CS 583: INTRODUCTION TO COMPUTER VISION

FALL 2013

PROJECT 3: PHOTOMETRIC STEREO

<u>PROJECT WRITE-UP</u>

Photometric stereo is a method to recover the 3D geometry of an object from multiple images taken under varying illumination.
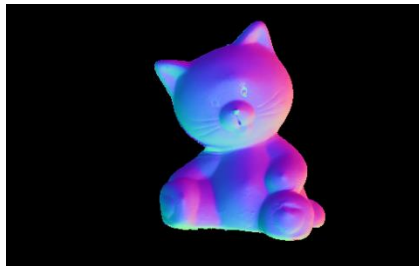
IMAGE 1: BUDDHA

RELIT BUDDHA
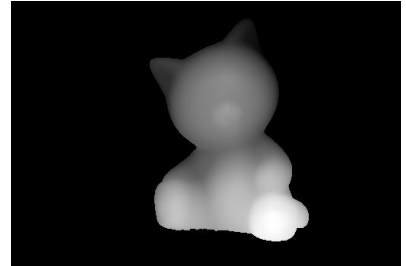

NORMAL   ALBEDO   DEPTH

IMAGE 2: CAT

RELIT CAT

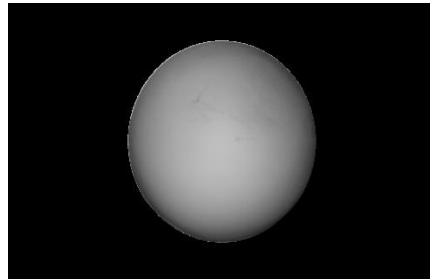NORMAL   ALBEDO   DEPTH

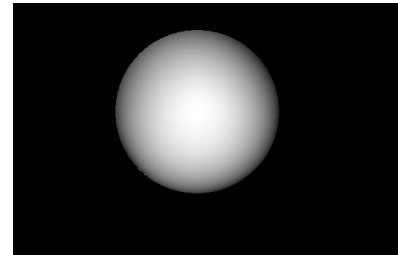IMAGE 3: GRAY SPHERE

RELIT GRAY SPHERE

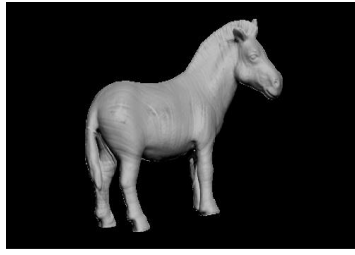NORMAL   ALBEDO   DEPTH
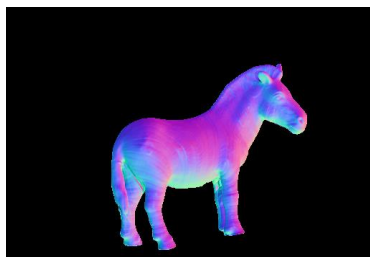
IMAGE 4: HORSE

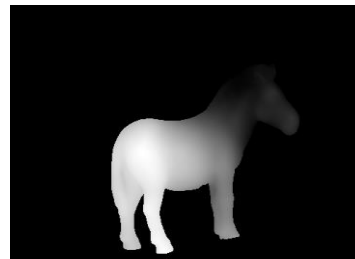RELIT HORSE

NORMAL   ALBEDO   DEPTH

IMAGE 5: OWL

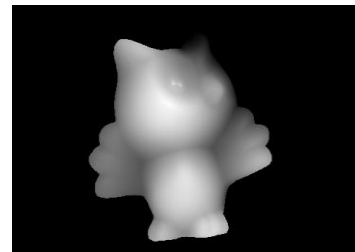RELIT OWL

NORMAL   ALBEDO   DEPTH
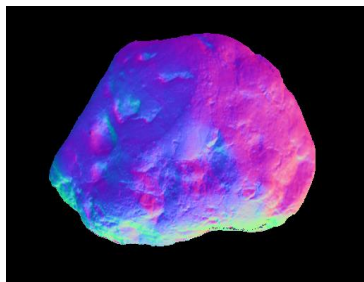
IMAGE 6: ROCK
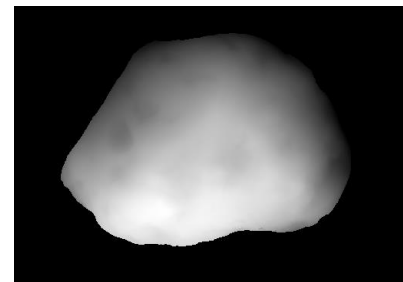

RELIT ROCK

NORMAL   ALBEDO   DEPTH

This project was interesting towards the end, especially after I figured how the output would be like. The mouse pointer works like a torch, wherever the mouse pointer moved, the light was shown on the opposite direction. It was amazing!

There were a lot of problems which I faced.

First of all the sample executable did not work in my computer for some reason which I do not know still. I am just getting a blank screen. The major problem was while finding the pseudo inverse, I was getting the matrix singular exception. I had to use the try and catch technique.

The brightness() method did not produce the correct light source directions. I had to normalize the red, green and blue values of the color. I am not able to see the output from the photometric stereo.pde.

In relight.pde, to find out that there was a normalization(norm.TwoRobust) in the matrix toolkit documentation took a lot of time. Only after using that I was able to get a proper result. It would have been a lot simpler if it was specified in the code.

Also to find the brightness I had to multiply the dotproduct of surfacenormal and lightdirection by 255 as they are unit vectors! I took a lot of time figuring out what the error must be!

Author: Sundar Ram

ID: 13113837

ss3782@drexel.edu