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Machine Learning for Consumer Electronics

March 29th, 2022

Milos Cernak
Principal engineer, CTO-AI team

Agenda

Company Overview

Opportunities and challenges:

- **On-device deployment**
- **Personalization ~ unique UX**
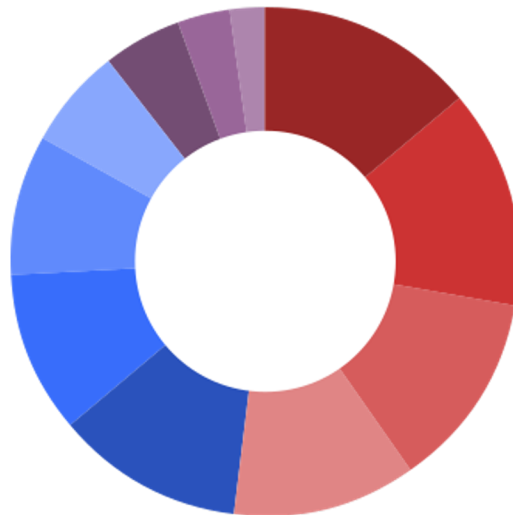- **Self-supervised learning**

A MULTI-BRAND COMPANY

Voice rise in consumer electronics

Which sectors will see demand in voice rise?

- 13.9% Banking, Financial Services, Insurance
- 13.9% Healthcare and Life Sciences
- 12.5% Consumer Industries and Electronics
- 11.8% Government
- 11.8% Media and Entertainment
- 10.4% Education
- 9.0% Telecoms
- 6.3% Robotic Process Automation
- 4.9% Consultancies
- 3.5% Legal
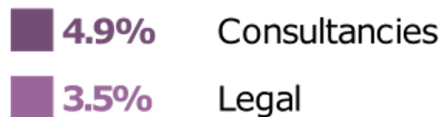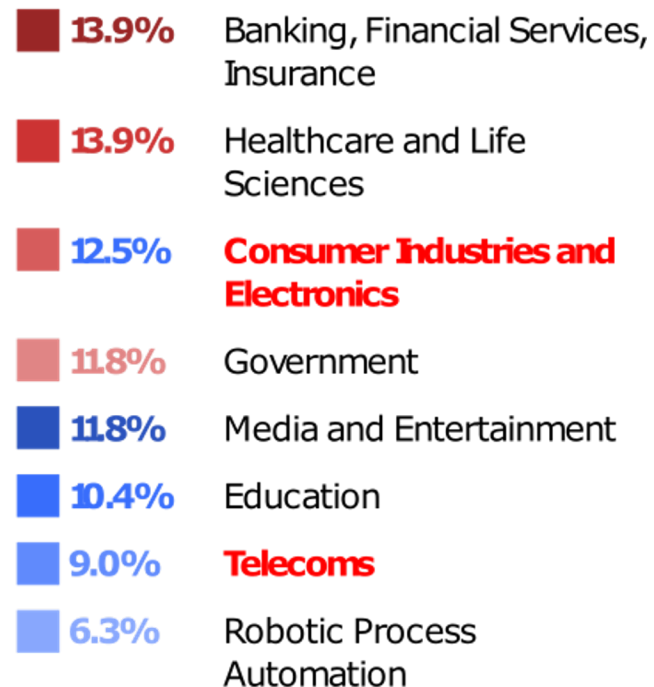
Source: Speechmatics Voice Report 2022

Opportunities and challenges
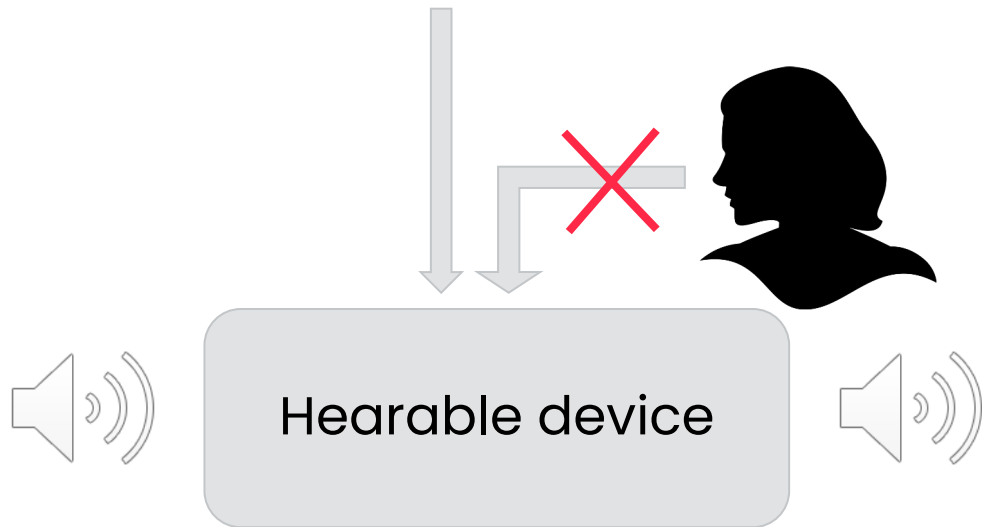
On-device deployment
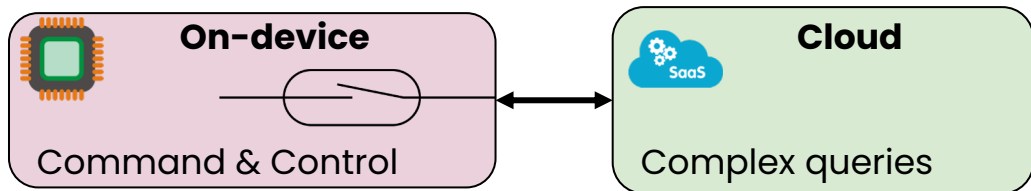
Opportunities: energy, security, privacy, and low latency constraints demand on-device processing:

