Eulerian video magnification--a microscope for motions and small color changes

Dr. William Freeman

We have developed a "motion microscope" to visualize small motions by synthesizing a video with the desired motions amplified. This was derived from an algorithm to amplify small color changes in videos, which allows the color changes from blood flow to be visualized. Both algorithms use a signal processing approach to analyze image motions. That approach is analogous to an Eulerian framework for fluid flow analysis, and we call the algorithms Eulerian video magnification. I'll describe the algorithms, and show color-magnified videos of adults and babies, and motion-magnified videos of throats, pipes, cars, smoke, and pregnant bellies. These algorithms are being used in research projects in related areas at MIT, including in biological, civil, and mechanical engineering.

Joint work with: Michael Rubinstein, Neal Wadhwa, and co-PI Fredo Durand.

Short videos: [http://www.youtube.com/watch?v=e9ASH8IBJ2U](http://www.youtube.com/watch?v=e9ASH8IBJ2U)
[http://www.youtube.com/watch?v=3rWycBEHn3s](http://www.youtube.com/watch?v=3rWycBEHn3s)