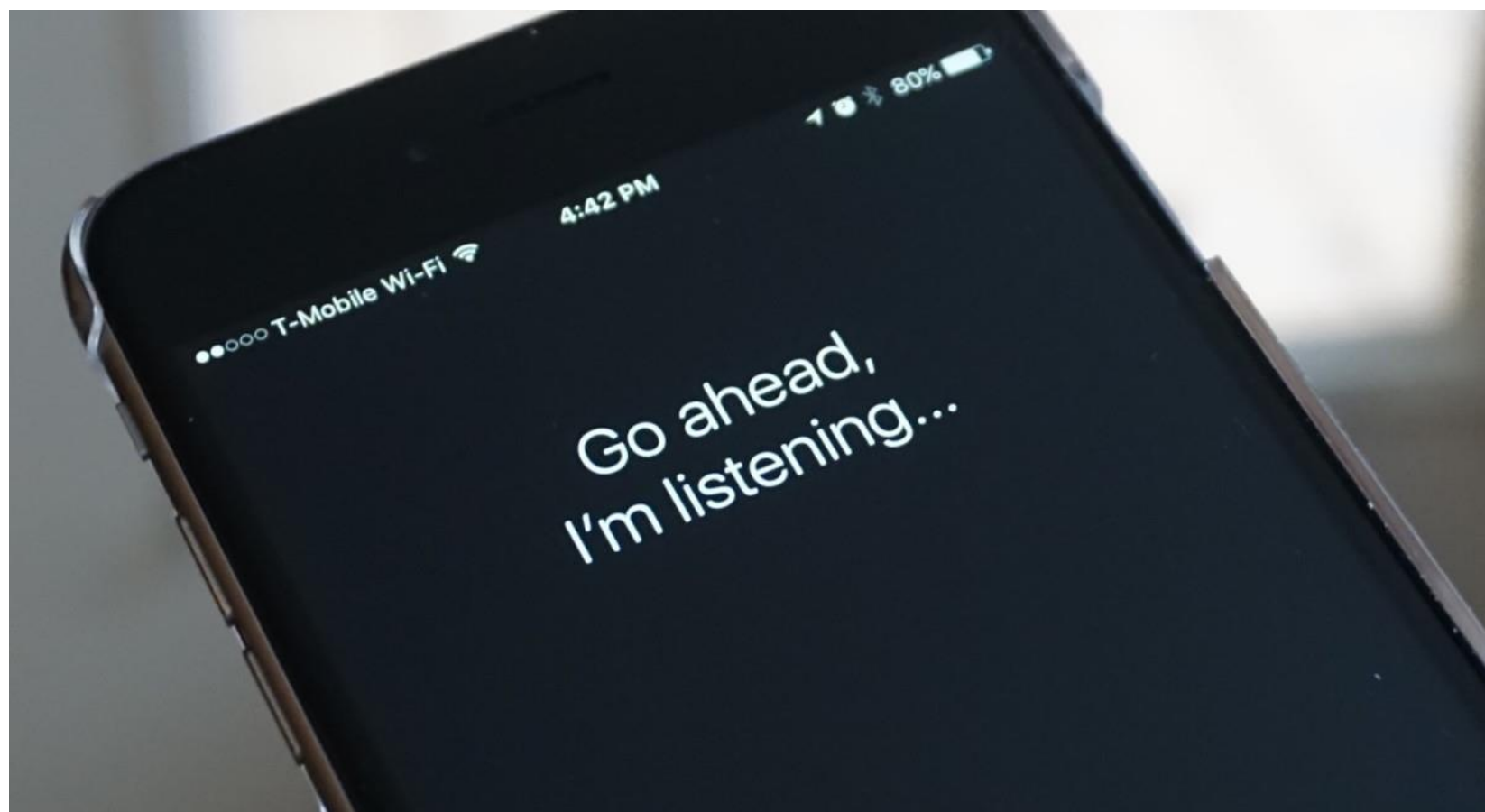
How do you feel towards voice recognition devices?

☐ Positive

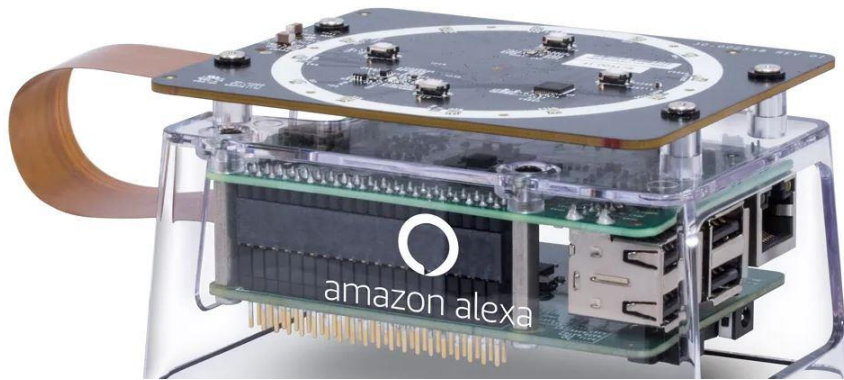
☐ Neutral

☐ Negative

# What about your phones? Tablets?



In very near future...



