ST. PÖLTEN UNIVERSITY
OF APPLIED SCIENCES

DIRENE
Competences for the new era of user-driven digital rehabilitation

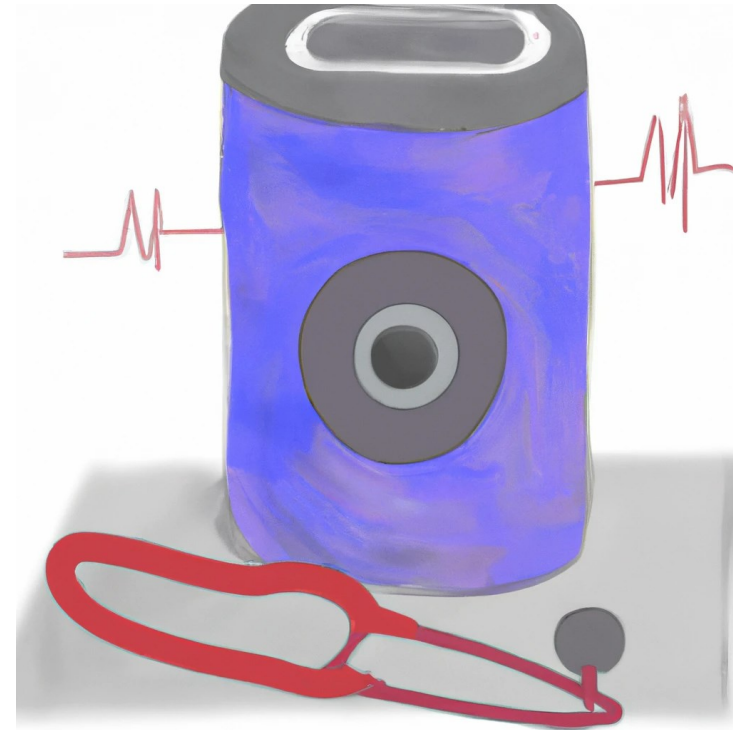Co-funded by
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Learning complex content easily together: Artificial intelligence for smart speakers as an example of digital rehabilitation

Andreas Jakl, Anita Kidritsch

Day of Teaching, 30.3.2023

The image is AI-generated by Dall-E from Open AI based on a description from Andreas Jakl. "a painting of a smart speaker in healthcare"
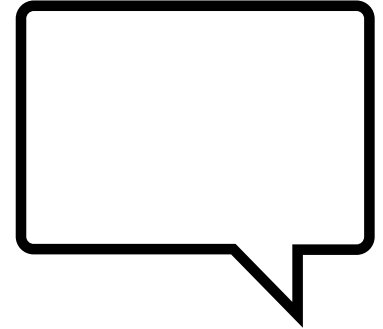
Voice User Interfaces (VUI)

- Simple: question & answer-style

  - Get information, play song, set alarm

- True conversations

  - Remember the past!

  - Understand context
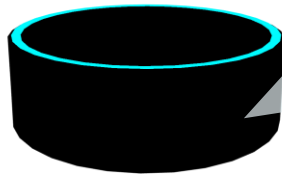
- → Conversational Design

Why Voice?