Challenges:
- Seamless UX for cloud+edge ML
- Blended DSP+ML solutions
- Neuromorphic, in-memory, ML accelerators

PEAF: Power Efficient Analog Acoustic Features for Audio Recognition, sub. to Interspeech 2022
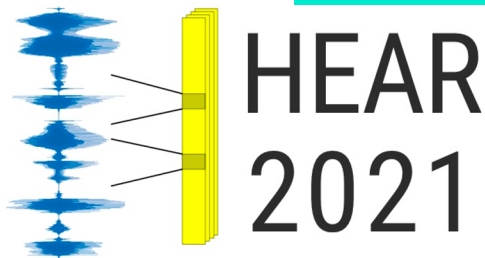
Personalization

Opportunities: personalization brings higher customization and unique UX for

- Neurodiverse people, e.g., suppressing disturbing sounds
- Gaming, e.g., footsteps enhancement
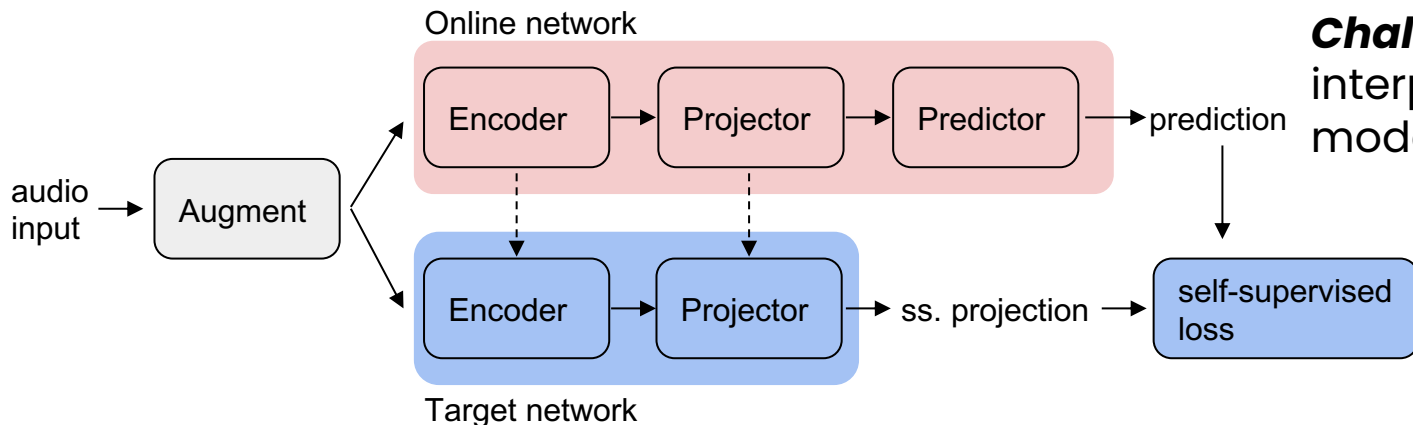- Videoconferencing

Challenge:

- New technology and universal design alignment

Male Speaker + Female Distractor

Self-supervised learning

Opportunities: leverage unlabelled data and zero-shot learning, develop common benchmark "in-wild" datasets

Challenges: still non interpretable modelling

HEAR 2021

Online network

audio input → Augment →

Encoder → Projector → Predictor → prediction

Encoder → Projector → ss. projection → self-supervised loss

Target network

SERAB: A multi-lingual benchmark for speech emotion recognition, ICASSP 2022

Summary

Opportunities and Challenges

	On-device processing	Personalisation	Self-supervised learning
Opportunities	Privacy Latency Energy	Customization Universal UX	Leverage unlabeled data
Challenges	Hybrid DSP + ML HW advances	Technology and (UX) design alignment	Interpretability

Thank you!
mcernak@logitech.com