Reduction of the power line interference in a single-channel AEP recording system based on low-cost consumer electronics: application for dissemination of audiology concepts in schools and at a science museum

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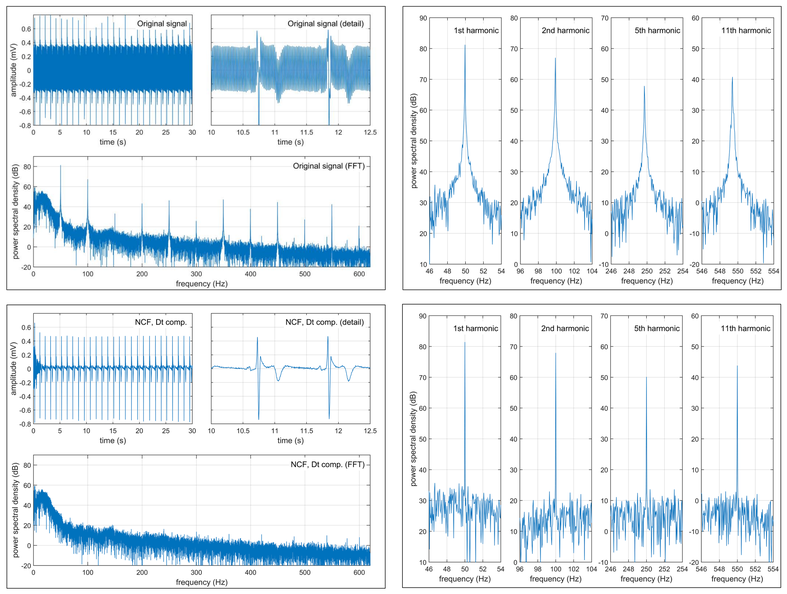
Background:

IERASG-2023: we presented an AEP recording system:

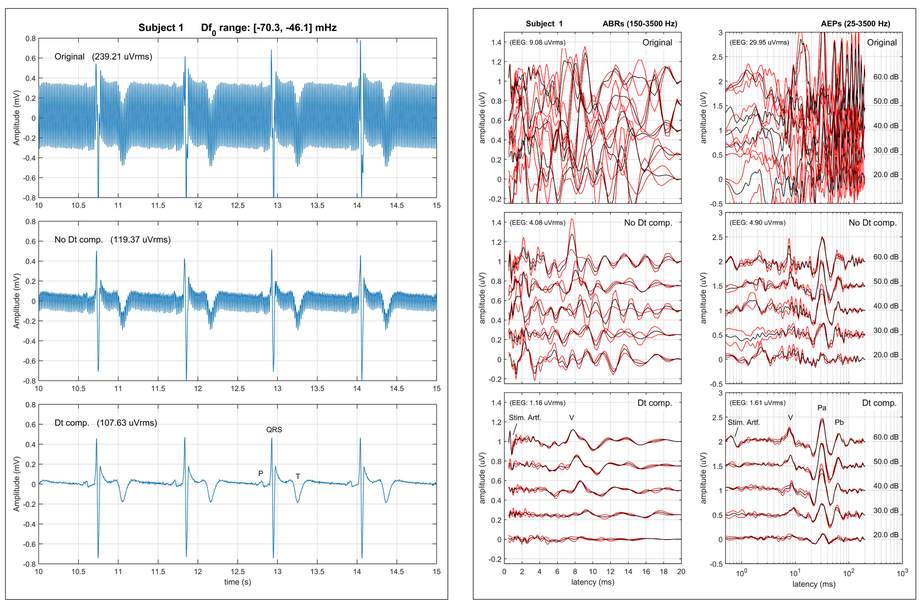
- Based on consumer electronics
- PLI reduction based on both common-mode / differential signals
- Requiring specific hardware and 2 input channels
- Demo at IERASG-2023 (Cologne, Ge)

IERASG-2025: Advanced portable and flexible AEP recording system

PLI REDUCTION PROCEDURE



PLI REDUCTION in ECG and AEPs



Methods:

Advanced method for PLI reduction:

- Estimation of time drift; time drift compensation (frequency drift cancellation)
- PLI reduction is really easy after frequency drift cancellation
- Details soon (patent pending; article under revision)

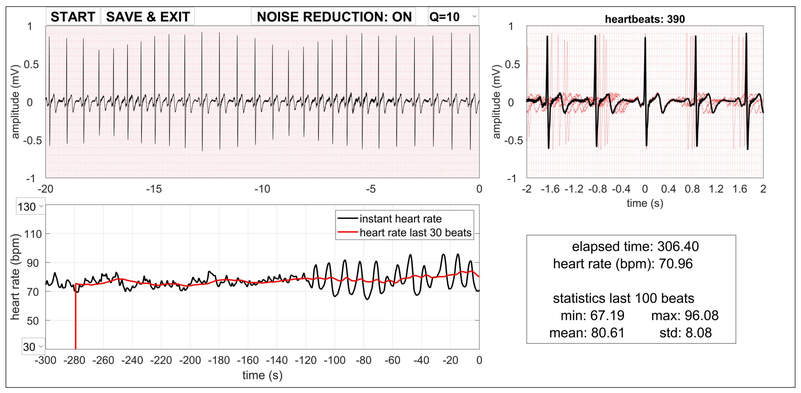
New concept of biopotential recording system:

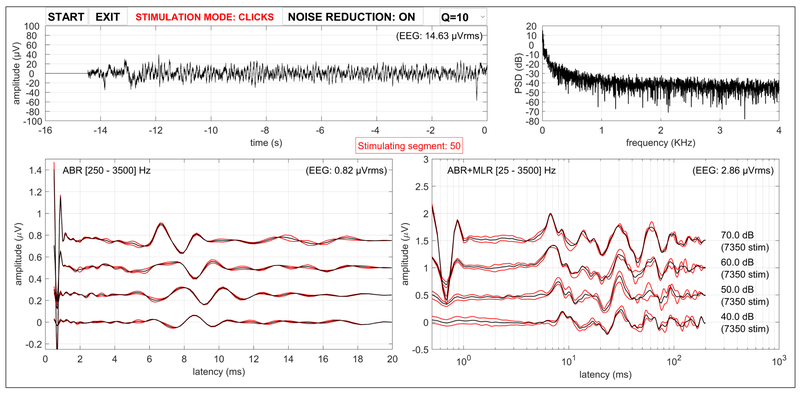
- Based on consumer electronics, no specific hardware, only one input channel
- Low cost; appropriate for research / education / dissemination

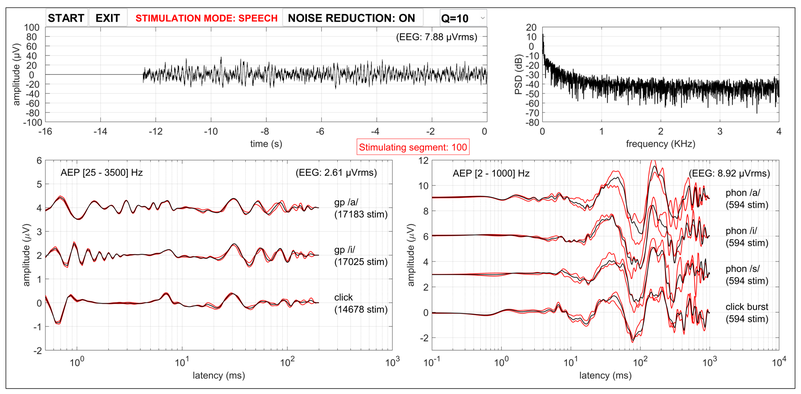
Dissemination workshop:

- Demo activities related to ECG and AEPs
- Primary & high schools, university, Science Museum of Granada

DEMO SCREENSHOTS







Results:

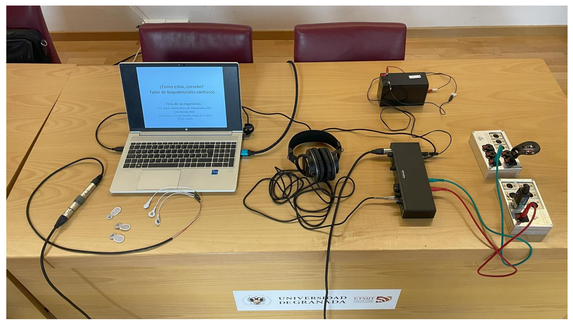
Reduction of PLI

Quality of recorded responses:

- ECG (EMG, ECG, Symp./Parasymp. NS)
- AEPs responses to clicks
- AEPs responses to synthetic speech

Workshops performed during spring 2025

THE BIOPOTENTIAL RECORDING SYSTEM

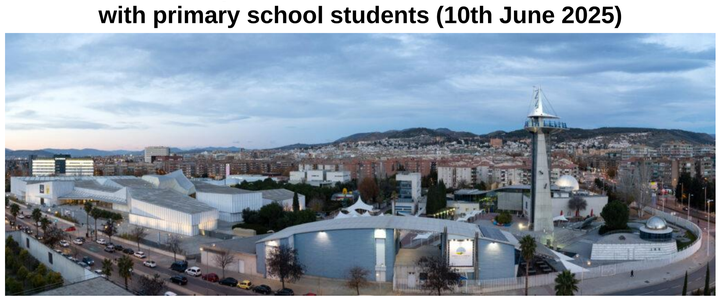


WORKSHOPS PERFORMED IN SPRING 2025

At ETSIIT (UGR) with high school students (12th April 2025)

At ETSIIT (UGR) with telecommunication engineering students (22nd May 2025)

At Parque de las Ciencias de Granada with primary school students (10th June 2025)



Conclusions:

- PLI reduction allows the design of a robust, flexible, low-cost and open biopotential recording system, appropriate for research, education and dissemination purposes.
- Experiments show the quality of the responses and the utility of the recording system for AEP and ECG experiments out of the laboratory.
- The workshop has attracted interest in the educative community at different levels (primary, secondary, university) and in the Science Museum of Granada

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Proyecto **P21.00152**