- Speed: Faster than typing

- Hands-free & available: e.g., doing exercises, cooking

- Intuitiveness: everyone knows how to talk

- Empathy: tone missing from written words
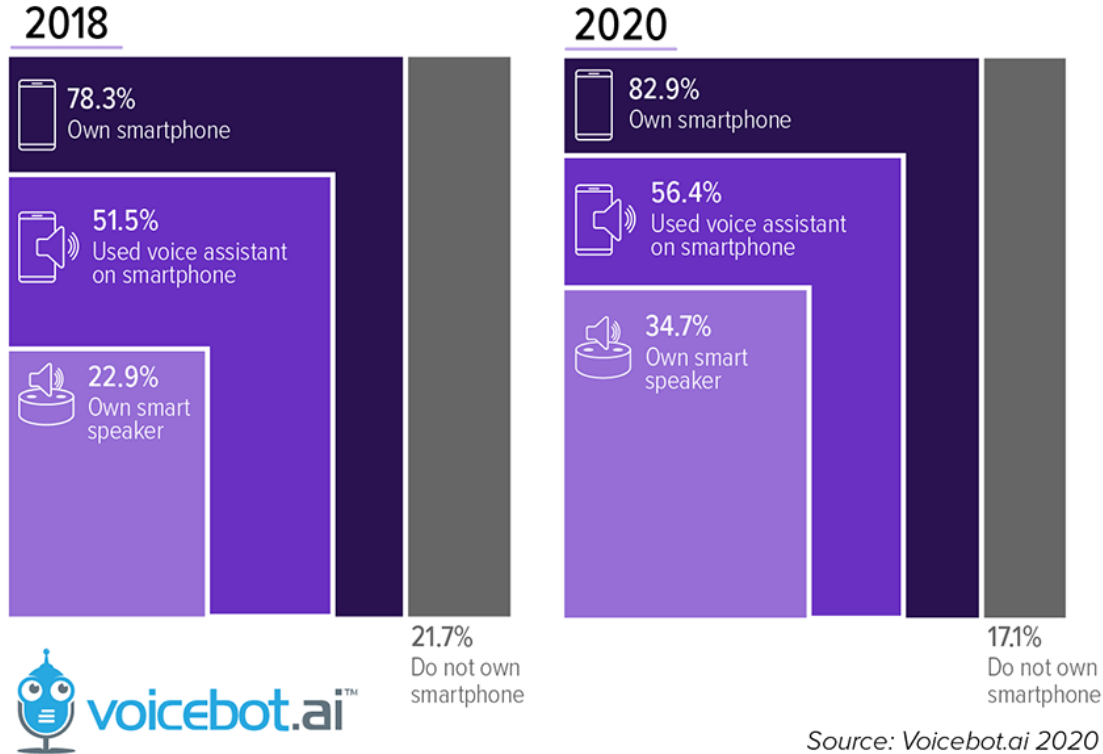
- Easier: Less mental & physical demand than typing

Pearl, C. (2016). *Designing voice user interfaces: principles of conversational experiences*. O'Reilly Media, Inc.

Speech Assistants & Services

Smartphone Ownership and Voice Assistant Use *

2018

- 78.3% Own smartphone
- 51.5% Used voice assistant on smartphone
- 22.9% Own smart speaker
- 21.7% Do not own smartphone

2020

- 82.9% Own smartphone
- 56.4% Used voice assistant on smartphone
- 34.7% Own smart speaker
- 17.1% Do not own smartphone

Source: Voicebot.ai 2020

Smart Speaker Installed Base

U.S. Smart Speaker Installed Base 2022

Total US Adult Population
259 MILLION

4.6%
One-Year Growth In 2022

3.4%
One-Year Growth

32.0%
One-Year Growth

2022 / 94.9 MILLION

2021 / 90.7 MILLION
2020 / 87.7 MILLION
2019 / 66.4 MILLION
2018 / 47.3 MILLION

42.0%
One-Year Growth

voicebot.ai
Source: Voicebot 2022
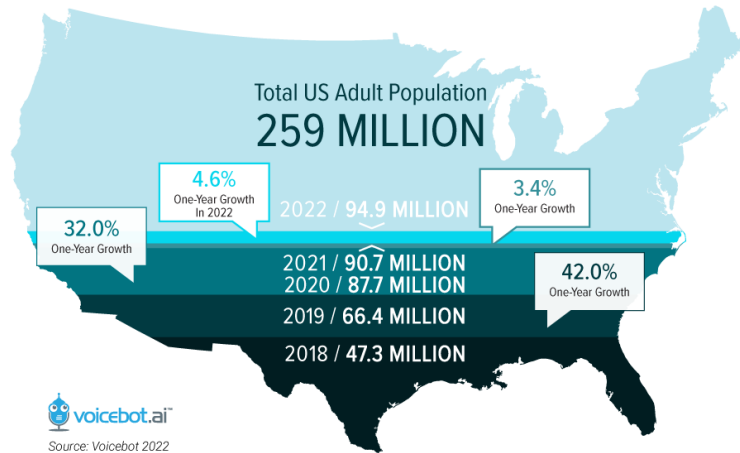
Smart Speaker Adoption Among German Adults

