Cool Applications of Image Processing

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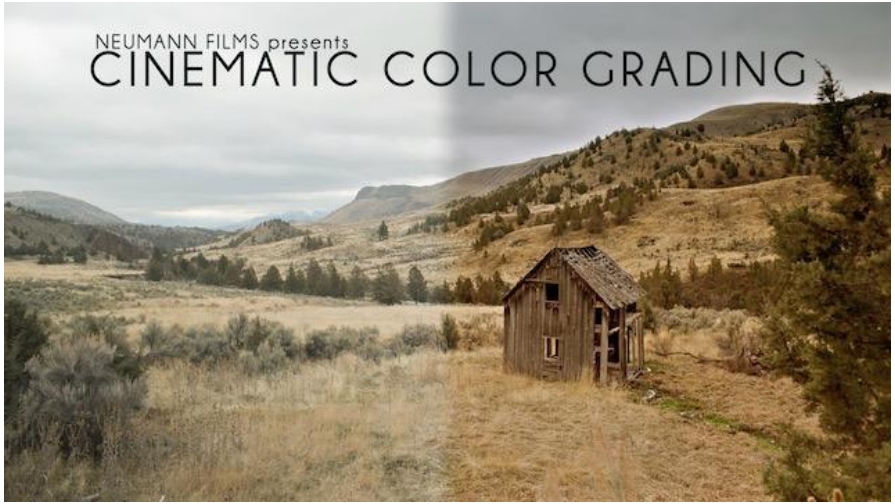
Retouch Personal Photos!

Print Media!

Movie post production

Image courtesy: juanmelara.com

Movie post production



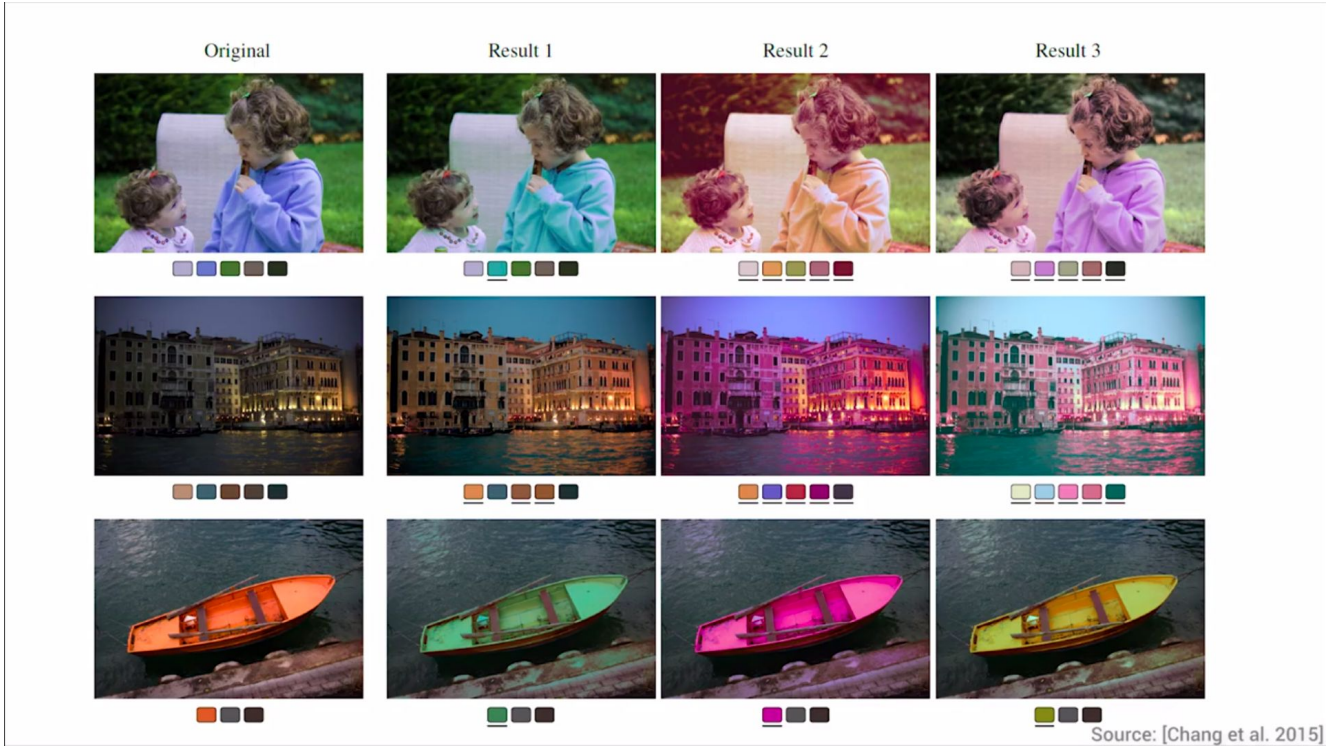
BW to Color

Inpainting

Criminisi et al. [CVPR 2003]


