



Investigating Changes in Head Movement Coordination Based on the Emotional Intentions of the Speakers

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Abstract

Imagine being able to evaluate acting quality more objectively or ease communication for autistic people with only a phone and a marble sized piece of technology. Nonverbal communication in the form of head movements is coordinated [1] and possibly conveys details about the emotional intent of the speakers. This study uses eSense [2] earbuds, which are equipped with an accelerometer and gyroscope, to investigate whether coordination changes during acted conversations given different emotional intentions.

Objectives

The presented research tests the following hypotheses:

- The head movements within dyads are more synchronous when both emotional intentions are positive.
- There is more interpersonal coordination within dyads if the intended emotions are more similar.

Technology

The wearable technology used to record head movement of participants is the eSense in-ear earbud (Fig 1). Inbuilt sensors capture the frequency and amplitude of motions. [1]

Data recordings are made with an Android app (below). [3]

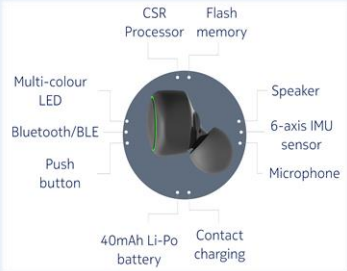
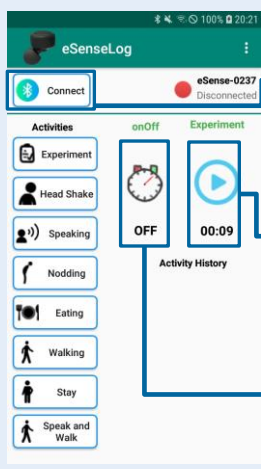


Fig 1: Overview of eSense earbud [1]



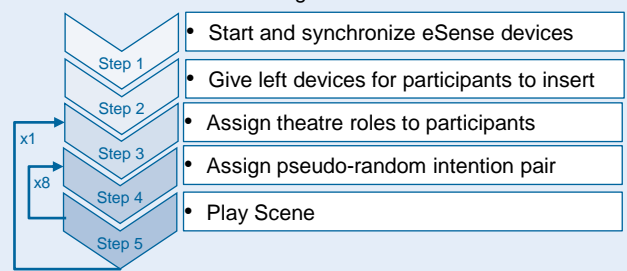
Connect phone to the app via Bluetooth

Record sensor and audio data

Timestamp when a trial begins and ends

Methodology

An extract of a play by James Saunders [4] is performed multiple times during the study, each time with different intentions through transitive verb pairs (positive-pos., negative-neg. or pos.-neg.). After two test trials the following is recorded:



Data Collection

Three recordings have been made so far with participants of one household (Fig 2). The first iterations show that the technology and procedure work well and are suitable for the task.



Fig 2: 2 participants during a trial.

Overlaying the data recordings of participant 1 and 2 shows that movements of the speaking participant are more pronounced than those of the non-speaking participant (Fig 3). The extent to which coordination occurs will be analysed once the data collection is completed.

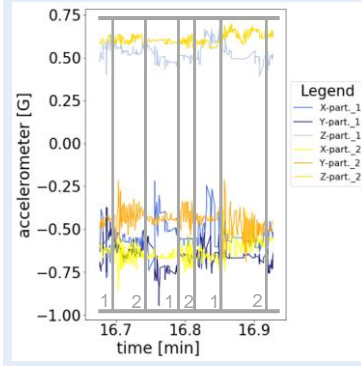


Fig 3: Excerpt of the three-axis accelerometer data recorded of 2 participants during a scene ('1 =block, 2 =cherish'). The lines indicate changes in speaker-listener roles. It can be seen that the head movements of the speaker are more pronounced than those of the listener.

Summary

This study looks at the difference in head movement coordination of conversation dyads upon different emotional intentions. So far the technology has been set up and the first 6 datasets were collected. Once the data collection is completed an averaged cross-wavelet analysis will be performed [1]. This study is preliminary and will be the basis for further studies with acting students.

Bibliography:

[1] Hale, J et al.. Oct 2019. *Are you on my wavelength? Interpersonal coordination in dyadic conversations.* Journal of Nonverbal Behavior.
 [2] eSense device presentation. accessed: 2020-01-20. <https://www.esense.io/>.

[3] eSense App repository. accessed: 2020-01-25. <https://github.com/SabrinaFrohn/Esense>.
 [4] Saunders, J. 1973. *Games and After Liverpool.* Published by Samuel French.