Introduction to Eriksholm Projects

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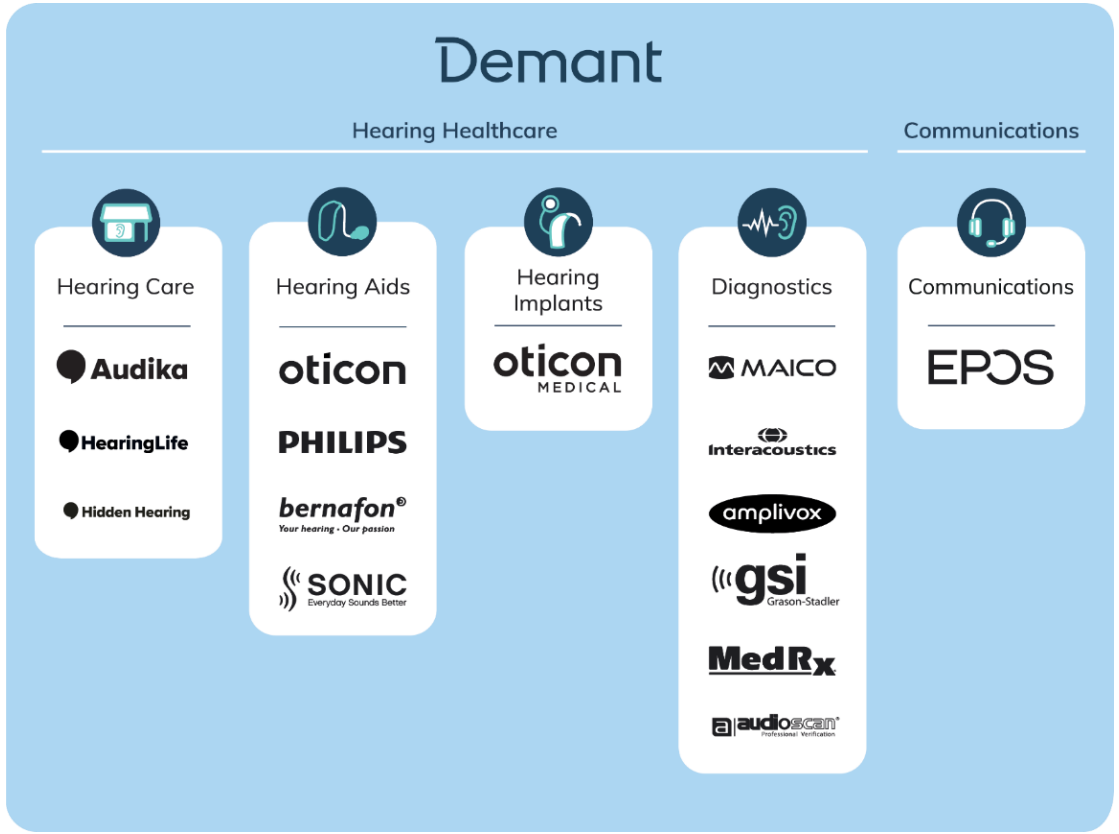
Eriksholm Research Centre
PART OF OTICON

About Eriksholm





Demant business areas



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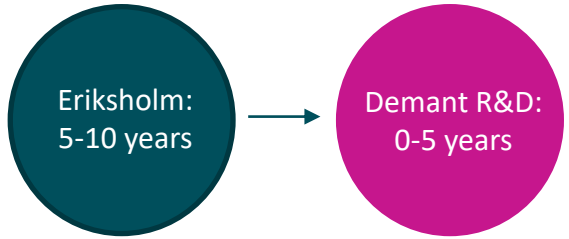
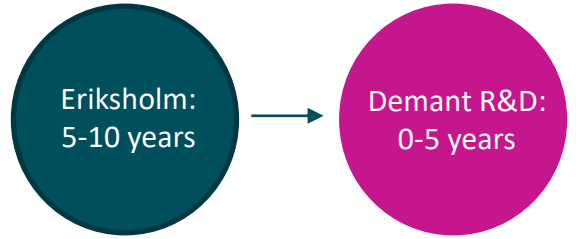