2019
7.4%

2020
19.2%

2021
25.8%

voicebot.ai
Source: Voicebot 2021
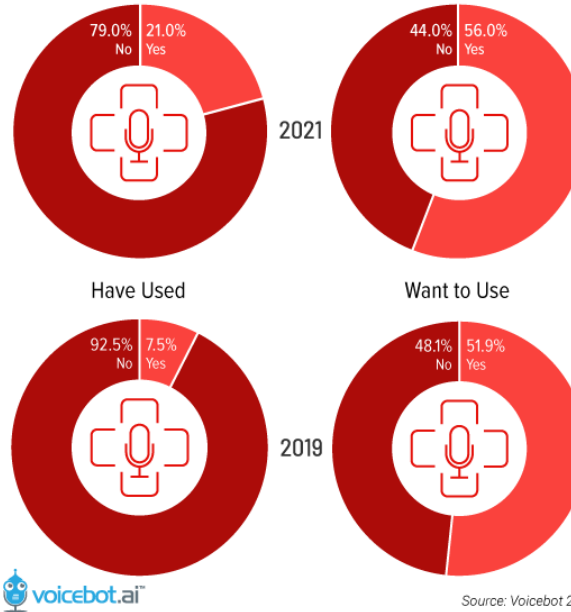
Source: voicebot.ai
https://voicebot.ai/2022/03/02/the-rise-and-stall-of-the-u-s-smart-speaker-market-new-report/
https://voicebot.ai/2021/06/17/germany-smart-speaker-adoption-closely-mirrors-u-s-pattern-new-report-with-30-charts/
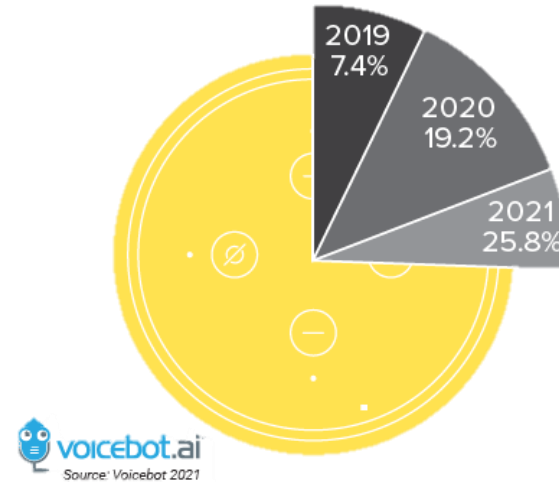
Voice Assistant Use in Healthcare

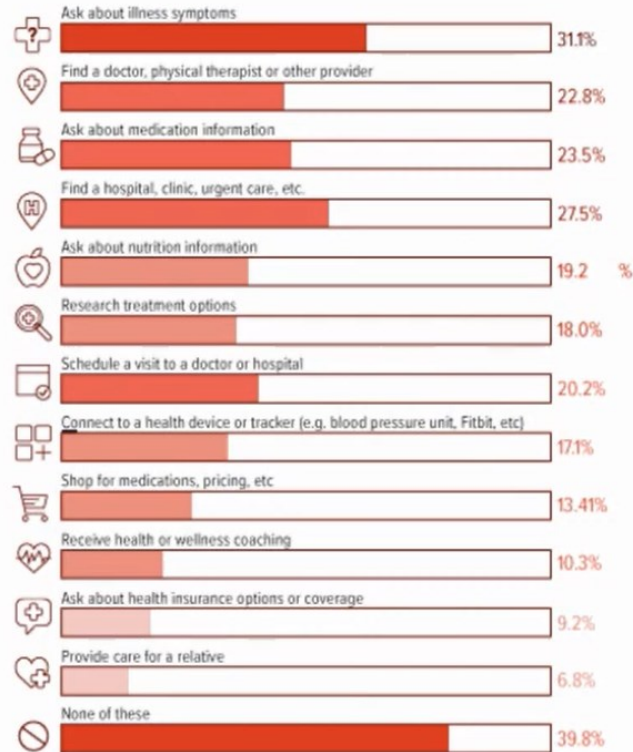Consumer Use and Interest in Voice Assistants for Healthcare

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Consumer Interest in Healthcare Use Cases on Voice Assistants

