

# Voice Assistants and Child Profiling: Navigating Children's Rights

Dr. Ingrida Milkaitė

Law & Technology research group

Human Rights Centre

Ghent University, Belgium



*Illustration by Bee Johnson*



Research Foundation –  
Flanders



# Voice assistants' consistent rise in popularity: the US



United States: 46.9 % of US adults used a voice assistant in 2022,  
→ 48.2 % by 2025

IN THE US...



**41%**  
OF PEOPLE USE SMART SPEAKERS  
AT HOME, MULTIPLE TIMES A DAY.



**38%**  
OF PEOPLE USE VOICE IN THE CAR  
OR VIA HEADPHONES EVERY DAY.



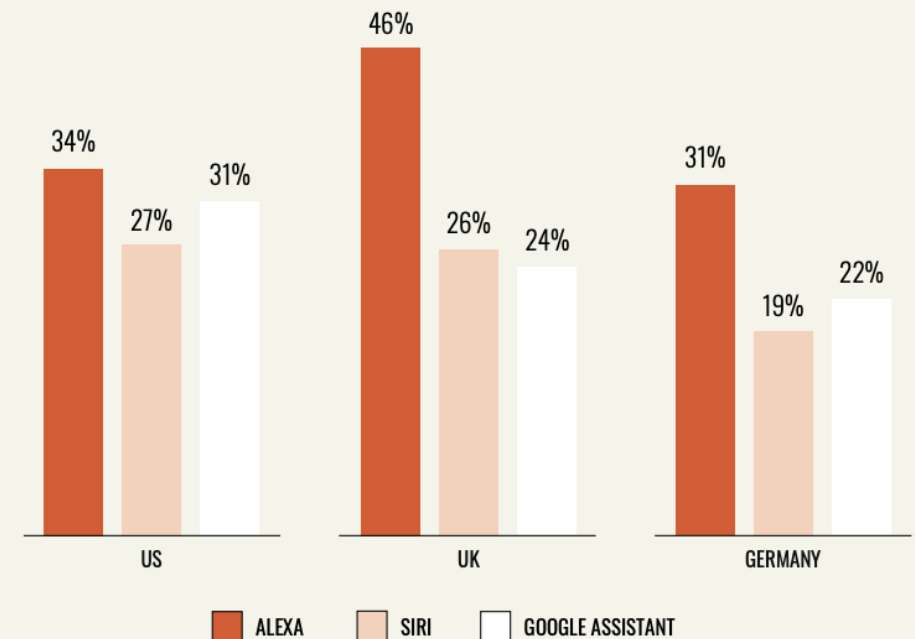
Source:

## POPULARITY OF THE BIG THREE: ALEXA, SIRI, AND GOOGLE ASSISTANT

HOW MANY PEOPLE ARE USING VOICE ASSISTANTS TODAY?

**CURRENT VOICE ASSISTANT USAGE HAS INCREASED IN ALL THREE MARKETS, BUT MORE SIGNIFICANTLY IN THE UK AND US.**

Usage in Germany is still more than half, having increased to 54% in 2022.



## Voice assistants' consistent rise in popularity: [the EU](#)



European Union: [11 % of EU](#) citizens used voice assistants in 2020

Leading VAs:



Flanders (Belgium): an increase from [14 %](#) to [16 %](#) from 2020 to 2021

The Netherlands: use reached [37 %](#) with [24 %](#) – or a quarter – using voice assistants daily