A brief history of Eriksholm

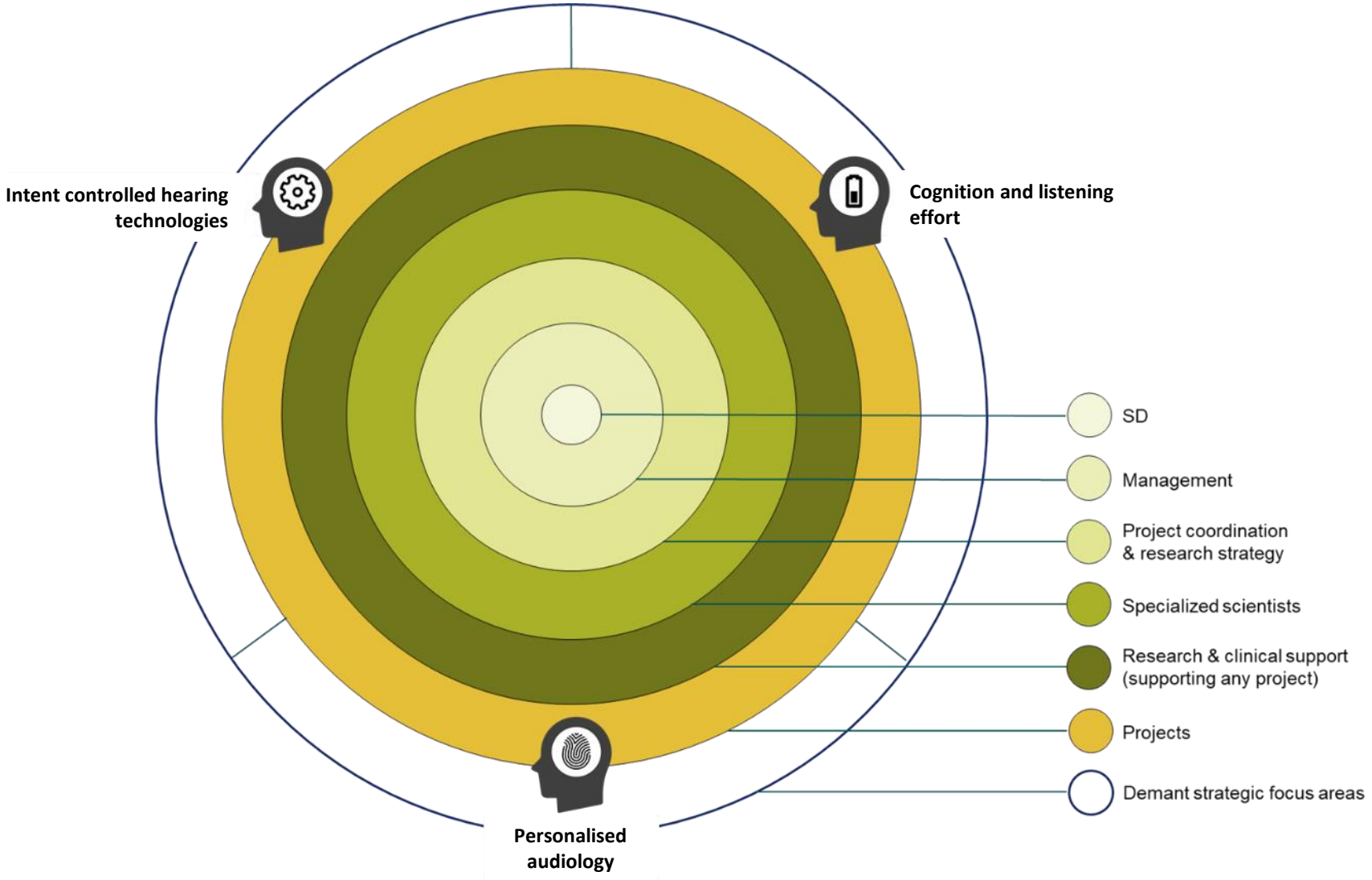
1977 Eriksholm Research Centre opening

2001 New building added

2014 Brain Hearing Lab added, extended 2019



Research areas and organizational roles

