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fNIRS and Neurocinematics

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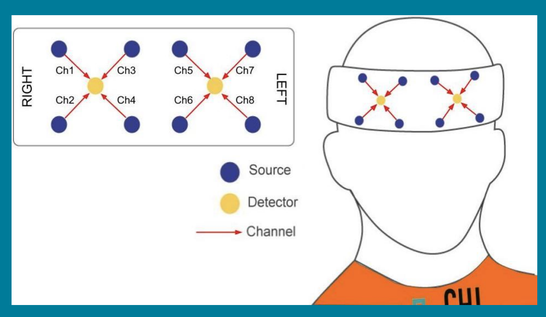
Benefits from Artinis Octamon sensor

1. Fully wireless, portable, and comfortable -> suitable for in-cinema experience
2. Eight-locational channels of Data (See Figure here)
3. Pre-processing:
   a. CBSI filter for signal improvement
   b. normalising the data -> allowing for between participants comparisons

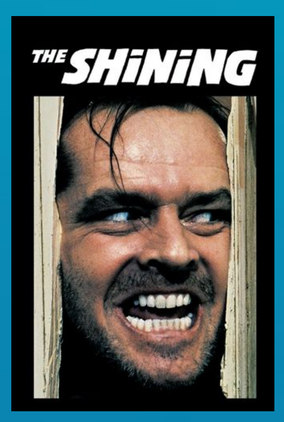


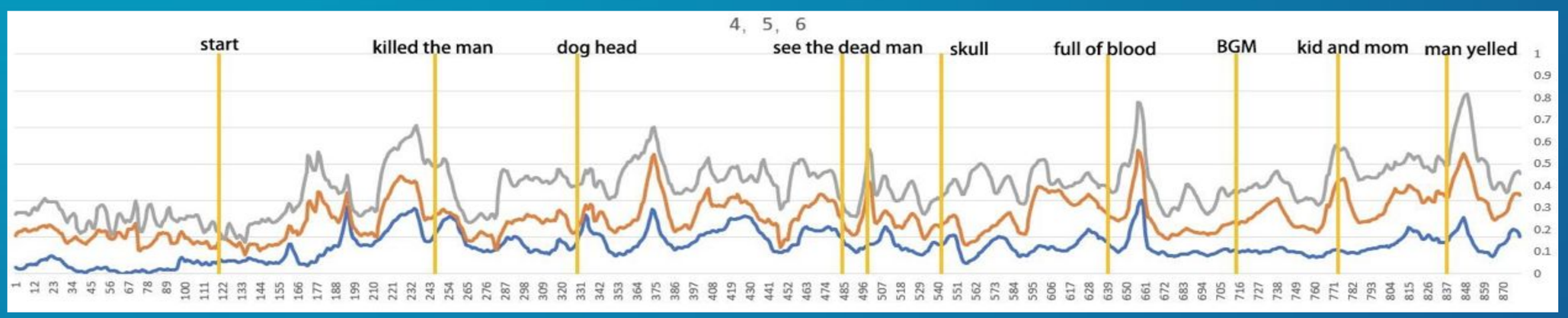
Research Questions

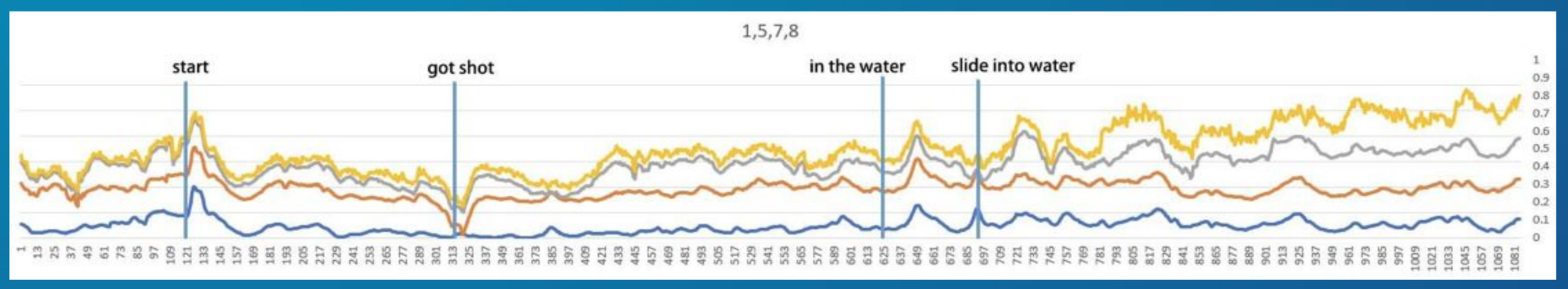
1. How is fNIRS data affected by different cinematics techniques?
2. Is it possible to find inter-subject correlations with fNIRS while subjects are watching well understood cinematic vignettes?
3. How can we use features in fNIRS data in order to control an adaptive cinematic experience?

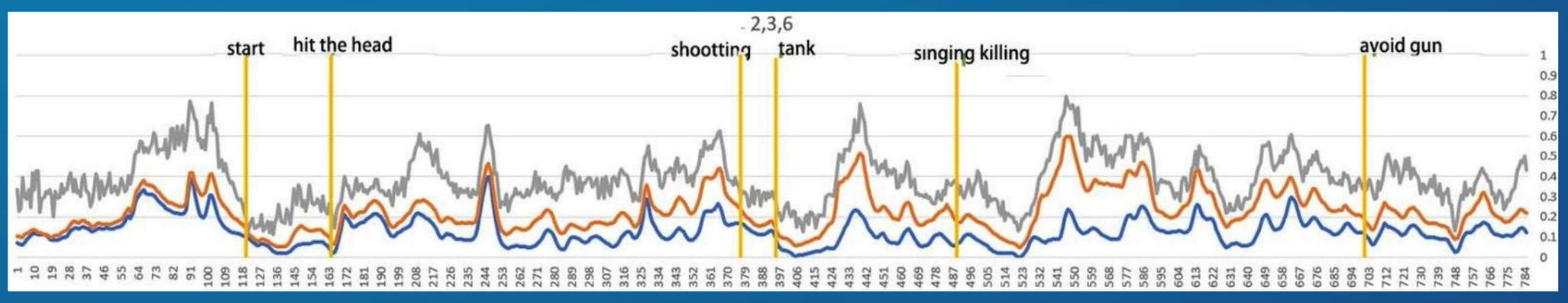
Findings (8 subjects):

1. Strong positive and negative correlations between participants
2. Confirmed previous findings with fMRI
3. Violence and Horror is different than Comedy.
4. Some locational channels contain stronger correlations between participants.









Challenges and Future Work

1. In the analysis of the movie and fNIRS data we used 3 approaches:
   a. Label certain events in the movie, then study the fNIRS data near these events.
   b. Build a list of events and experiences based on participants' movie experience, then check corresponding fNIRS data near these events.
   c. Inspect the fNIRS data in order to identify patterns, peaks and dips, then check the corresponding events in the movie in order to understand the triggers in the movie..
2. Correlations exist but what do they mean?
3. Response in fNIRS data is delayed, can we still use fNIRS to drive an interactive movie similar to EEG [1]?
4. Previous work using fMRI found the inter-subject correlations in the PFC area during different movies [2].

References

[1] Pike, M., Ramchurn, R., Benford, S., & Wilson, M. L. (2016, May). # scanners: Exploring the control of adaptive films using brain-computer interaction. In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (pp. 5385-5396). ACM.
[2] Hasson, U., Landesman, O., Knappmeyer, B., Vallines, I., Rubin, N., & Heeger, D. J. (2008). Neurocinematics: The neuroscience of film. Projections, 2(1), 1-26.

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