CSCE 489 HW-1
CAMERA OBSCURA

Jorge Farinacci
Anuj Parakh
Sodiq Adeniyi-Adeoye

1. Introduction

The goal of this project is to design and test a camera obscura or pinhole camera. A pinhole camera is a simple camera without a lens but an aperture; a tiny hole with allows a small amount of light pass through. This light hits a reflective screen on the other side of the camera and produces an image of the scene generating the light. As the images formed by the pinhole camera use a basic principle of image formation, they are of low quality. This leads to the second goal of the project - to analyze the images produced by the camera obscura with varying scenes and aperture diameters. After images of varying scenes have been taking with different aperture sizes, we will then analyze the effect of the size of the aperture has on the image

2. Fabrication

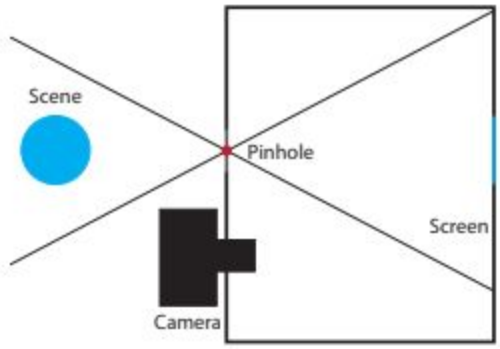
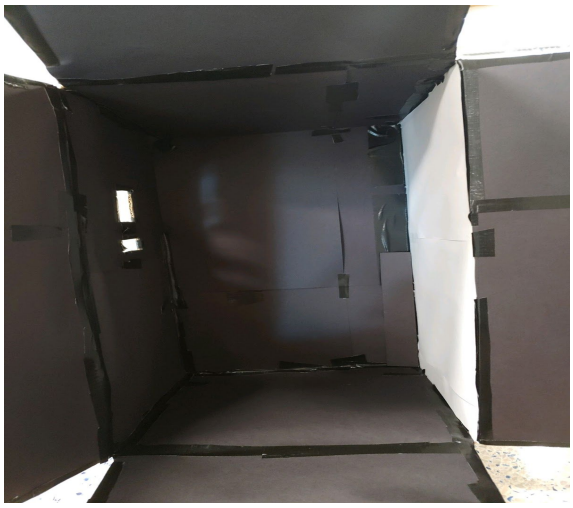


Figure 1: Pinhole camera

The camera obscura is a simple device, made from a decently sized-box (a shoe or cardboard box). The box is completely covered on all parts of the inside with black paper or any black material. One side of the box is covered with reflective white paper to serve as the screen. The side opposite the screen will serve as the front of the camera. This side has a large circular hole to hold the digital camera. A digital camera with the ability to take long exposure images is required to view the images due to the fact that the images cannot be seen with the naked eye. Above the hole for the camera, a square hole is made. This square hole will hold an extra square piece of paper with the actual aperture punched in it. Using this method, one can easily swap out different aperture sizes in the camera.



*had to update size of whole for camera. Initial design on left intended to use LGV40 camera with *long exposure 2* app to take photos.

3. Results

Scene 1

Original Picture

As you can see in the original picture, the prominent feature in this picture is the window. In the pictures taken from the pinhole camera, you can see the window upside down in each of them. It can be seen that as the aperture increases, the picture gets brighter and blurrier with the brightest picture being 8/64”. We used an exposure time of about 20 seconds to stay consistent, but we noted that as we increase the exposure time the picture gets brighter. So, the picture with the aperture of 5/64” needed the longest exposure time to be brighter.

Aperture size: 5/64”

Aperture size: 6/64”

Aperture Size: 8/64”

Scene 2

In this original picture, a prominent part of the pictu

Original Picturere is the umbrella that can be seen in each of the pinhole camera pictures. As with the first scene, as the aperture gets bigger the pictures get brighter and blurrier. With smaller apertures, the pictures are sharper and darker.

Aperture Size: 5/64 “

Aperture Size: 6/64”

Aperture Size: 8/64”

4. Analysis

While the design of the pinhole camera was not one of much ambiguity, the actual capturing of the images was quite a challenge. To elaborate several environmental factors came into play for how much light was absorbed and as a consequence affected the overall quality of our images. These factors included but were not necessarily limited to time of day, weather, any movement in the background, and overall reflectivity of the objects present in the scene in question. Attempting to combat this by hunting down some ideal scenes we came upon the next aspect in our process, the actual taking of our photos. As is evident based on the photos displayed in the previous section at different pinhole sizes the clarity of the scene changed, being that either more or less of it came into focus. That is, a larger aperture diameter allowed more light to reach the screen, thereby producing a brighter but blurrier image while a smaller aperture diameter produced a darker and sharper image. In addition, the exposure time also determined the image brightness (more exposure meant more light reaching the screen). Regardless, the images taken in all these cases were of low quality as expected of a pinhole camera. Needless to say a pinhole camera probably wouldn't hold as a marketable product in case you're wondering but fascinating subject for studying light .