← Alexa chip

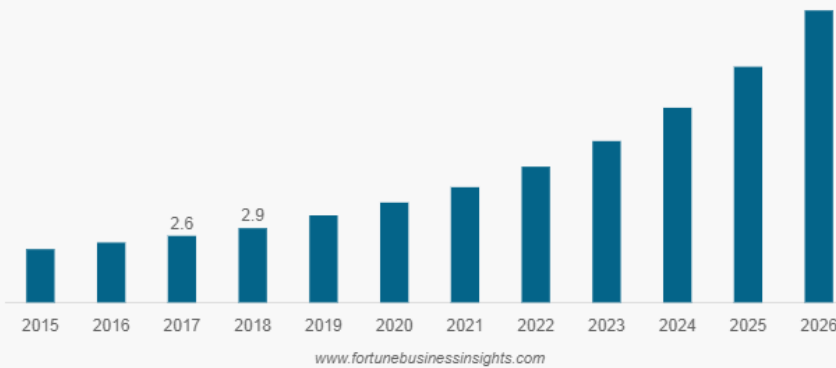
Cook it again,  
Alexa



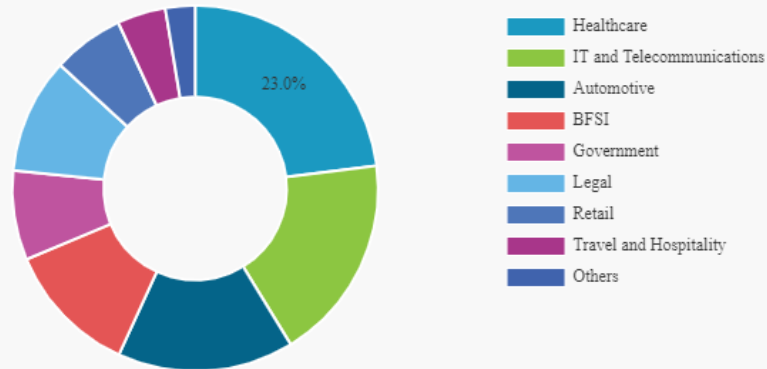
# Application by Sectors



North America Speech and Voice Recognition Market Size, 2015-2026 (USD Billion)



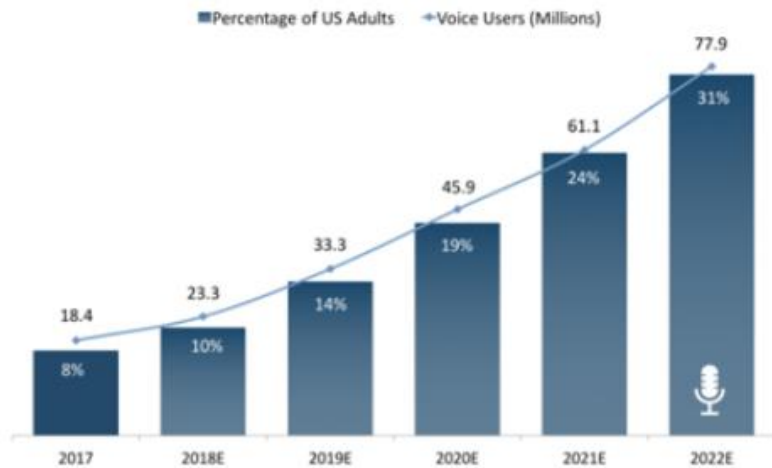
Global Speech and Voice Recognition Market Share, By End-User, 2018



Source: Fortune Business Insights

# Application by users

## FORECAST: US Voice Payments Adoption



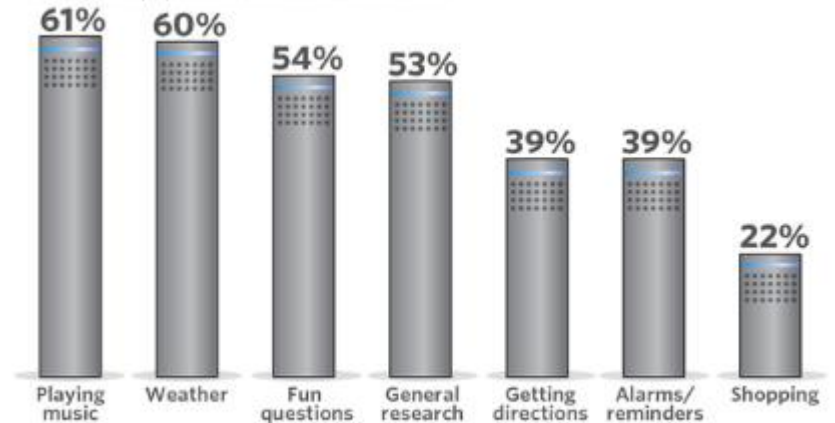
Source: BI Intelligence survey (n=950), March to April 2017, analyst estimates

EXCLUSIVE DATA FROM  
BI INTELLIGENCE

Credit: Business Insider

## Voice in control

54% of consumers with a voice assistant use them at least once a day. Here's a look at the most popular uses of voice command:



Source: Adobe Analytics

Credit: MarketWatch



# THE FOUR STAGES OF CONVERSATIONAL COMMERCE



Credit: Forbes

# All big (and small) companies in the game

- Google
- Baidu Inc.
- Facebook
- Amazon
- Apple
- IBM
- Microsoft
- Brianasoft
- Raytheon
- Voicebox
- Fulcrum
- Neurotechnology
- M2SYS Technology
- Sensory Inc.
- VoiceBase Inc.
- Auraya
- VoiceTrus
- Nuance



