Lighting/Background Changes in Interview Footage

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Problem

- In interview footage, making good cuts is difficult in presence of background or lighting changes
- Optical flow makes convincing foreground transitions, but not as great for background

Traditional Method

- Use only optical flow to transition across cut
- Foreground (see face) looks okay, but moving backgrounds fail

Demo: Optical Flow Failure

Motivations

- Make both background and foreground in footage appear natural during cuts

Approach

- Separate foreground and background using Video Matting
- Apply Optical Flow to foreground across cut
- Generate Video Texture for Background footage
- Composite together

Matting

- Construct initial rough trimap for first frame
- Compute alpha matte using Bayesian Matting
- Neighboring frames are very similar, so:
- Warp the alpha matte to roughly fit the next frame using Optical Flow
- Create new trimap for next frame by extracting fully opaque and partially transparent regions of the warped alpha matte
- Repeat

Demo: Video Matting Process

Video Textures

- Take short clip of background of interview without foreground
- Use this short clip to create Video Texture background for whole interview

Demo: Results

Issues

- Matlab is unbearably slow :(
- Need to try out different parameters for Video Textures depending on input video
- Really good video matting probably only works for fairly static backgrounds without large movement
  - For our method, large background movement (such as cars) tended to introduce artefacts in the warped trimaps

Future Work

- Instead of using separate background footage to generate video textures from, use 3d PatchMatch to do video completion on the background after the foreground is masked out.