Voice assistants integrated in smartphones particularly popular → Dutch



### Sector inquiry into the Consumer Internet of Things

Brussels, 20.1.2022  
COM(2022) 19 final

# Voice assistants



Hey Siri

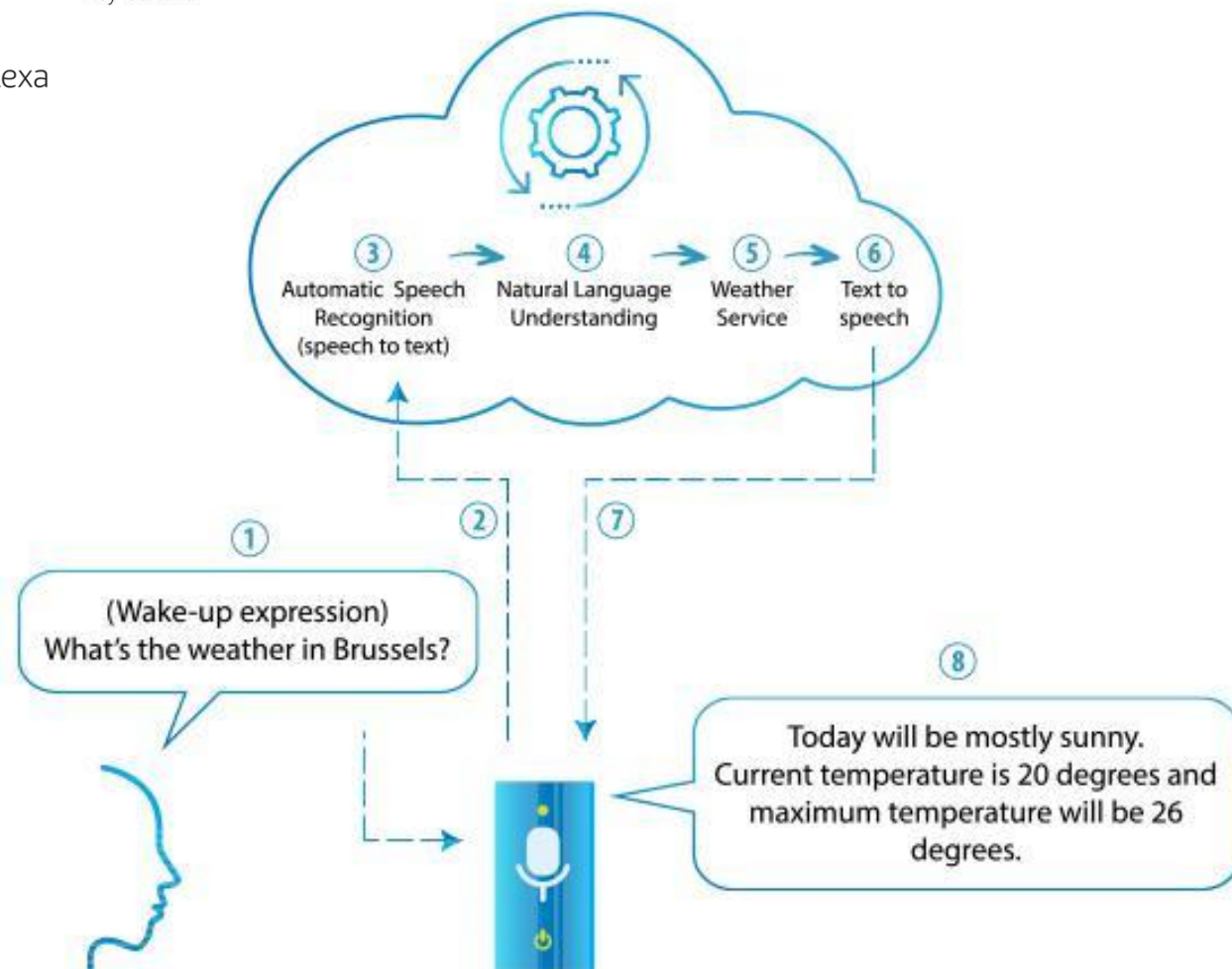


Hey Cortana



Definition:

'A virtual voice assistant (VVA) is a service that understands voice commands and executes them or mediates with other IT systems if needed', often utilising artificial intelligence (AI) technologies such as natural language processing, automatic speech recognition, and machine learning to 'recognize verbal commands, identify patterns, retrieve information and generate responses.'