# Marketing Ethics

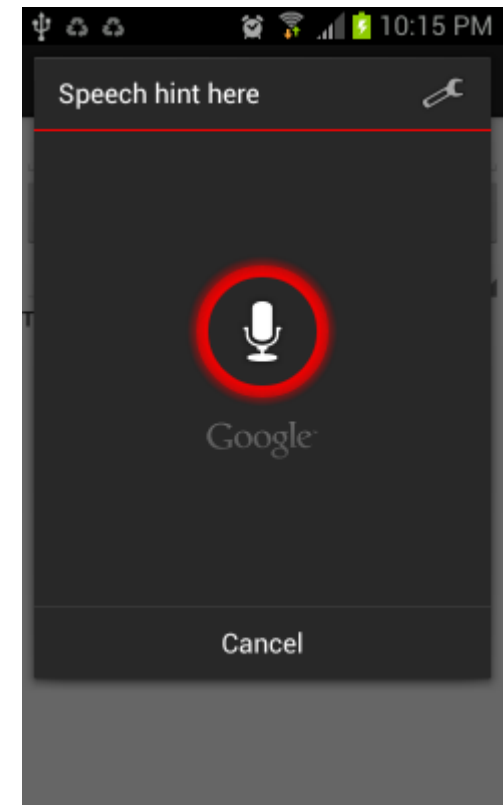
Main principles:

- Consumer sovereignty,
- preserving the conditions of an acceptable exchange,
- paternalism,
- the perfect competition ideal,
- mutuality



# Voice recognition: is it really as secure as it sounds?

- Also known as “**voice biometrics**,” it confirms your identity by analysing your voice’s unique characteristics. Companies say it makes accessing your account fast and easy – plus it reduces fraud. But how secure is it?
- Guardian Money was told that **if there are clips of your voice out there on the web – on a podcast, say – there is technology that can create a very convincing imitation of your voice.**
- And should we be worried about the large-scale harvesting of our voiceprints? Earlier this year, it was claimed that **HMRC had collected millions of taxpayers’ voiceprints without their consent.** This data, it has emerged, is being held by a private company, KCOM – formerly Kingston Communications.



# Voice recognition: is it really as secure as it sounds?

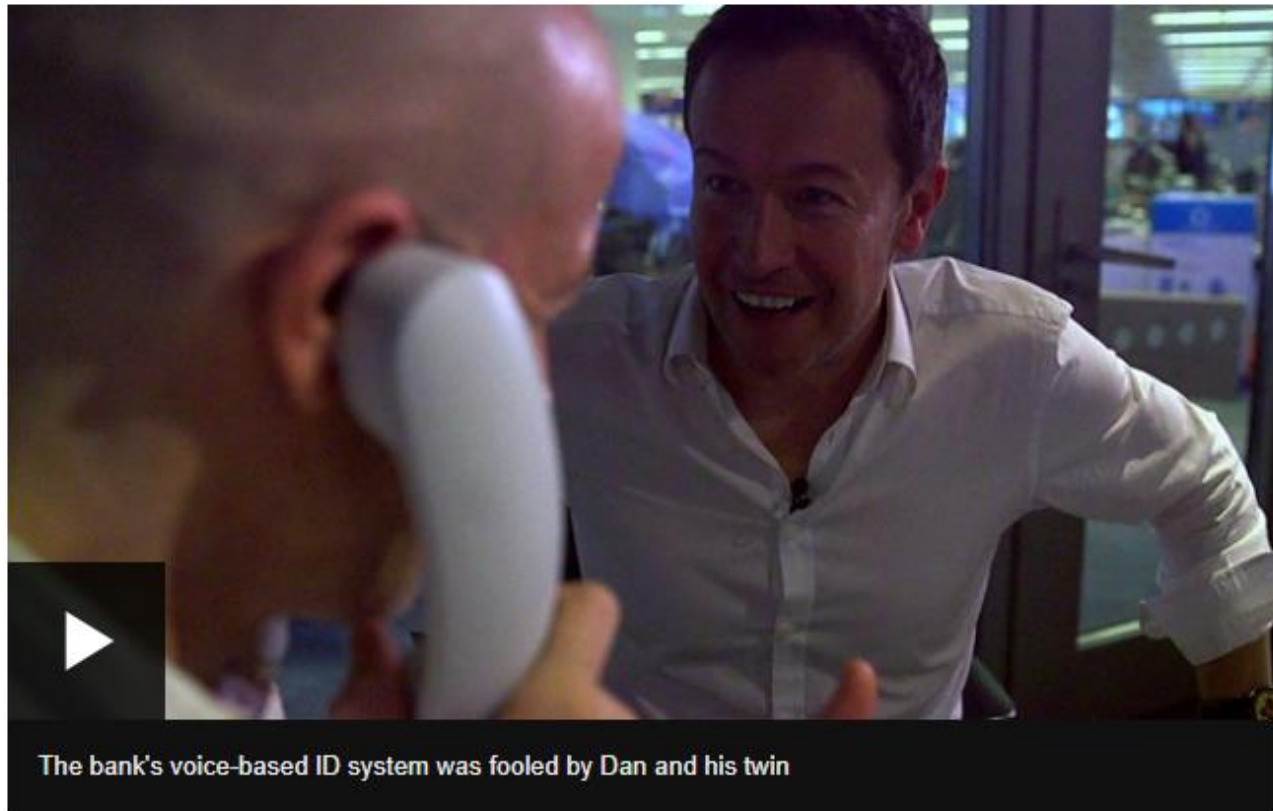
- So how exactly does the technology work? It basically verifies a **caller's identity by comparing their voice to the voiceprint the company has stored in its database.**
- The companies behind this technology say that a **voiceprint includes more than 100 unique physical and behavioural characteristics of each individual,** such as length of the vocal tract, nasal passage, pitch, accent and so on.
- However, **this is different to the tech behind digital assistants such as Apple's Siri and Amazon's Alexa,** which recognise what words are said, not how someone says them.