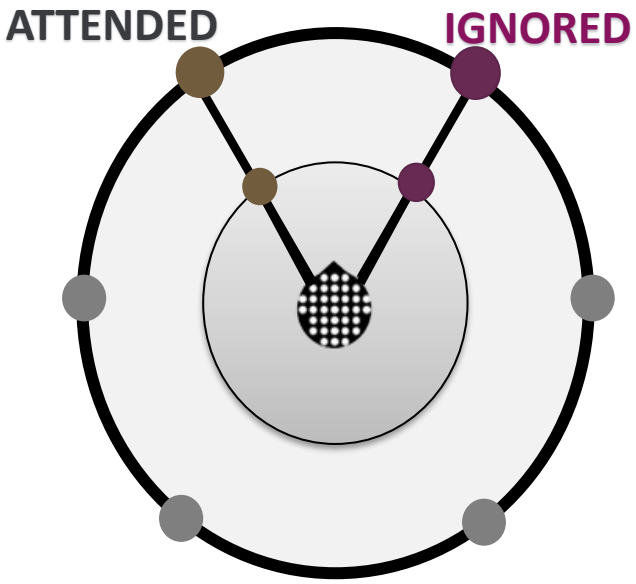


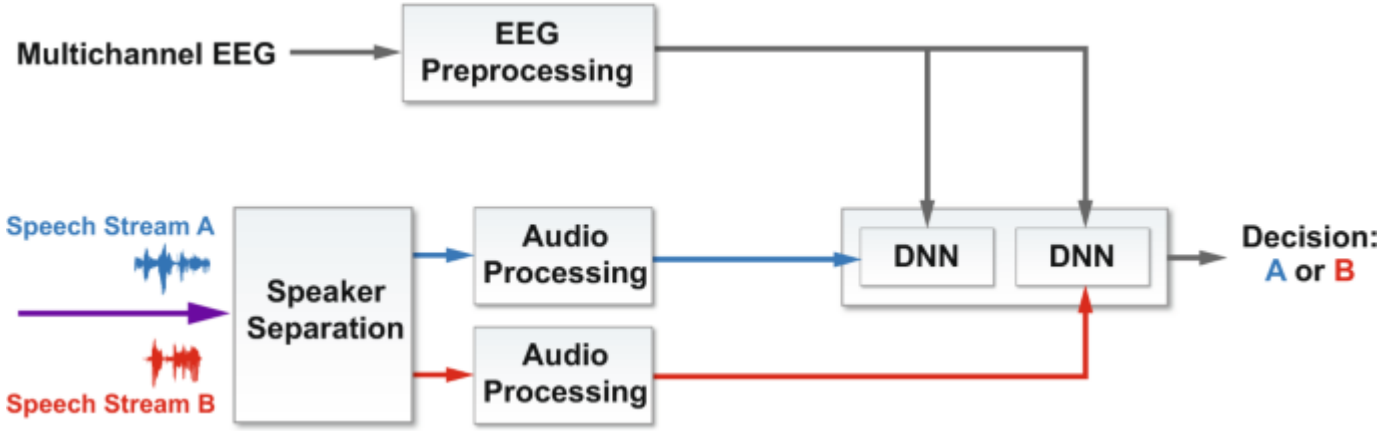
About Projects





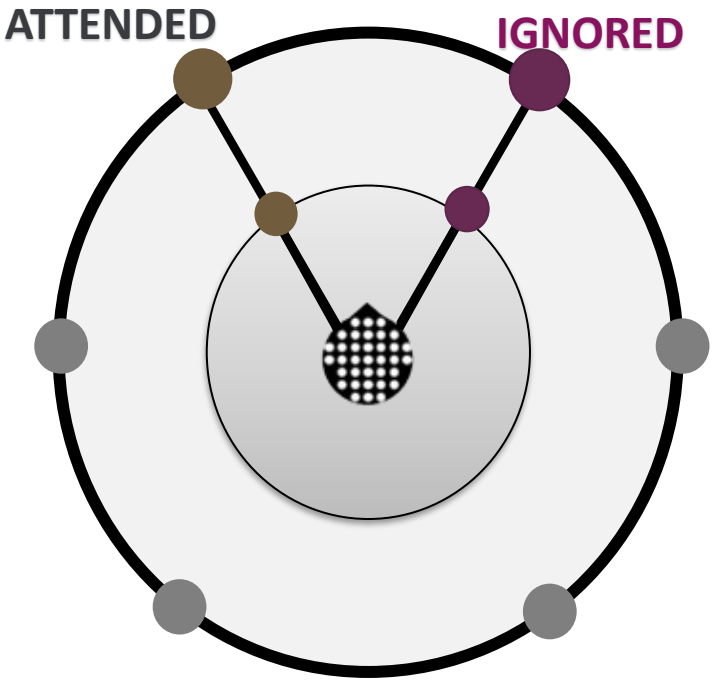
Project 1: Brain-Based Monitoring of Target Speech

