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

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 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. The work is being used by others at MIT, in biological engineering (Dean Denny Freeman), civil engineering (Profs. Buyukozturk and Kausel), and EECS (Prof. John Guttag). I hope to learn from the audience about other physical systems where this algorithm might prove useful or fun.

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

Project web pages:
  http://people.csail.mit.edu/nwadhwa/phase-video/
  http://people.csail.mit.edu/mrub/vidmag/

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