# BBC fools HSBC voice recognition security system

By Dan Simmons  
Click presenter

🕒 19 May 2017



Security software designed to prevent bank fraud has been fooled by a BBC reporter and his twin.



# THE IRISH NEWS

## HSBC UK's voice recognition technology stops over £300m of attempted fraud



*HSBC said 15,000 fraudulent calls have been identified, with over £330 million worth of UK customers' money protected, since it launched VoiceID.*

# AI and Voice Re-Production

[API Documentation](#)[Careers](#)[Login](#)

## Let your business speak for itself.

Your customers are listening. Voicery brings your brand to life using custom text-to-speech engines with natural, human voices.

[Contact Us](#)

### What could your business sound like?

Demo a selection of our existing voices.

Style  
Narration  
Accent  
British



Style  
Conversational  
Accent  
Indian



Style  
Scared  
Accent  
American



Style  
Angry  
Accent  
American



### Try the Audio.

Speaker  
Katie



Style  
Angry



How can you use the data without my permission? How dare you?

61/300

Source: [Link](#)

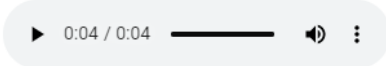
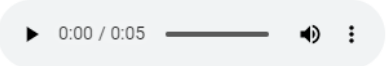







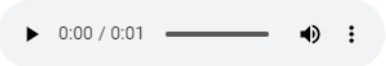


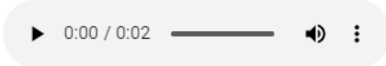



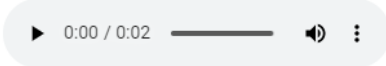
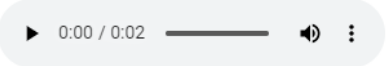
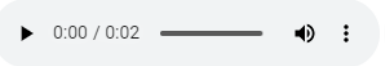

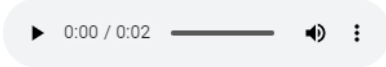



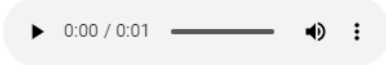






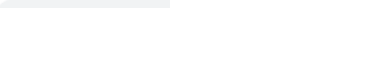


# AI and Voice Re-Production

## Speaker Adaptation for Unseen Speakers

Each column corresponds to a single speaker. The speaker name is in "Dataset SpeakerID" format. All speakers are unseen during training. The first row is the reference audio used to compute the speaker embedding. The rows below that are synthesized by our model using that speaker embedding.

These examples are sampled from the evaluation set for Table 1 and Table 2 in the paper.

	VCTK p240	VCTK p260	LibriSpeech 1320	LibriSpeech 1320
Reference:				
Synthesized:				
0: Take a look at these pages for crooked creek drive.				
1: There are several listings for gas station.				
2: Here's the forecast for the next four days.				
3: Here is some information about the Gospel of John.				
4: His motives were more pragmatic and political.				
5: She had three brothers and two sisters.				
6: This work reflects a quest for lost identity, a recuperation of an unknown past.				

Source: [Link](#)



A Stable Genius Explains Coal

Source: [Link](#)

## PRO CYBER NEWS

# Fraudsters Used AI to Mimic CEO's Voice in Unusual Cybercrime Case

Scams using artificial intelligence are a new challenge for companies

30/08/2019

**Criminals used artificial intelligence-based software to impersonate a chief executive's voice and demand a fraudulent transfer of €220,000 in March 2019 in what cybercrime experts described as an unusual case of artificial intelligence being used in hacking.**



The CEO of a U.K.-based energy firm thought he was speaking on the phone with his boss, the chief executive of the firm's German parent company, who asked him to send the funds to a Hungarian supplier. **The caller said the request was urgent**, directing the executive to pay within an hour, according to the company's insurance firm, Euler Hermes Group SA.

# Google Assistant – I'll Book it for you...



Source: [Link](#)



# Funny! Entertaining! – Hateful, Racist

25 Nov 2019 | 14:00 GMT

## In 2016, Microsoft's Racist Chatbot Revealed the Dangers of Online Conversation

The bot learned language from people on Twitter—but it also learned values

By Oscar Schwartz



Photo-illustration: Gluekit

Microsoft's Tay chatbot started out as a cool teenage girl, but quickly turned into a hate-speech-spewing disaster.