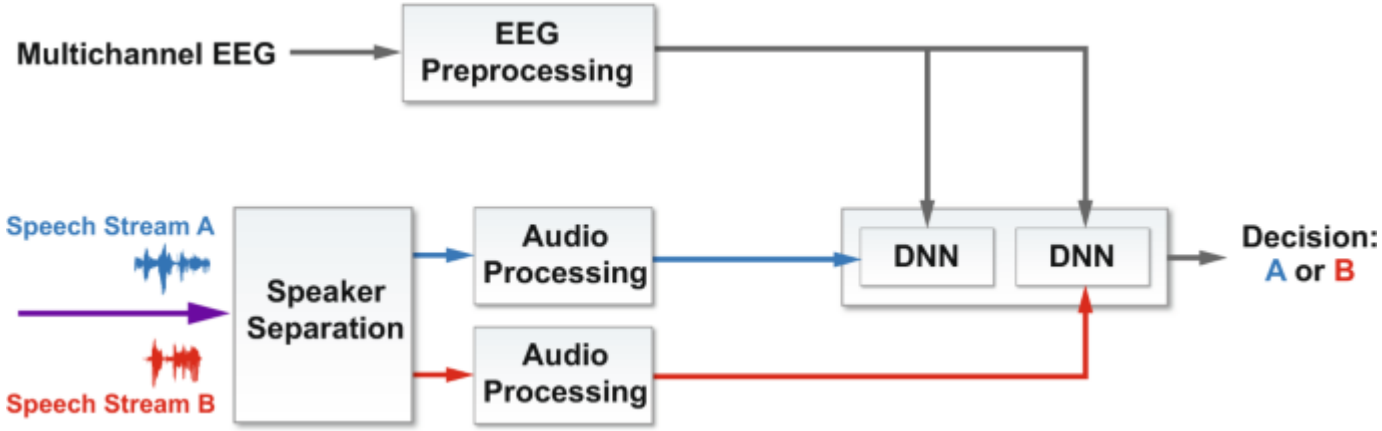




PROJECT GOAL 1:
IDENTIFY ATTENDED TALKER
FROM SUBSET OF EEG ELECTRODES
USING DEEP LEARNING (e.g., SSL)

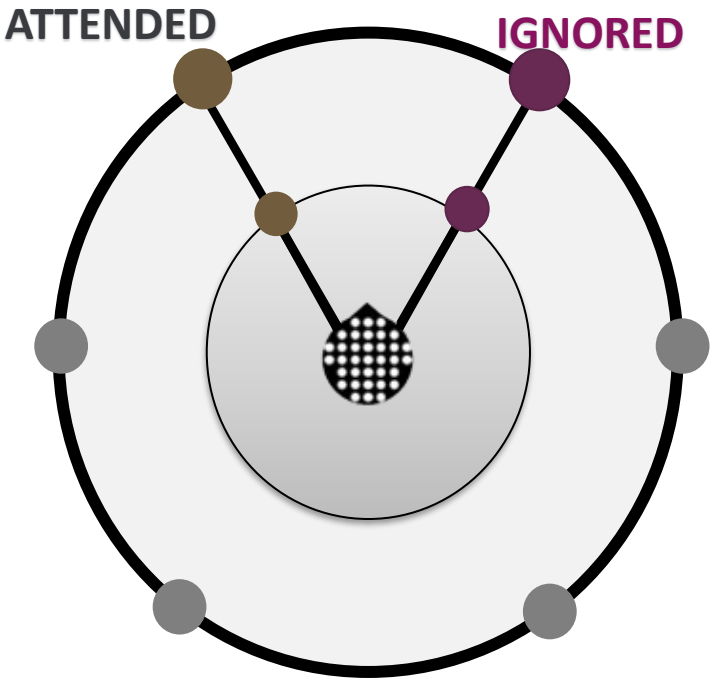
Project 1: Brain-Based Monitoring of Target Speech

