Title: Tiny Motion Detection, proposed by ICT for Brain, Body and Behavior (i3B)

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Challenge:
In a lively TED Talk Michael Rubinstein explains the Motion Microscope, a technique to detect tiny motions in video. For example tiny movements of the face, which reveal heart rate, skin temperature, breathing, muscle twitches, etc. He also shows how a high-speed camera can read the tiny vibrations of a crumpled plastic bag on the table, revealing a conversation between people in the room.

The challenge in the workshop is to investigate the robustness of the method under varying conditions such as lighting, and the applicability of this method for non-stationary objects. The question is whether it is possible to compensate for camera motion. High-speed accelerometers make measurements of the 6 degrees of freedom of forehead (3D rotation and translation). In a frame-by-frame processing of the video sequence, after compensation of the camera motion, the object becomes stationary (compensation of movement within limits, of course), so that the only movement that remain would be those of the object itself. Other issues are the comparison between high frequency (shivering) and low frequency (breathing) movements.