Tay was designed to learn more about language over time.... Eventually, her programmers hoped, Tay would sound just like the Internet.



# AI in Human Resources

TECHNOLOGY NEWS

OCTOBER 10, 2018 / 4:12 AM / A YEAR AGO

## Amazon scraps secret AI recruiting tool that showed bias against women

Jeffrey Dastin

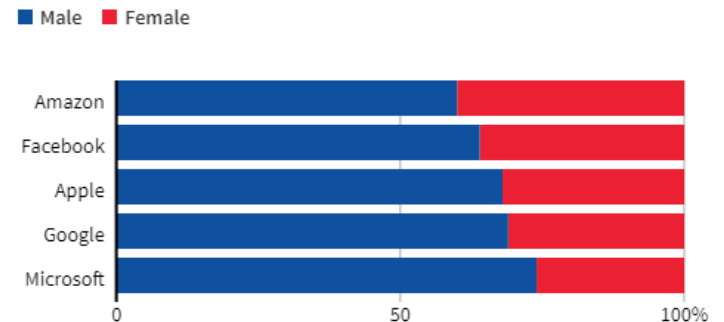
8 MIN READ

SAN FRANCISCO (Reuters) - Amazon.com Inc's (AMZN.O) machine-learning specialists uncovered a big problem: their new recruiting engine did not like women.

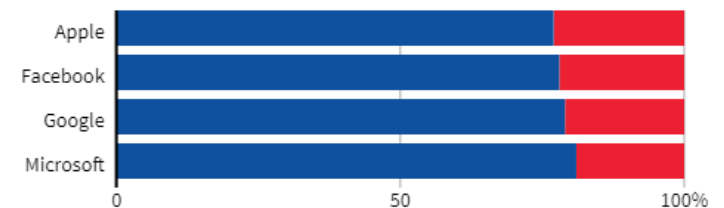
### Dominated by men

Top U.S. tech companies have yet to close the gender gap in hiring, a disparity most pronounced among technical staff such as software developers where men far outnumber women. Amazon's experimental recruiting engine followed the same pattern, learning to penalize resumes including the word "women's" until the company discovered the problem.

#### GLOBAL HEADCOUNT



#### EMPLOYEES IN TECHNICAL ROLES



Note: Amazon does not disclose the gender breakdown of its technical workforce.

Source: Latest data available from the companies, since 2017.

By Han Huang | REUTERS GRAPHICS

# Google scraps AI ethics council after backlash: 'Back to the drawing board'

**Decision comes after employees called for the removal of a rightwing thinktank leader from the council**



▲ Google announced last week it had started a council dedicated to advising on ethical questions related to facial recognition and machine learning and consulting 'diverse perspectives' on its work. Photograph: Stephen Lam/Reuters

April 2019, Source: [The Guardian](#)

# What did you say, Alexa?

## NEWS

### WOMAN SAYS AMAZON'S ALEXA TOLD HER TO STAB HERSELF IN THE HEART FOR 'THE GREATER GOOD'

BY JAMES CROWLEY ON 12/24/19 AT 12:04 PM EST



Danni Morritt was studying for a paramedic course when she asked Alexa to explain the "cardiac cycle of the heart." Alexa's response baffled the woman.

"We have investigated this error and it is now fixed," an Amazon spokesperson said in a statement to *Newsweek* Tuesday.

Source: [Link](#)



# What did you say, Alexa?



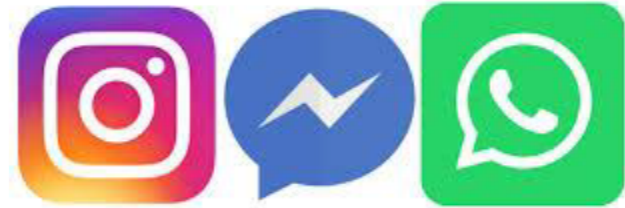
Source: [Link](#)



# Facebook – Are you listening?...



Twitter is full of suspicious Facebook users Credit: Twitter / The Sun



Users think there's no snooping through the

"Facebook does not use your phone's microphone to inform ads or to change what you see in News Feed," the company's statement reads.

"Some recent articles have suggested that we must be listening to people's conversations in order to show them relevant ads. This is not true.

"We show ads based on people's interests and other profile information – not what you're talking out loud about.




"We only access your microphone if you have given our app permission and if you are actively using a specific feature that requires audio.

"This might include recording a video or using an optional feature we introduced two years ago to include music or other audio in your status updates."

# Facebook Said It Wasn't Listening to Your Conversations. It Was.

Facebook's excuse? All the other tech companies were doing it, too.

By David Gilbert

Aug 14 2019, 1:06pm  Share  Tweet  Snap



Source: [Link](#)

- “Much like Apple and Google, we paused human review of audio more than a week ago,” a company spokesperson said in an emailed statement. When asked if the practice was likely to be restarted, the company declined to answer.
- A Facebook spokesperson told VICE News that the practice was “very common in tech” ☐ — at least until a week ago, when media reports revealed that Amazon, Apple, Google, and Microsoft were all capturing and listening to audio from users’ devices.



If you have an iPhone or iPad, disabling microphone access to Facebook is a snap:

- Open Settings.
- Then tap Privacy.
- Then Microphone.
- Select Facebook, and disable access. Easy!