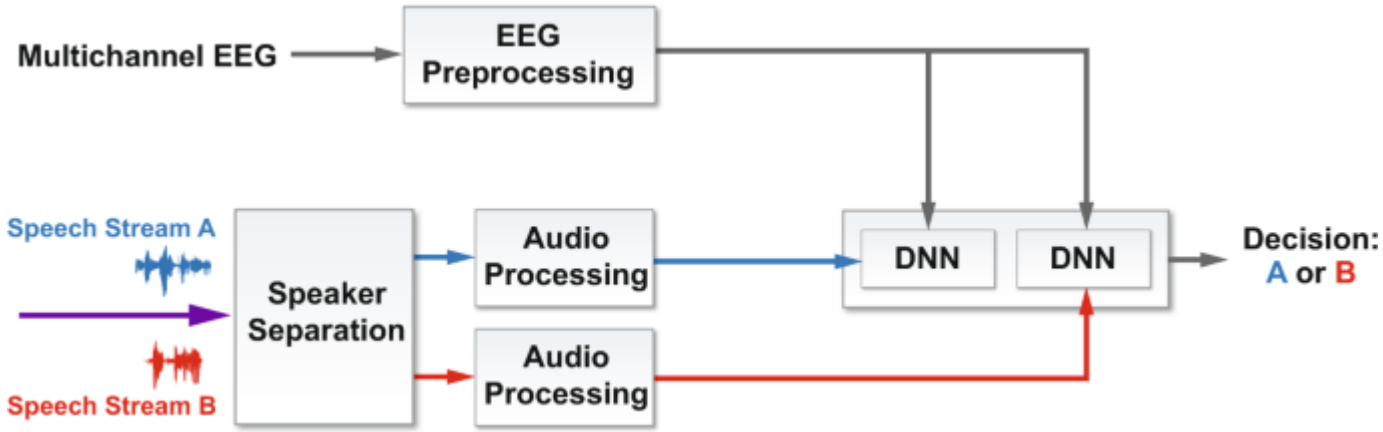




PROJECT GOAL 2:
TO USE SYSID TO STUDY MECHANISMS UNDERLYING SELECTIVE AUDIO-VISUAL ATTENTION?

Project 1: Brain-Based Monitoring of Target Speech





PROJECT GOAL 3:
TO GENERATE SUFICIENTLY GOOD MULTIMODAL (e.g.,BRAIN and EYE) DATA USING GENERATIVE MODELS.

