Spatio-Temporal Video Amplification

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Abstract

Visualizing small changes that are indiscernible to the human eye is an interesting challenge in video processing. Given that modern cameras have the ability to detect minute motions, processing video to amplify these motions can give signicant insight. We propose to implement a realtime digital system that will amplify small motions in videos. In the temporal domain our system will calculate the amplified time derivative of pixel intensities in our input video. Our output video will be the sum of the original input and this amplified time derivative. We will amplify spatial translation (for example motion of objects that are vibrating back and forth) by computing the derivative of the pixel-coordinates (as opposed to intensities) with time. This spatial translation will be amplified and used to translate pixels in the original video. Our system will first be implemented using grayscale. If time permits, we will implement a color-version, and possibly include frequency selective motion amplification.