A similar set of instructions works for Android:

- Open Settings.
- Select "Apps & notifications."
- Select "Advanced" at the bottom.
- Select "App permissions."
- Select "Microphone," and disable Facebook. Maybe disable Instagram and WhatsApp too while you're there, as both are owned by Facebook.

There's also another, even stronger option of course: Delete the Facebook app from your phone.



**Brian Acton**  
@brianacton

It is time. [#deletefacebook](#)

11:00 PM - 20 Mar 2018

Source: [Business Insider](#)



# Guess who is listening?



Source: [Independent](#)

- The online retail giant said its staff “reviewed” a sample of [Alexa voice assistant](#) conversations in order to improve speech recognition.
- **“This information helps us train our speech recognition and natural language understanding systems, so Alexa can better understand your requests, and ensure the service works well for everyone,”** Amazon said in a statement.
- “We have strict technical and operational safeguards, and have a zero tolerance policy for the abuse of our system. Employees do not have direct access to information that can identify the person or account as part of this workflow.”
- Amazon does not explicitly state in its terms and conditions that humans review customer recordings, though its Alexa privacy settings offer users the chance to opt out of helping the firm “develop new features”.

# Facebook will now pay you for your voice recordings <sup>6</sup>

*But it won't pay much*

By [Jay Peters](#) | [@jaypeters](#) | Feb 20, 2020, 3:00pm EST



Illustration by Alex Castro / The Verge

Facebook will offer to pay some users for voice recordings that will be used to help improve its speech recognition technology, the company announced Thursday. The move comes after [Facebook](#) — as well as [Amazon](#), [Apple](#), [Google](#), and [Microsoft](#) — was caught listening to and transcribing voice recordings to improve speech recognition systems without informing customers it was doing so.

Source: [Verge](#)

# AI Devices & Children



LITERACY

## To Build Speech Recognition for Early Literacy, Soapbox Labs Gives Kids a Voice

By Tony Wan Nov 5, 2019



**Inc.**

## Even Executives at Voice-Recognition Companies Are a Little Freaked Out About Their Kids Using the Technology

The people building new A.I. audio technologies share how they feel about their families interacting with robots, being recorded, and disclosing personal information.



By Christine Lagorio-Chafkin *Senior writer, Inc.* [@Lagorio](#)



---

## Bipartisan bill would give parents more power to protect their kids online

The bill would also broaden COPPA's protections to include mobile apps.



Igor Bonifacic, @igorbonifacic  
01.09.20

If Congress enacts the bill, online services, websites and apps will need to give parents the ability to delete any personal information related to their children. That's a power that COPPA, in its current form, doesn't provide parents. The legislation also aims to raise the age at which companies can collect data from an individual without parental consent from 13 to 16, in addition to broadening COPPA's protections to include mobile apps, as well as geolocation and biometric data. When it comes to sites [such as Facebook](#), this means kids won't be able to create an account until they're 16 or older.

# Your Data Matters



Source: [Link](#)

# Protecting your personal data...

- Your voice, your image, your personal data!
- Youronlinechoices.com
- [ico.org.uk/your-data-matters](https://ico.org.uk/your-data-matters)
- Check your permissions & settings & data usage
- You have your rights! (Thanks to GDPR)

## Your rights

Find out more about your personal data rights.



### Your right to be informed if your personal data is being used

An organisation must inform you if it is using your personal data.



### Your right to get copies of your data

You have the right to find out if an organisation is using or storing your personal data.



### Your right to get your data corrected

You can challenge the accuracy of personal data held about you by an organisation.



### Your right to get your data deleted

You can ask an organisation to delete personal data that it holds about you.