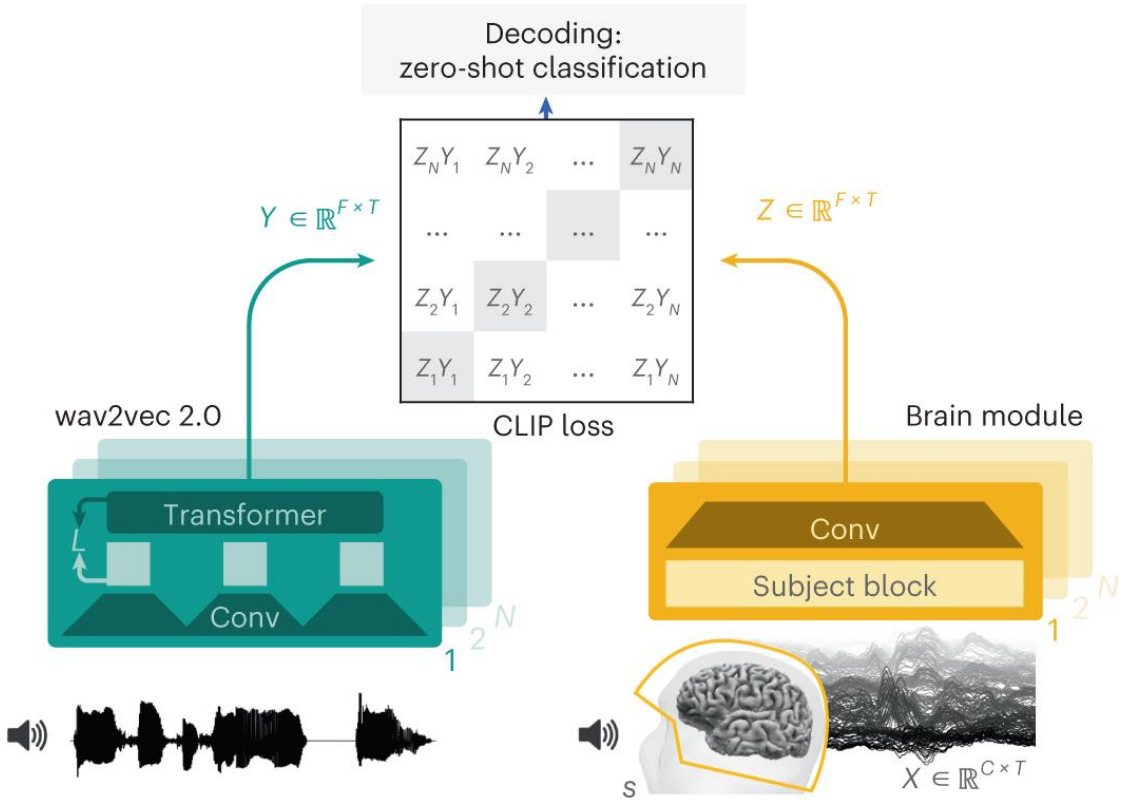
PROJECT 2: DESIGNING NEXT-GENERATION USER-INFORMED BEAMFORMERS

TAD with multidirectional sources

PROJECT GOAL:

TO FUSE DATA FROM DIFFERENT MODALITIES (BRAIN, EYE AND BEAMFORMERS) FOR FAST DETECTION OF TARGET OF USER'S INTEREST

PROJECT 3: BRAIN-BASED SPEECH RECOGNITION SYSTEM



PROJECT GOAL:

To use ASR systems to study how competing speech is processed and understood in the brain.

PROJECT 4: USING ASR AS A BIOMARKER

PROJECT GOAL:

Are ASR systems informative enough to be used as biomarkers of neurocognitive disorders?

INTERSPEECH 2023
20-24 August 2023, Dublin, Ireland

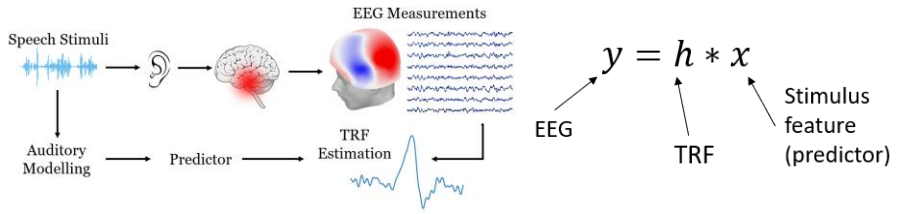
Capturing Mismatch between Textual and Acoustic Emotion Expressions for Mood Identification in Bipolar Disorder

PROJECT 5: Early brain responses from continuous speech for automatic control of hearing device

Early brain responses to natural speech contain information whether sound is ‘loud’ enough to reach the brain

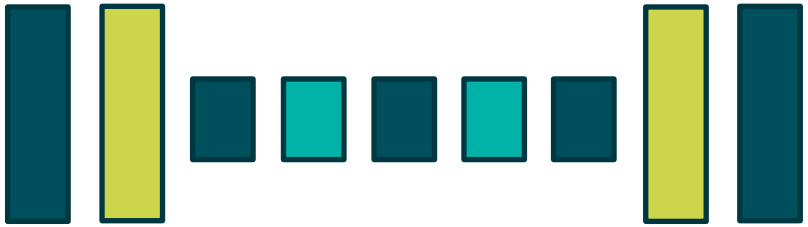
⟶ automatic, self-adjusting hearing devices for seamless hearing experiences in daily life

