# Extracting automatically social signals from psychotherapy sessions

Thomas Gargot[1,2,*], Giovana Varni[2], Mohamed Chetouani[2], Jonathan Aigrain[2],
Michel Spodenkiewicz[1,2], Hugues Pellerin[1], David Cohen[1,2]
1. Hôpital de la Pitié Salpêtrière, 2. Institut des Systèmes Intelligents et de la Robotique, Paris, France
* thomas_gargot@hotmail.com

## Introduction and motivation

Psychotherapy is an important part of treatment of mental disorders alone or complementary with pharmacotherapy. Some techniques are now widely evidence-based and very cost effective (Layard & Clark, 2014).

Studies hardly control what is actually happening during psychotherapy, especially the interaction between the patient and the therapist. Consequently, it is difficult to make precise links between theory and practice, control application of psychotherapy recommandations and understand which of its ingredients are the most important. An automatic feedback during the psychotherapy could help the therapists to reorganize a treatment.

## Towards an automated research framework

Here we suggest a research framework (Fig 1.) to extract automatically social signals from psychotherapy videos. We focus on motor synchrony considered as a predictor of psychotherapy outcome in a first study (Ramseyer, 2011) and a relevant signal for the study of mother-child interactions. Varni et al. 2015 developped the SyncPy open source python library to help researchers and practitioners to automatically analyse synchrony. It could be possible to measure synchrony even in familial therapies. Other features could be quite easily extracted manually like direction of the body, head direction or smiles.

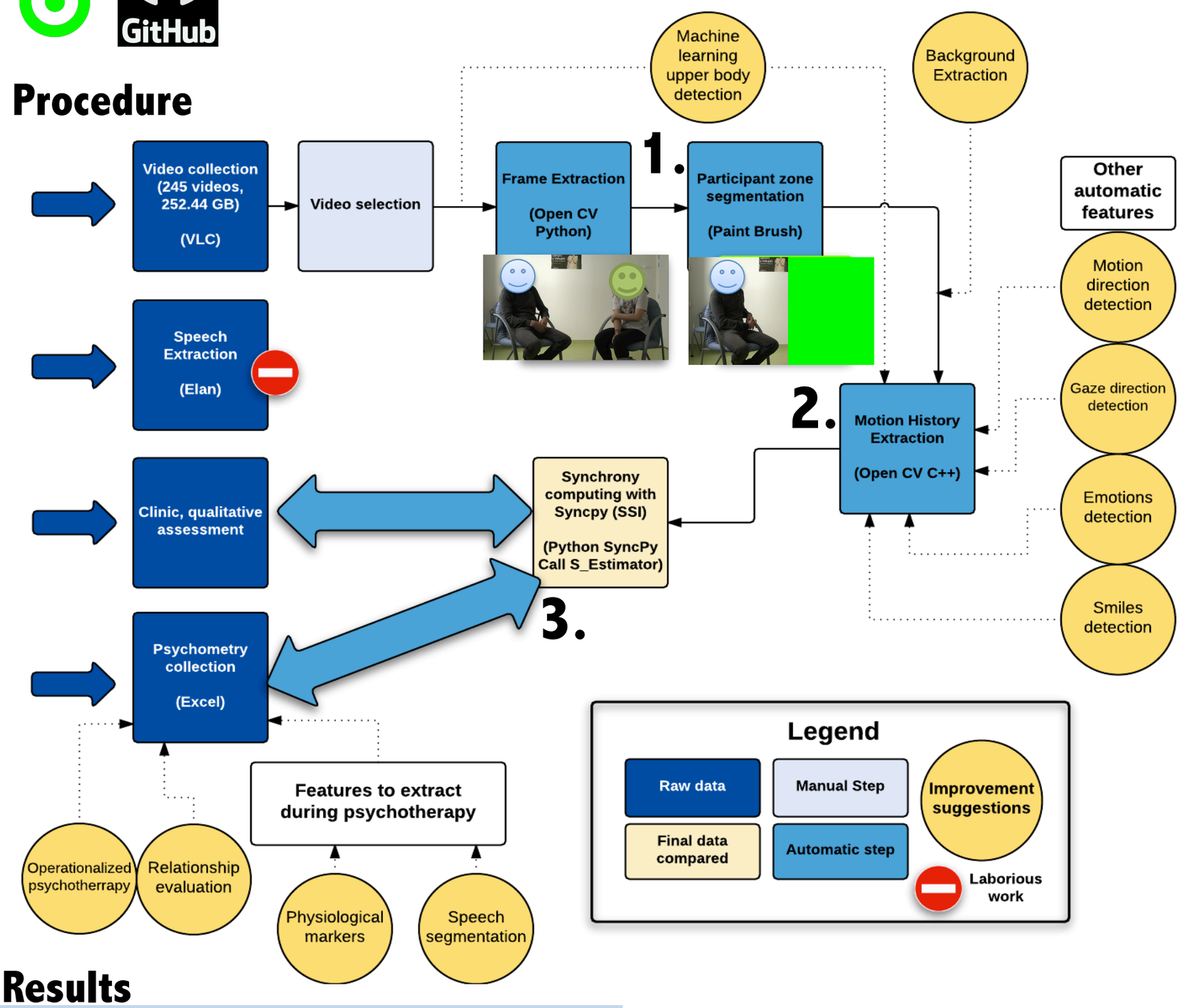
Here, we show an example of a video database analysis comparing synchrony before and during a conflictual talk between 34 children and their parent (Fig 2. and 3.).