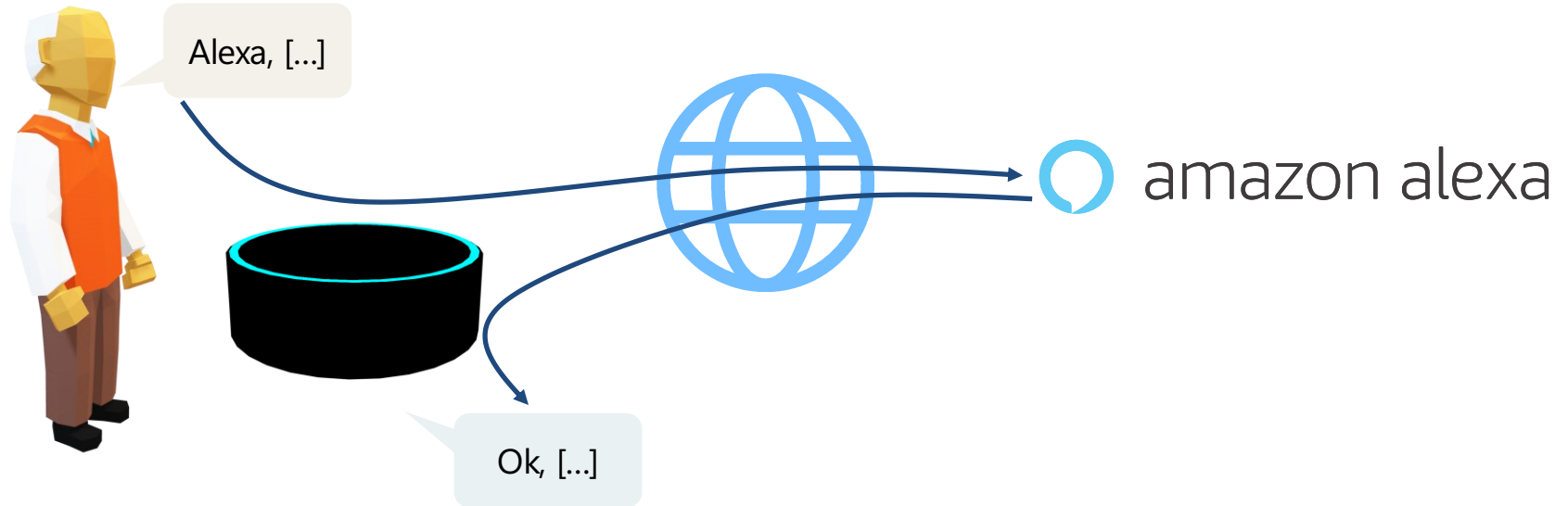| Use Case	Percentage
Ask about illness symptoms	31.1%
Find a doctor, physical therapist or other provider	22.8%
Ask about medication information	23.5%
Find a hospital, clinic, urgent care, etc.	27.5%
Ask about nutrition information	19.2 %
Research treatment options	18.0%
Schedule a visit to a doctor or hospital	20.2%
Connect to a health device or tracker (e.g. blood pressure unit, Fitbit, etc)	17.1%
Shop for medications, pricing, etc	13.41%
Receive health or wellness coaching	10.3%
Ask about health insurance options or coverage	9.2%
Provide care for a relative	6.8%
None of these	39.8%

voicebot.ai   Source: Voicebot 2021

Source: voicebot.ai, Healthcare Voice Assistant Adoption Data Deep Dive - What the Numbers Say, Jan 24, 2022
https://www.youtube.com/watch?v=TQm3l0NjH64

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Amazon Alexa

Alexa, [...]

Ok, [...]

amazon alexa

Skill Development

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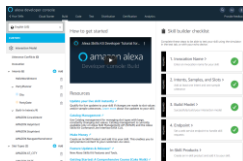/fh/// st. pölten

a Cross platform tools, e.g.:

Voiceflow

b Skill development with vendor-provided tools, e.g.: Amazon Alexa Skills Kit

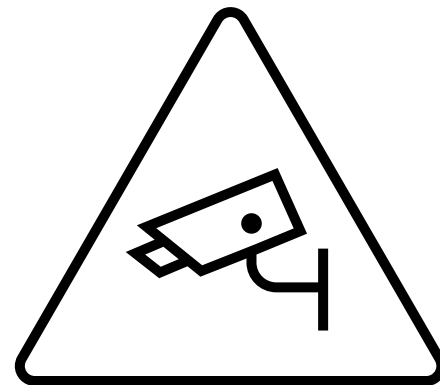Testing: use your Browser, Alexa smartphone app or smart speaker

Google: https://play.google.com/store/apps/details?id=com.amazon.dee.app
Apple: https://apps.apple.com/us/app/amazon-alexa/id944011620

