**Laplacian Pyramids and Image Blending**

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E27: Computer Vision, Prof. Matt Zucker

February 26, 2017

*Final Results:*

* Laplacian Pyramid Blending
  + Sunflower and Matt’s face
  + Brown bear and penguin
* Hybrid Images
  + Obama and Biden
  + Kennedy and Nixon
  + Lincoln and Lincoln Memorial

*Who did what for this project?*

All three team members worked together on generating a Laplacian pyramid and using it to reconstruct an image. Throughout this process, we took turns writing code and looking up documentation. Nhung wrote an image alignment program that geographically centers the object of interest in a given image. The program also detects human faces as objects of interest and geographically centers that onto a black background image. Richard wrote the alpha blend function and fine-tuned the Laplacian program to use images generated by the alignment program. Dan wrote the hybrid image program, and all three members adjusted the parameters defined in the program to fit all the images we tested the program with. Additionally, we all contributed to this project report.

*How did you obtain and align your images for each of the two tasks? Did you use any third party software (e.g. Paintbrush, Photoshop), or write a program to help prepare the images or mask?*

We obtained all of our images using Google Image search. The criterion was that the background was not too complex in terms of colors and shapes— we wanted the object of interest to have visually obvious distinctions from the image background. Often times, we found pairs of images that were compatible (i.e. it made sense to blend them together), but were not the same dimensions. For those cases, we used Microsoft Paint to crop the images to the correct aspect ratio and an online image resizer (<http://resizeimage.net/>) to scale the images. For the Laplacian pyramid blending procedure, our alignment program was used to geographically center the object of interest within a given image. Assuming that a second image contains only one face, the program also detects that face and centers it on a black background image. The resulting image is used for the mask in the Laplacian pyramid program.

*What depth did you choose to build your Laplacian pyramid to, and why?*

*Why does Laplacian pyramid blending blend low-frequency content over a larger distance than high-frequency content? See if you can illustrate this with some carefully chosen input image examples.*

*How did you arrive at good values for the constants σA, σB, kA, and kB for the hybrid image generation? Describe the process.*

*If you display your hybrid image at full size on your computer screen, how close do you need to be in order to primarly see image B? How far away do you need to get before you only see features from image A? Are these distances fairly consistent between you, your lab partner, and any unsuspecting friends you show your image to?*

*What does the Laplacian pyramid of your hybrid image look like?*