Input
Monet
Van Gogh
Cezanne
Ukiyo-e

Interactive Photo Recoloring



Palette Based Photo Recoloring

Super-Resolution (using Kernel Regression)

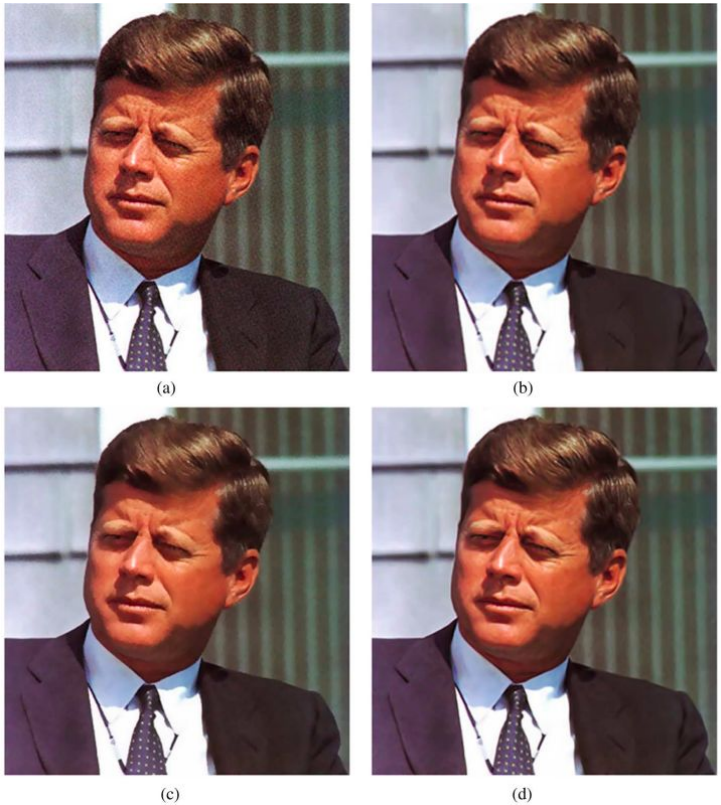


Fig. 14. Performance of different denoising methods are compared in this experiment on a color image with real noise; (e)–(g) show the residual between given noisy image and the respective estimates. (a) Real noisy image. (b) Wavelet [40]. (c) Bilateral filter [7]. (d) Iterative steering kernel regression. (e) Wavelet [40].

