

## Final Project Proposal

Ryan Baker, NetID: rtb2

CS 445, Spring 2020

For my final project (completed individually, not in a group), I propose the following two key components:

1. Implement and demonstrate image morphing, particular with human faces
2. Create and compute a metric that determines the similarity between two human faces

In my current work, I am a software engineer for a pharmaceuticals company that uses images to determine whether or not a drug is able to help a diseased cell become healthy again. I have found that it is very helpful to be able to identify the similarity or difference between two given images. One application that I find interesting is being able to identify how similar two individuals are (e.g. parent and child, brother and sister). This has fun implications for things like family history work to determine the relative from whom a given person gets their physical traits.

The milestones for the project will be as follows:

1. Understand and implement affine transformations between triangles (Course week 11)
2. Understand and implement triangulations of images (Course week 12)
3. Combine steps 1 and 2 to create image morphing between two images (Course week 13)
4. Come up with metric(s) for determining similarity of images, perhaps based on the amount of morphing required (Course weeks 14-15)

A successful implementation of this final project will include the following evaluation:

1. Complete implementation of image morphing that produces smooth transitions
2. Accurate and interpretable metric for similarity between images based on morphing amounts
  - a. Images of two relatives (e.g. parent and child) should have high score
  - b. Images of two non-relatives (e.g. coworkers, friends) should have low score
  - c. Stretch evaluation: Image of real person and image of cartoon person or animal should have very low score

The resources I will need for this project are:

1. Camera and images
  - a. Images of people (myself, family members, non-family members, etc)
  - b. Images of animals or cartoon people
2. Computer and tools for computation (e.g. Python, scipy, numpy, etc)
3. Course resources for understanding and implementing image morphing