Current: **Temporal Response Functions (TRFs)**



- Noisy data (sensors far from source, interfering generators)
- Low-amplitude early responses overshadowed
- Linear models used for modeling processes that are known to be non-linear
- Different sensor placement across sessions

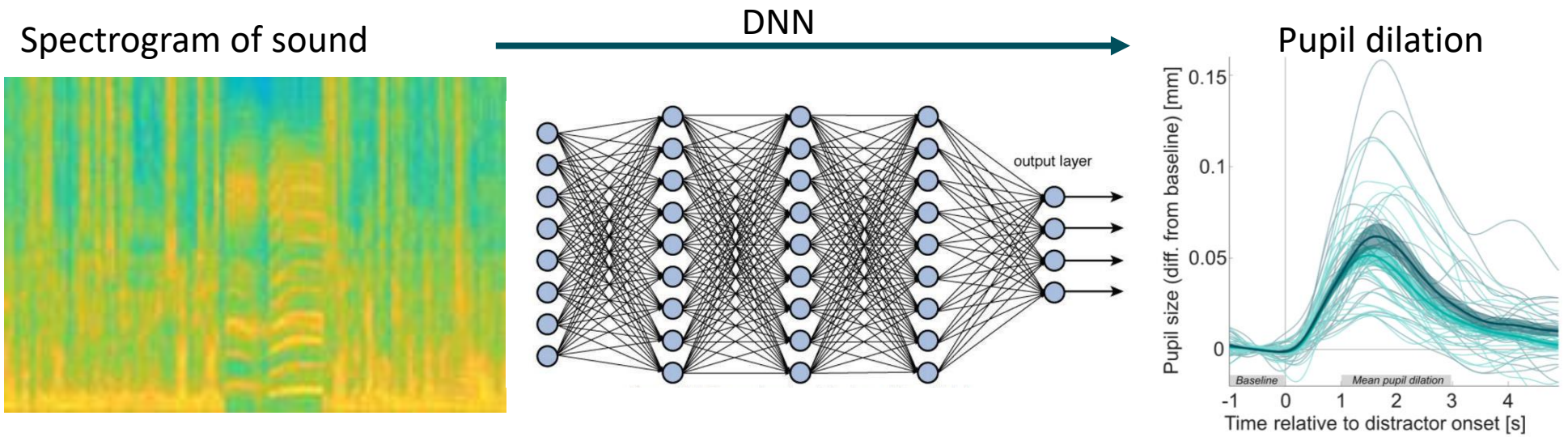
Future: Deep learning



- **Deep neural networks with**
- **Multiple layers that**
- **can model non-linearities**
- **Transfer learning**

PROJECT 6: Which spectro-temporal features of sound lead to pupil dilation?

- Pupil dilation in response to sounds in the background can be considered as a measure of distraction.
- However, existing models for acoustic salience only explain a small amount of variability in pupil dilation.
- Goal of a master thesis can be to train and test a deep neural network to predict pupil dilation in response to sounds in the background.
- We can provide an existing dataset from 47 participants who listened to continuous speech while one-second-long sounds were played in the background (a total of ~12000 sound events)
- Interested? Ask Lorenz Fiedler (lfie@eriksholm.com) for more info.



PROJECT 7: Eye-gaze behaviour in virtual communication

Background:
Gaze analysis can reflect the behavior of talkers in an interactive communication. It has been also used in auditory research to measure listening effort related to changes in SNR. In summary, More gaze transient (saccade) indicated increased effort.

Objectives:
- Prediction of turn-taking through eye-gaze behaviors
- Assess engagement in the conversation

Methods:
- Conduct virtual dyadic conversation
- Record speech signals of both talkers
- Obtain eye-tracking data from eye tracker

Hypothesis:
- More frequent gaze shifts are expected before a turn transition
- Gaze aversion can be used to understand about the interest of talkers' engagement

CONTACT:

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