# Voice assistants. Many useful functions:



Answering ?s  
Voice interaction



Music  
Playback



Podcasts



Audiobooks



To-do lists



Alarms,  
Reminders



Weather



News



Traffic



Sports



Messages



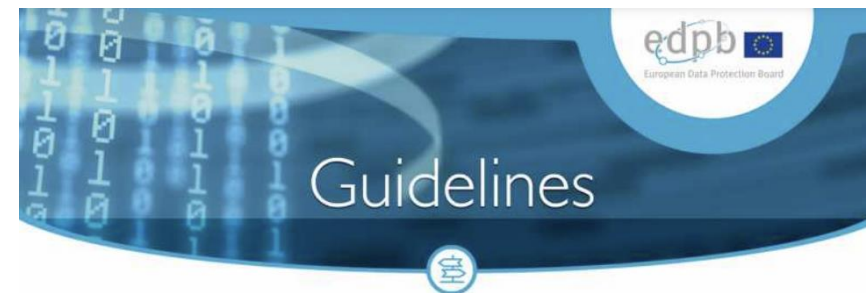
Online  
Orders



Bills



Package  
Tracking



Guidelines 02/2021 on virtual voice assistants

Version 2.0

Adopted on 7 July 2021

# Increasingly integrated in various devices



Smart Toys



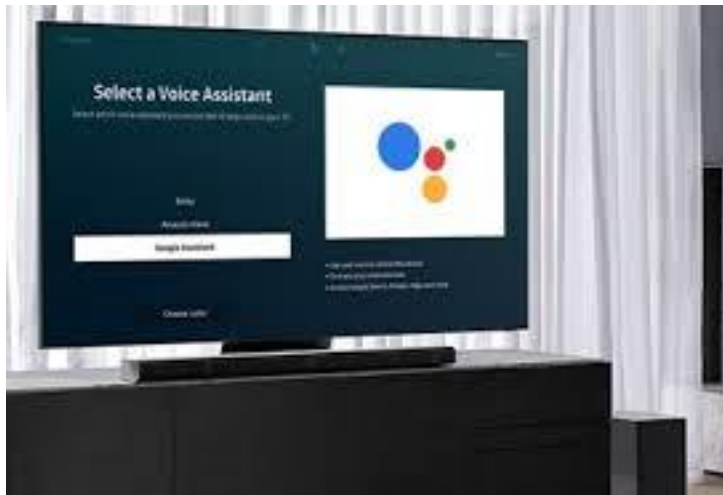
Smart Clocks



Door Locks



Other Smart Devices



Thermostats



Lighting



## Steady increase in interactions with voice assistants among children [at home](#)

Children grow up surrounded by voice assistants:

[Not directed at children](#)



Can be very [beneficial](#):

provide  
entertainment and  
information

[Directed at children](#)



### **Toy story: Toys that talk are no longer just a fictional story**

Voice assistant-enabled toys



**Australia:** [42 %](#) of [Australians](#) are currently using a voice assistant

Considered a helpful tool in [reducing screen time](#) for [51 %](#) of Australian households with children.

While [69 %](#) of respondents believe smart devices have made it easier [to entertain children](#)

Voice assistants increasingly aid educational activities **in schools & educational environments**



Language learning,  
translation,  
calculations,  
word explanations,  
spelling,

setting timers and reminders,  
research aid,  
playing games,  
audiobooks,  
news

Data from 2019, US:

**50 percent** of children **aged 2 to 8**, use voice assistants **at least once a day** to play music, get information, talk or 'fool around' and hear jokes

**43 percent** of children aged between **6 and 8** use voice assistants to do their **homework**.

*Source: <https://kidscreen.com/2019/03/28/young-kids-use-smart-speakers-daily-survey/>*

→ Significant increase in use brought about by the **Covid-19 pandemic** ('Living the future', Hall, 2020)



# VAs and the processing of personal data

Definition (article 4 GDPR)