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Develop our own Voice Skill

LIVE DEMO
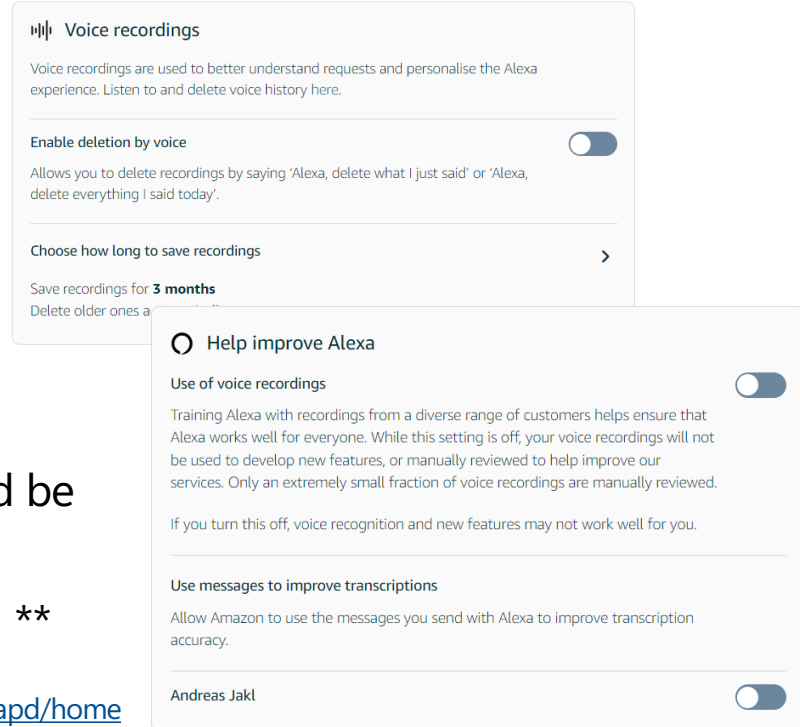
Smart Speakers

PRIVACY AND ETHICS

Platform Privacy

- Alexa always listens to wake word ("Alexa")
  - Locally on-device
  - Thrown away if not detected
- Only records when trigger word recognized
  - Review & delete recognition history
    (in Alexa app or just say it)
- Privacy: choose if speech recognition should be improved based on your voice
- Future: more on-device voice recognition *, **

https://www.amazon.de/alexa-privacy/apd/home

Manage Your Alexa Data

The more you use Alexa, the smarter the service gets by adapting to your speech patterns, vocabulary and personal preferences. Data from a diverse range of customers also helps ensure that Alexa works well for everyone.

Voice recordings

Voice recordings are used to better understand requests and personalise the Alexa experience. Listen to and delete voice history here.

Enable deletion by voice

Allows you to delete recordings by saying 'Alexa, delete what I just said' or 'Alexa, delete everything I said today'.

Choose how long to save recordings

Save recordings for **3 months**
Delete older ones a

Help improve Alexa

Use of voice recordings

Training Alexa with recordings from a diverse range of customers helps ensure that Alexa works well for everyone. While this setting is off, your voice recordings will not be used to develop new features, or manually reviewed to help improve our services. Only an extremely small fraction of voice recordings are manually reviewed.

If you turn this off, voice recognition and new features may not work well for you.
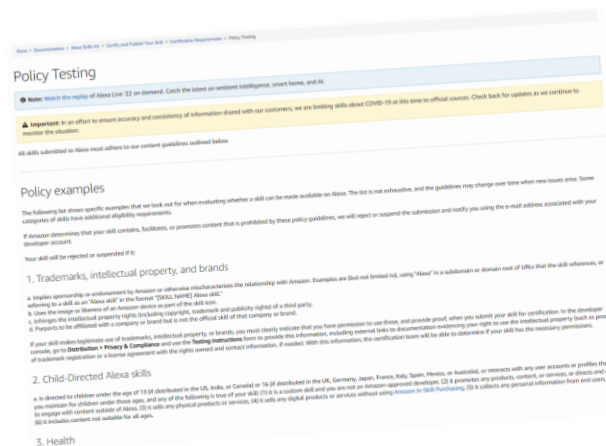
Use messages to improve transcriptions

Allow Amazon to use the messages you send with Alexa to improve transcription accuracy.

Andreas Jakl

* https://ai.googleblog.com/2019/03/an-all-neural-on-device-speech.html
** https://www.engadget.com/amazon-is-adding-offline-voice-recognition-to-alexa-devices-171145961.html

Skill Guidelines

- Theoretically, you could ask the user everything and do what you like
    - But: that's not allowed!
    - Extra permissions required to access user data from their account
- Public Alexa Skill
    - Comply to certification requirements
        - Strict guidelines for data privacy & security
        - Additional rules for children and health information
    - Manual review
        - Can take a few days. Humans really test your skill and give you feedback.
    - Required privacy policy: you're a legal person and your service needs to comply with GDPR & co!
- Submission checklist: https://developer.amazon.com/en-US/docs/alexa/custom-skills/certification-requirements-for-custom-skills.html

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Contact:

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https://www.andreasjakl.com/

THANK YOU!