Journal Report 8

10/27/19-11/10/19

Aimee Feng
Computer Systems Research Lab
Period 1, White

Daily Log

Tuesday, October 29

Researched ways to associate objects and shadows in images. Haven't found much information, since most methods involve a human selecting the shadow region and the object to associate them.

Thursday, October 31

Associated objects with their shadow by having the user click on each region. Ideally, I would like to make the program not require human input aside from the original picture, so I will continue to try and find other ways to associate object/shadow pairs.

Monday, November 4

Tried using data from mean-shift segmented blocks to group together a shadow and its object. This only works well when the shadow is well defined, but doesn't work well when an object is black or the program erroneously identifies part of the object to be a shadow.

Tuesday, November 5

Went back to researching different approaches to shadow detection, because improving the accuracy may allow the mean-shift shadow/object association method to work.

Thursday, November 7

Found a paper explaining the various approaches towards shadow detection. Still trying to understand specifics for implementation, but I want to try and test the various implementations and compare their accuracy.

Timeline

Date	Goal	Met
October 13	Identify 90% of shadow superpixels/regions in image	Yes. Every superpixel where a majority of pixels inside are shadow pixels is counted as a shadow region as a whole.
October 27	Associate each shadow with respective object for images with one object	No. I went back to focusing on improving my identification of shadow pixels and regions with the logistic growth curve.
November 10	Associate shadow with respective object for images with one object	No. I tried with the mean-shift segmentation, but the results vary too much based on the image. Some are successful, and some aren't.
November 17	Implement a feature-based shadow detection and a region-based shadow detection.	
November 24	Determine the most accurate shadow detection method	

Reflection

Being able to detect the shadow region most accurately is very important to be able to use any information from the shadow to help locate the light source, so I want to make it as accurate as possible. There's a lot of approaches towards shadow detection, and I would like to try and combine some of the approaches to increase the accuracy of the detection program. Currently, I use a color model based shadow detection, but it has its drawbacks when an object is black or even when there is very dark shading on an object due to the light source. It also identified individual pixels, so shadow regions often had small holes where the shadow pixel didn't fall within the desired color spectrum. When I combined it with a region-based detection using kmeans segments, the detection accuracy increased dramatically, filling in all the small holes. I think I can improve accuracy even more by combining another mode of shadow detection.

Once I improve identifying shadows, I will return to associating objects and shadows. I think the mean-shift segmenting will work, but I may also need to use canny edge detection to find the object/shadow border or an object identifier instead.