**‘Personal data’** – any information relating to an identified or identifiable person, such as:



name



physical characteristics



ID number



genetic information



location



psychological & mental characteristics

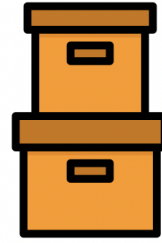


online identifier



economic, cultural or social identity characteristics

According to article 4 (4) GDPR, **profiling is**



any form of automated processing of **personal data** aiming to EVALUATE **certain personal aspects** relating to a person, to ANALYSE or PREDICT **aspects** concerning that person's



performance at work



economic situation



health



personal preferences



interests



reliability



behaviour



location or movements

GDPR does not prohibit the profiling of children but the EU DPA recommended that service providers '**should – in general – refrain from profiling children for marketing purposes**' as children can be "particularly susceptible in the online environment and more easily influenced by behavioural advertising

Information inferred from voice data: potential for [inferences](#) and [deductions](#)

European Data Protection Law Review > [Volume 6 \(2020\)](#), [Issue 3](#) > Pages 464 - 469

## Practitioners Corner · How can Private Information Recorded by Voice-enabled Systems be Identified?

open-access

Alvaro Moreton, Ariadna Jaramillo

DOI <https://doi.org/10.21552/edpl/2020/3/17>

3 primary data sources:

Speech Content

User's Voice Signal

Background Sounds

Information inferred from voice data: **potential** for **inferences** and **deductions**

Speech Content / The Spoken Message	User's Voice Signal	Background Sounds
<p><b>Personal or sensitive information:</b></p> <p>user's <b>identity</b> and <b>traits</b> that reveal information about their <b>background</b></p> <p><b>gender, age, ethnic origin, health status</b> or <b>medication</b></p> <p><b>address, preferences</b> in terms of products, services and</p> <p><b>interests</b> in general</p>	<p>User's <b>unique voice signal</b>,</p> <p>voice features like <b>accent</b> and <b>voice pitch</b></p> <p><b>mental state</b> or <b>illnesses</b> such as stress, relaxation, <b>depression</b> or other <b>emotional states</b></p> <p><b>physical health</b> state such as bronchitis, asthma, cold</p>	<p>Additional <b>context</b> to <b>identity &amp; living circumstances:</b></p> <p><b>conversations</b> in the background; <b>music and TV shows</b> → preferences</p> <p>other sounds: arguments, crying babies, children playing → <b>insight into personal life and family situation</b></p> <p>sounds produced by trains, planes or cars, <b>revealing proximity to</b> an airport, train station or a highway</p>

# Information inferred from voice data: potential for inferences and deductions

‘Sensitive’ data  
Processing generally prohibited  
Art 9.2 GDPR provides exceptions,  
e.g., explicit consent

## Article 9



### Processing of special categories of personal data

1. Processing of personal data revealing racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, and the processing of genetic data, biometric data for the purpose of uniquely identifying a natural person, data concerning health or data concerning a natural person’s sex life or sexual orientation shall be prohibited.



The protection of individuals  
with regard to automatic processing  
of personal data in the context  
of profiling