**Project website**

**http://bit.ly/syncpsy**

## Model

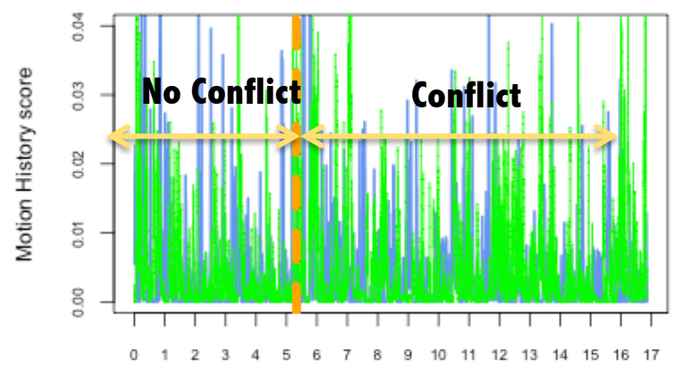

## Procedure



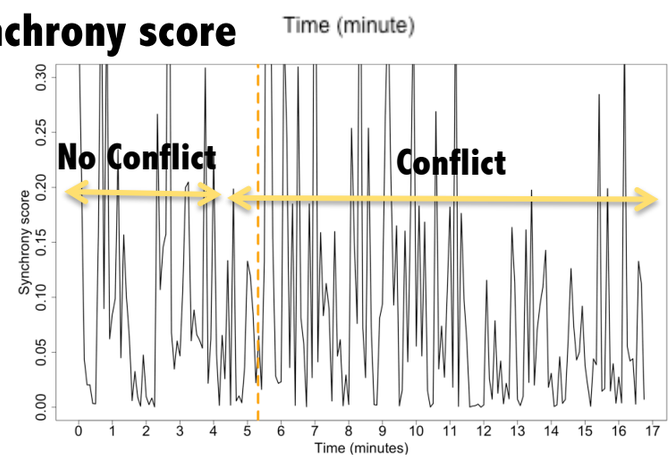

## Example on a conflict video

## 1. Participant zone segmentation

## 2. Motion history



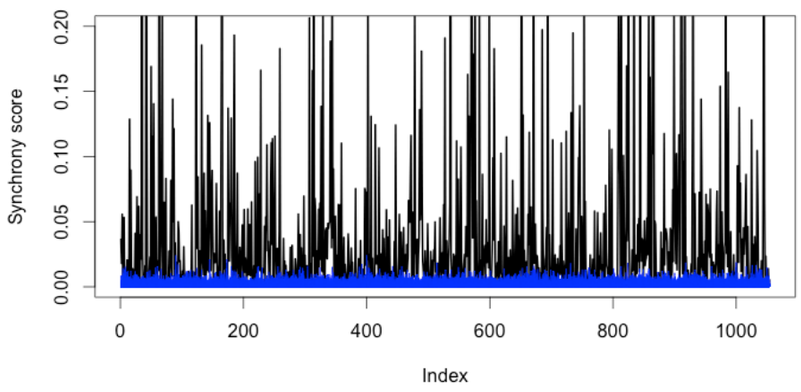

## 3. Synchrony score




## Results

- **Synchrony scores of motion history (blue) are completely different from synchrony scores of randomised motion history (Fig 4.).**
- **Synchrony scores before and during conflict are correlated (p<0.03), are therefore a feature of the dyad**
- Synchrony scores do not differ in presence of conflict or not
- Synchrony scores are not correlated with attachment styles of child nor alexithymia scores of child (TAS20)
- Motion history scores are not correlated with scores of depression (BDI) or anxiety (STAY)

## 4. Synchrony scores from natural (black) and 100 shuffled motion history data (blue)




## Conclusions

- **Automatic extraction of social signal on videos is promising**
- **Videos need to have a sufficient quality** (comparable set up, light, framing of the subjects, without interlacing)
- **Important to work on precise annotations** (moment and intensity of conflict)
- **An interdisciplinary team and open science framework is important**

**No potential conflicts of interests**

## References

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- **Varni**, G., et al. "SyncPy: a Unified Open-source Analytic Library for Synchrony." *Proceedings of the 1st Workshop on Modeling INTERPERsonal SynchrONy And infLuence*. ACM, 2015.