A Primer in the Analysis of Facial Expression Time Series

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Description: One of the fast-growing fields of cognitive neuroscience is the study of emotions and their effects on cognitive processes. A very promising approach, which allows unique insights into human emotions, is the observation of humans’ facial expressions. Studies have shown that facial expressions are systematically associated with emotions such as anger, joy or fear; therefore, tracking facial movements allows studying underlying emotional experiences. Most importantly, these readings of emotions provide a way to accurately predict behavior in real environments.

Facial expression tracking used to be labor-intense. However, advances in computer vision have rendered automatic facial expression detection fast and reliable. In this tutorial, I will provide a broad overview of state-of-the-art software for automatic facial expression analysis (e.g. CERT, Emotient Analytics, Affectiva, and IntraFace). I will focus on facial expression time series computed using Emotient Analytics.

As with most time series, there are nuisances due to the nature of the signal, which need to be addressed before performing statistical inference. I will present a Matlab toolbox that is meant to provide a basic set of algorithms for these analyses — FexMetrica.

Synopsis: The workshop will cover these three main topics:

1. Introduction to facial expression analysis and automatic facial expression detection software;
2. Facial expression time series analysis and visualization using Emotient Analytics & FexMetrica;
3. Practical example: from raw videos to classification of stimuli.

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Before the Workshop: The following is required, if you want to replicate on your computer the analysis I will be presenting:

- Install Matlab (v2014a or latter) with “stats,” “vision,” and “wavelet” toolboxes;
- Install Python with numpy;
- Install ffmpeg — note, Linux users can use avconv instead;
- Create a GitHub account;
- Install FexMetrica.

Obtaining Access to FexMetrica: FexMetrica, the Matlab module we will be using for facial expression time series analysis and visualization, is still in its alpha version. For this reason, it is set to “private” on GitHub. Access will is granted by invitation. In order to gain access, you will have to send me an email with the following information:

Address: frossi [at] ucsd [dot] edu;
Subject: TDLC: fexmetrica request;
Content: Your GitHub user name;
       The OS you will be working with;
Attachment: A copy of your cv.