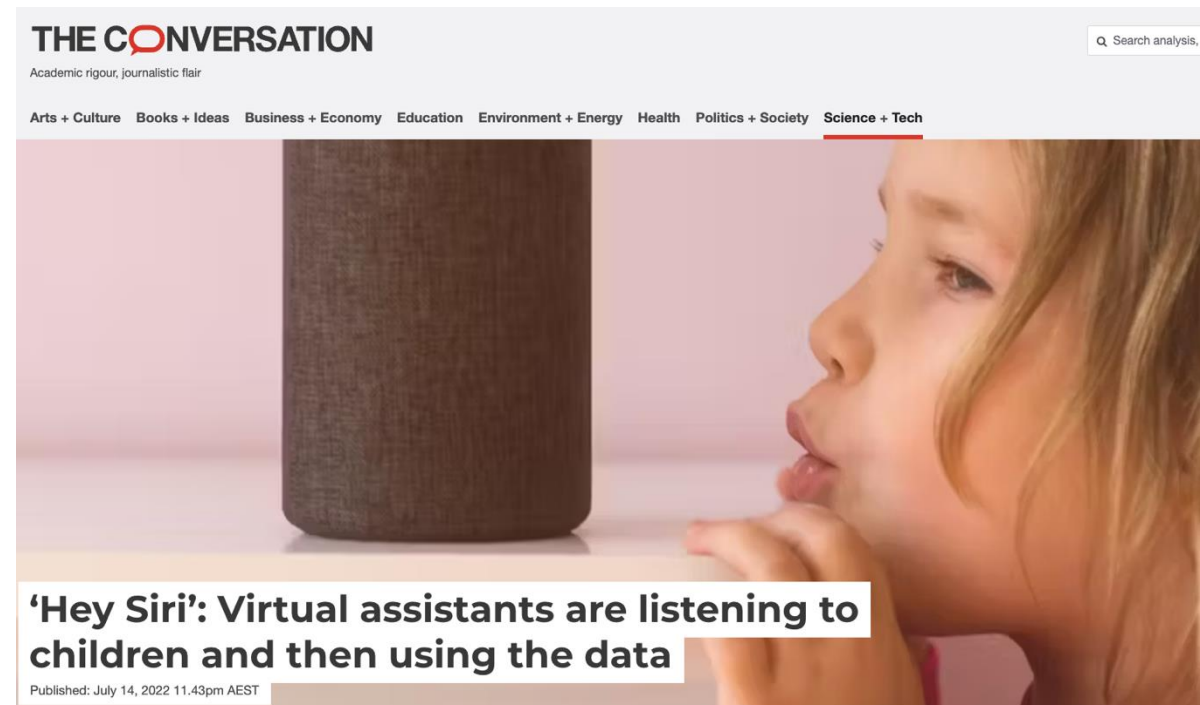
CoE: inferring sensitive data when profiling

→ potential to subject individuals to “particularly high risks of discrimination and attacks on their personal rights and dignity”.

Interaction with voice assistants → steady & constant **collection of personal data**

→ Potential for **profiling** for the purposes of

- *voice assistant service improvement*
- *user identification*
- *personalisation*
- *(behavioural) advertising*



Profiling children is **highly valuable for businesses** →

enables **targeted advertising** and establishes **early commercial relationships**



# UNCRC legal framework



Provides a **comprehensive legal framework** on children's rights

Recognises **children as rights holders** in and of themselves –  
as human beings in development

Considerable **impact**: signed and ratified by almost **every country in the world**,  
except for the US

**EU, CoE I. f. and policies** are based on and explicitly guided by the UNCRC

4 general principles & rights



General principles

VA's positive impact on children's rights:



## Child Profiling: What's at Stake?

Shaping [opinions](#), online [experiences](#), [knowledge](#) and [worldviews](#)

Assigning children [predefined profiles](#) could [restrict](#) their access to [opportunities, suggestions, information, and choices tailored exclusively to those profiles](#), [compartmentalising](#) children and curtailing their [freedom to explore](#) and [experiment](#).

**Gendered toys example** – pre-installed ‘family filters’ limiting topics that children can discuss with the toy:

‘gay marriage’, ‘homosexual’, ‘atheism’, ‘LGBT’, ‘menstruation’, ‘violence’, ‘abortion’ and ‘religion’ were [censored](#) while ‘heterosexual’ and ‘Christianity’ were not.

Art. 2 UNCRC: Non-discrimination

Art. 6 UNCRC: Right to development



## #Toyfail

An analysis of consumer and privacy issues in three internet-connected toys

Desember, 2016

## Child Profiling: What's at Stake?

### Commercial personalisation of news and content

- Constant stream of recommendations for sponsored content or content closely resembling what was previously engaged with
- Potentially limiting children's exposure to diverse information
- ? Balance between commercially driven recommendations and individuals' genuine and authentic choices

Art. 6 UNCRC: Right to development

Art. 8 UNCRC: Right to identity

Arts. 13, 14, 17 UNCRC: Freedom of expression, freedom of thought, opinion and the right to receive pluralistic information

Art. 32 UNCRC: Economic exploitation

## Researchers find Amazon uses Alexa voice data to target you with ads



/ Amazon and third parties use data from smart speakers to sell you stuff, says report