Face Style Transfer

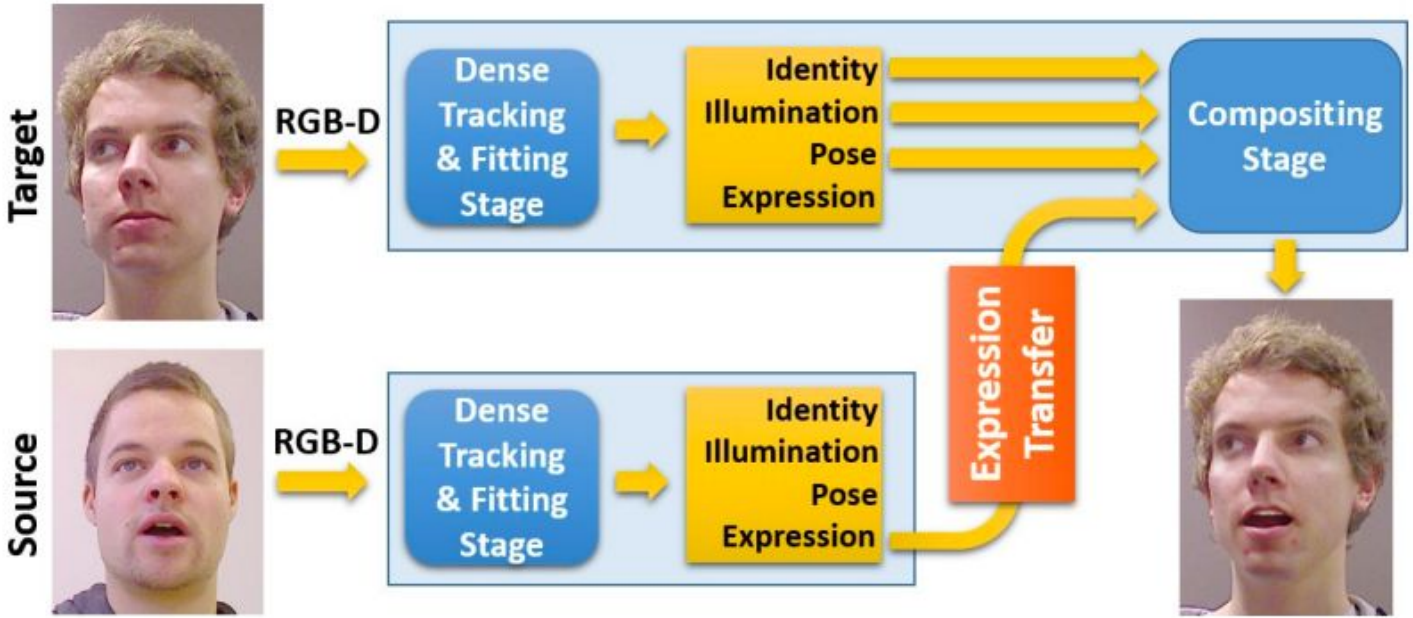
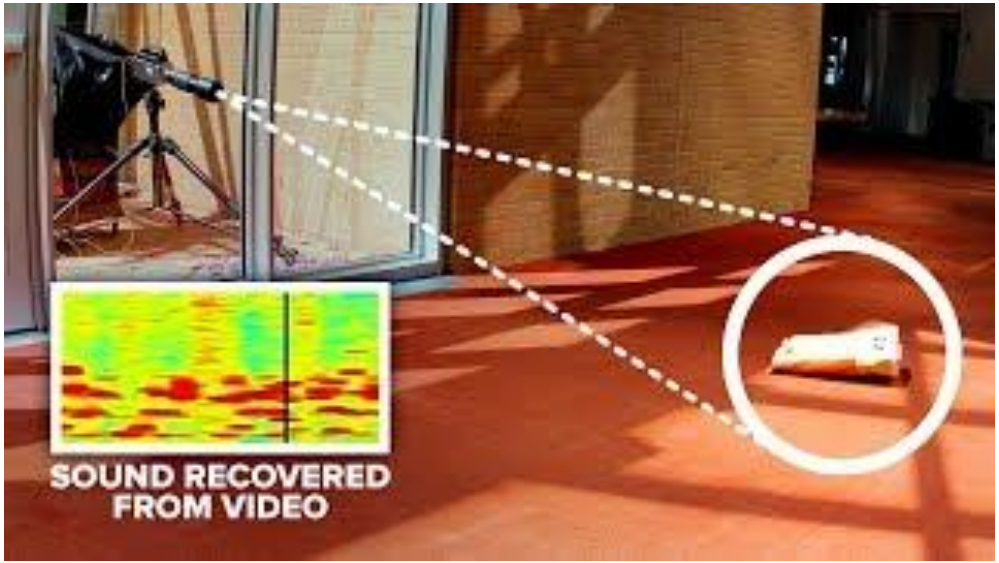


