
# Introduction to Computer Vision

CSE 327 Spring 2012

Lecture 2

Prof. Alex Berg

# Image Formation I

- Primitives and transformations
  - What and where
- Photometry
  - How
- Measurement

# Points, transformations, homogeneous coordinates

- Work on black board
  - Points, lines, planes
  - Matrix operations
  - Affine and homogeneous transformations

# Concatenating transformations – One reason matrices are really cool

- Work on black board
  - Matrix multiplication

# Projections

- Work on black board
  - Orthogonal and perspective projections

# Homework

- Make color images from 3 examples of your own choice from the Prokudin-Gorskii Collection website below (I will give you some required images later)

http://www.loc.gov/pictures/search/?sp=1&co=prok&st=grid

For example:

http://lcweb2.loc.gov/service/pnp/prok/01000/01043v.jpg
http://www.loc.gov/pictures/collection/prok/itemprk2000000186/
http://www.loc.gov/pictures/collection/prok/item/prk2000000415/

Load image of 3 plates, **automatically:** 1) crop out each plate, 2) align cropped plates (translate), and 3) make a color image. Extra credit for making your own plates using color filters and a digitial camera, or automatically making fine adjustments to alignment or color.

Make a web-page with code and intermediate images, send me URL by midnight Thursday Feb. 9

(extended office hours on Friday this week 1-3:30, in addition to regular office hours 3:40-5:20 T/Th in 1418 CS. I will be out of town next week)

**Credit to Alyosha Efros for the assignment idea!**

# Example matlab start for assignment

```
% set string with file name
image_file = '00899r.jpg';

% load image file
I= imread(image_file);


% display the size of image I ( a matrix )
size(I)

% convert to double precision floats
I = im2double(I);

figure(1); % make a figure window
imagesc(I);  % show the image
colormap(gray) % set colormap to gray

% divide the image into 3 pieces
% note the plates go B G R from top to bottom...
[h,w]= size(I);  % get the size of I
t = floor(h/3)   % one third of the height
I1 = I(1:t,:);
I2 = I(t+1:2*t,:);
I3 = I(2*t+1:3*t,:);

% TODO write these to image files for your webpage


% TODO align the images

% put the (aligned) pieces together in an image
Ic = cat(3,I3,I2,I1);

% show the image
imagesc(Ic)

% TODO write the aligned image to a file for your
webpage
```