By Jennifer Pattison Tuohy, a smart home reporter who's been testing connected gadgets since 2013. Previously a writer for Wirecutter, Wired, Dwell, and US News.  
Apr 28, 2022, 10:40 PM GMT+2

Intention to use voice data not only to predict potential purchases but also modify individuals' behaviour →



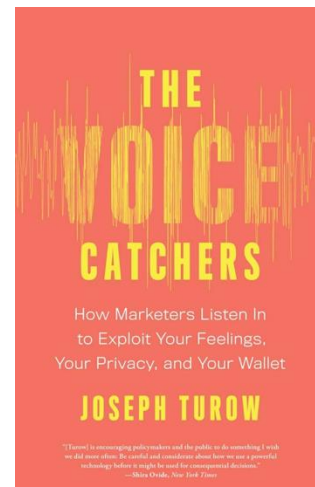
THE INTERNATIONAL JOURNAL OF CHILDREN'S RIGHTS  
28 (2020) 833-859



brill.com/chil

### The Child's Right to Protection against Economic Exploitation in the Digital World

Simone van der Hof,<sup>a</sup> E. Lievens,<sup>b</sup> I. Milkaite,<sup>c</sup> V. Verdoodt,<sup>d</sup>  
T. Hannema,<sup>e</sup> T. Liefwaard<sup>f</sup>



## Precautionary principle



The **precautionary principle** essentially ‘**compels society to act cautiously** if there are **certain – but not necessarily absolute** – scientific indications of a potential **danger** and if not acting upon these indications could inflict harm.

Traditionally accepted that it is **justified to err on the side of caution** when it comes to the protection of vulnerable beings against potential harm.’

Can be useful and crucial for children’s rights today and in the future:

‘it is **hard to assess and to predict the impact** [of profiling] activities in commercial environments will have on children’s lives **in the long term.**’



*Eva Lievens, The Rights of the Child in the Digital Environment:  
From Empowerment to De-Responsibilisation (2020).*

A few way to address the concerns

→ Applying the precautionary principle to mitigate long-term harm

In line with recital 38 GDPR,  
the fairness principle and  
best interests of the child, children's rights perspective

In practice: **business accountability** can be demonstrated through

- a. Children's rights impact assessments (CRIAs)
- b. Data protection impact assessments (DPIAs)

→ Legal frameworks should explicitly **prohibit the profiling of children**

EU level prohibition of the profiling of children for commercial purposes –

following in the CoE and UN footsteps

**Recital 38 GDPR** emphasises the need for **specific protection** for children's personal data, especially when it is used for **marketing purposes** or **creating personality** or **user profiles**.



**Children's Rights** and  
**Business Principles**



## CoE and UN recommendations to **prohibit** profiling of children

Guidelines to respect,  
protect and fulfil the  
rights of the child in the  
digital environment



www.coe.int/children

Building a Europe  
for and with children



- Powerful influence on children's **life opportunities** and undermining their capacity to **develop, experiment, and change** in the future.
- Can potentially lead to **adverse consequences on children**, which can continue to affect them **at later stages of their lives**.

**'Profiling of children**, which is any form of automated processing of personal data which consists of applying a "profile" to a child, particularly in order to take decisions concerning the child or to analyse or predict his or her personal preferences, behaviour and attitudes, **should be prohibited by law.**'

United Nations

CRC/C/GC/25



**Convention on the  
Rights of the Child**

Distr.: General  
2 March 2021

Original: English

Committee on the Rights of the Child

**General comment No. 25 (2021) on children's rights in  
relation to the digital environment**

'States parties **should prohibit by law the profiling or targeting of children of any age for commercial purposes** on the basis of a digital record of their **actual or inferred characteristics**, including group or collective data, targeting by association or affinity profiling.'



Dr. Ingrida Milkaitė

Voluntary Postdoctoral Researcher

[ingrida.milkaite@ugent.be](mailto:ingrida.milkaite@ugent.be)

LinkedIn: Ingrida Milkaite



Research Foundation –  
Flanders