Figure 2: *Our live facial reenactment pipeline.*

Pulse Calculation Motion Magnification

Refer to https://github.com/Dhruv-Mahajan1/Phase-Based-Motion-Magnification

Recovering Sound From Video



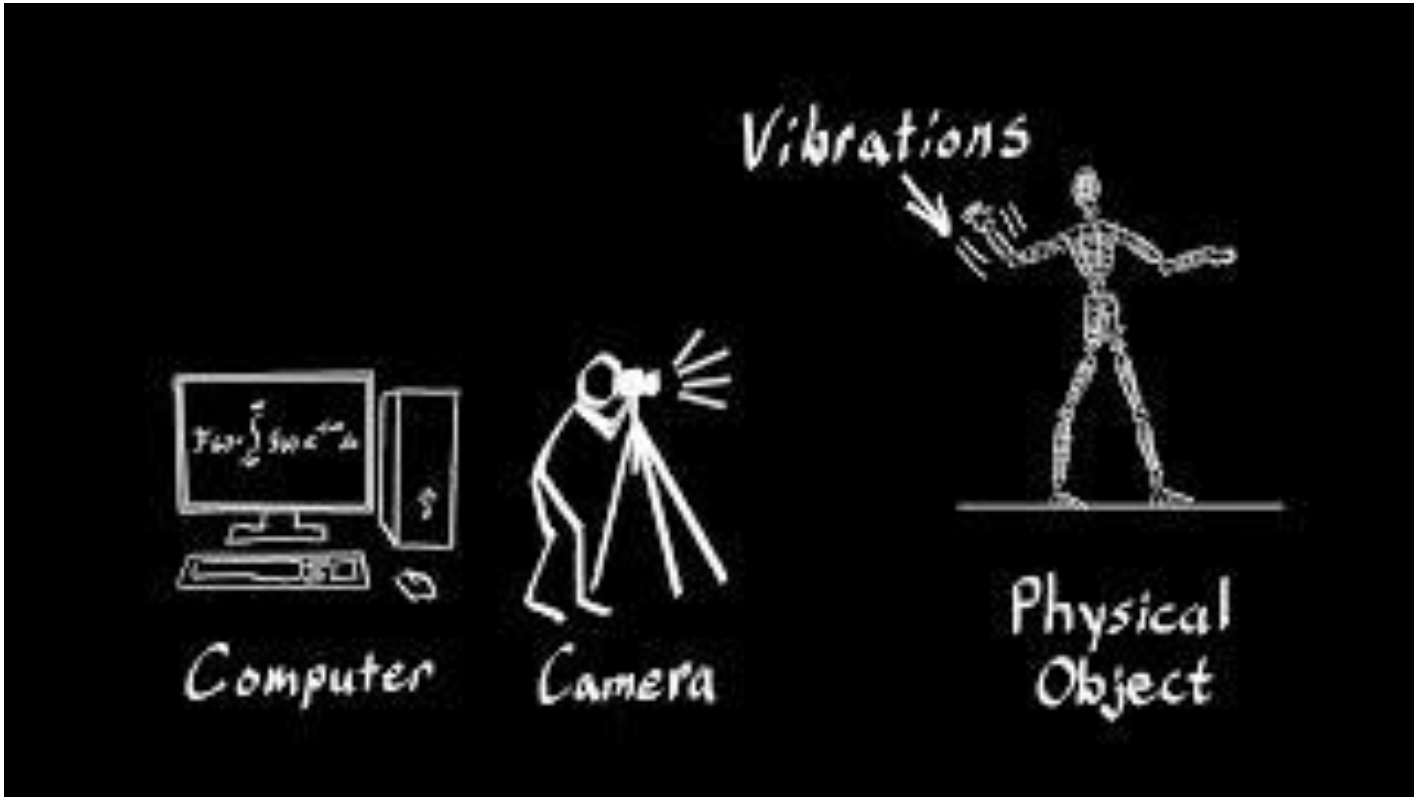
Interactive Video Dynamics: Our DIP Project

We saw this work by Abe Davis et al (2015) which was called Interactive Video Dynamics. In that work, they try to use the motion of objects in the video to find the structural properties which are the modal shapes of those objects.

Once these mode shapes are found, they model the physics of the objects which allows them to render the video of the object under novel motion caused by an impulse force.

In simple words, we are given a video with vibration as input. Only from this, we can get to know the properties of the material in the video

Examples from Abe Davis Paper



Overview of 2D interactive video paper

The way it works is that we first calculate the displacements for each pixel at each timestep using optical flow on the original video.

Then, we calculate the fourier transform of all the displacement of all the pixels to get what are the dominant frequencies which are present in this object

We can then use these frequencies (also called the modal frequencies) to model the physics of the object and make it move in response to an impulse force applied on that object.

Our Implementation of Abe’s paper

We tried implementing the original paper by Abe Davis and while we were not able to implement all things covered in the paper, we did got some results

Input Video: (after banging the table)

Output Video: (After applying a force towards the right on the cheek)

Web App for 2D Interactive Video Dynamics

We also created a demo web app of the current 2D implementation that we had so far.