### Your right to limit how organisations use your data

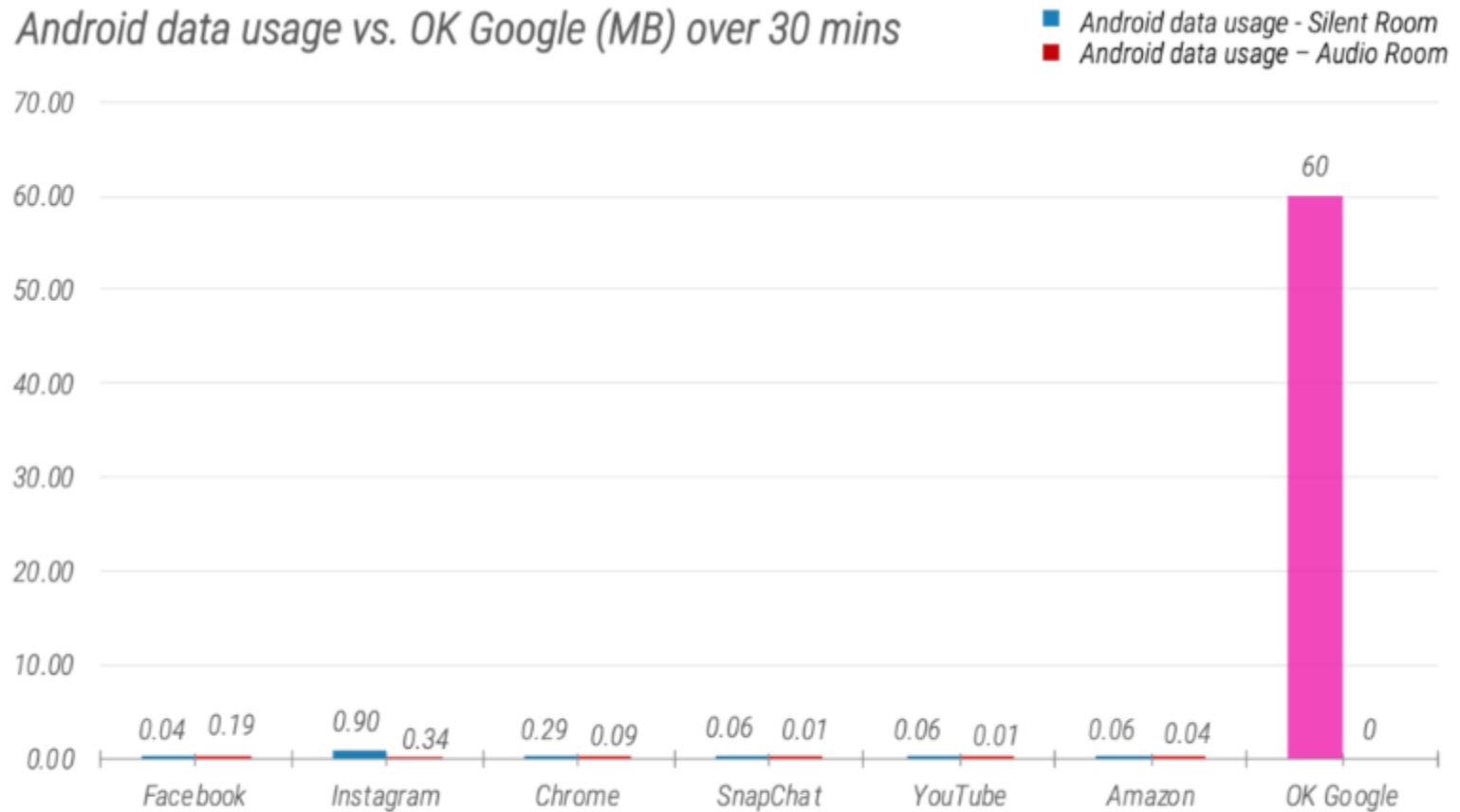
You can limit the way an organisation uses your personal data.



### Your right to data portability

You have the right to get your personal data from an organisation in a way that is accessible .

## Android data usage vs. OK Google (MB) over 30 mins



Android data consumption over 30 minutes compared to the volume of data the Google Voice Assistant uses across the same time period Wandera



# Your Online Choices

a guide to online behavioural advertising

Home

About

Your ad choices

Five top tips

FAQs

Download guide

Helpful videos

Jargon buster

Make a complaint

Help page

## Your ad choices

The companies listed below are some of the providers who work with website providers to collect and use information to provide online behavioural advertising.

Please use the buttons below to control your online behavioural advertising preferences. You can turn off or turn on all companies or alternatively set your preferences for individual ones. By clicking on the expand button you can find out more about the company itself as well as its behavioural advertising status on the web browser that you are using. If you are having any problems please visit our [help page](#).



Please note: this does not turn off all internet advertising only advertisements that are customised to your likely interests based upon previous web browsing activity.

[Read more about the process](#)

### Meaning of the icons:



This company has not set-up a cookie, but may deliver in the future advertisements that are customised to your interests.



This company is delivering advertisements customised to your interests.



This company is not delivering advertisements customised to your interests.

