



Multi-echo fMRI for overt speech production

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Overview

Project phases

- ① Methods for *fMRI speech production* (**Methods development**).
- ② *Foreign sound learning*, a fMRI experiment (**Methods implementation**).

Magnetic Resonance Imaging (MRI) *Methods development*

How does it work?



Magnetic Resonance Imaging (MRI) *Methods development*

How does it work?



Magnetic Resonance Imaging (MRI) *Methods development*

How does it work?

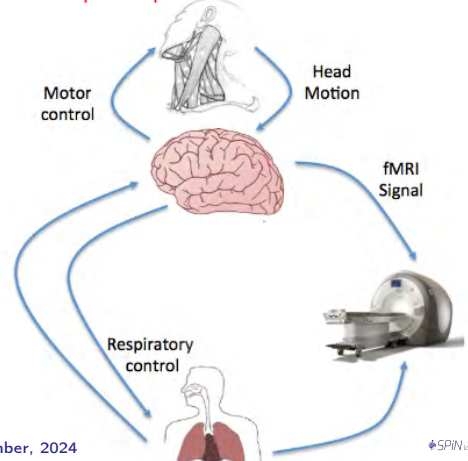


Magnetic Resonance Imaging (MRI) *Methods development*

Measurement noise sources!



Speech production artifacts



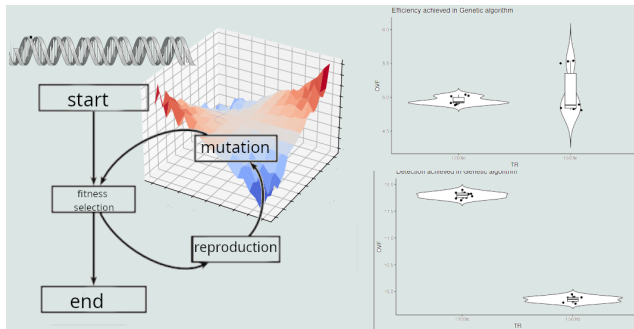
fMRI parameters *Methods development*

Problem

What's the best to sample speech production with fMRI?

Work done

Comparison of computer simulations with different methods.



fMRI parameters *Methods development*

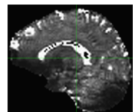
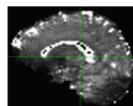
Problem

How do we clean noise originated in MRI machine?

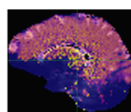
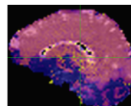
Work done

Development and comparison to reduce noise and improve signal measurement.

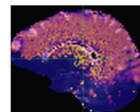
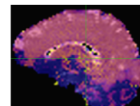
T2* maps (% change compared ME-OC)



ME-OC



NORDIC-OC



HYDRA-OC

2.4 mm iso

2 mm iso

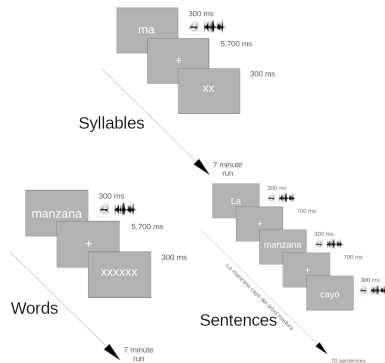
Speech denoising *Methods development*

Problem

The more speech, the more artifacts.

Work done

Speech experiment (e.g., syllables, words, sentences).



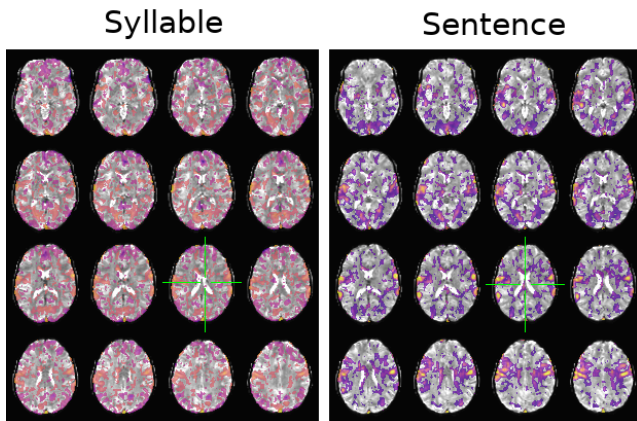
Speech denoising *Methods development*

Problem

Need to classify artifacts from signal.


Work done

Build signal classification algorithm (in course).



Thanks

Thanks!
Eskerrik asko!

 "la Caixa" Foundation