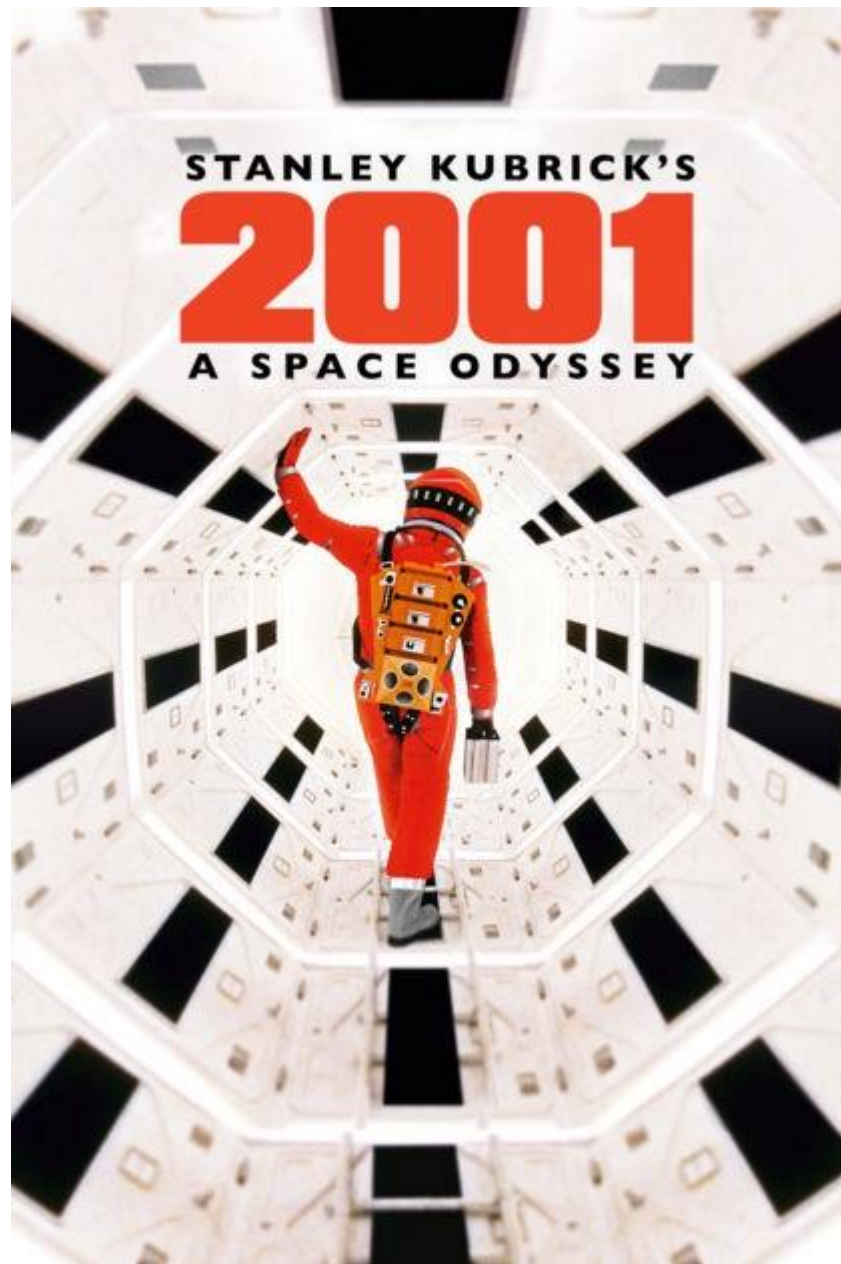
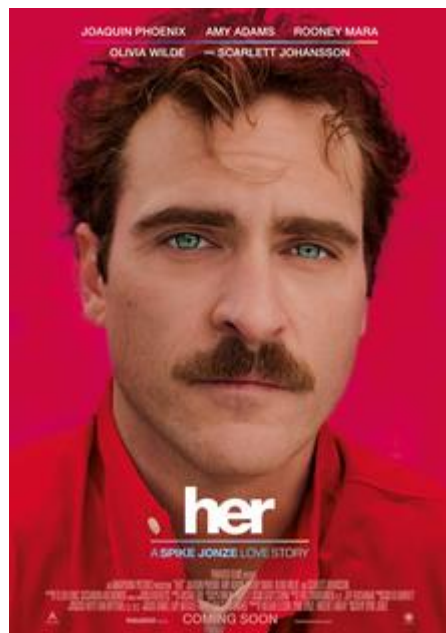
Collecting your status from 0 companies. This may take a while...

Turn on or off individual companies.

Company	On/Off	Status	Info
1plusX	<input checked="" type="radio"/> On <input type="radio"/> Off	?	▼
33Across	<input checked="" type="radio"/> On <input type="radio"/> Off	?	▼
4W MARKETPLACE SRL	<input checked="" type="radio"/> On <input type="radio"/> Off	?	▼
Accordant Media	<input checked="" type="radio"/> On <input type="radio"/> Off	✓	▼
ADARA	<input checked="" type="radio"/> On <input type="radio"/> Off	?	▼
AddThis	<input checked="" type="radio"/> On <input type="radio"/> Off	?	▼



Your Examples?

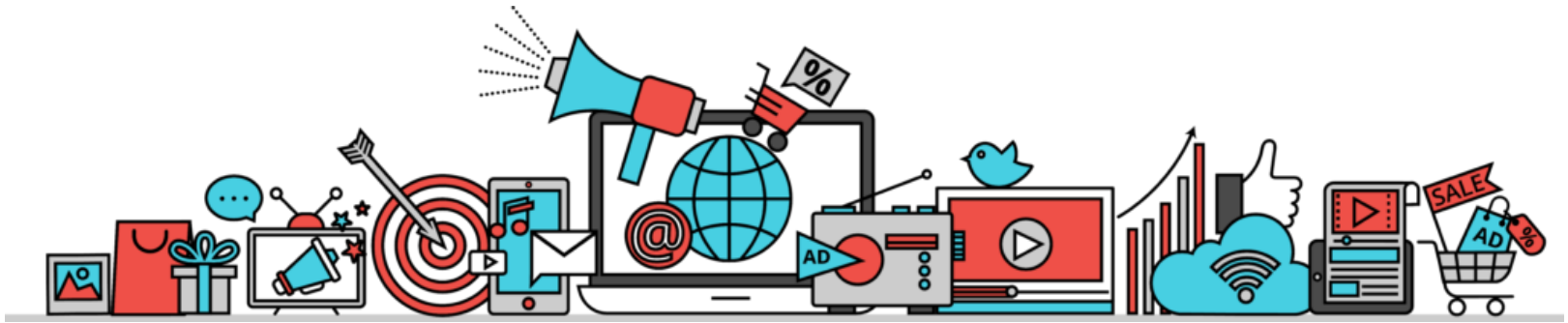




# Would you like to participate in future research?

- Contact:
- [eakcay@bournemouth.ac.uk](mailto:eakcay@bournemouth.ac.uk)
- Ediz Akcay, Bournemouth University





● THANKS FOR YOUR TIME!