

Project Topics

CSc I6716

Fall 2009

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Topic 1. Geometry of a painting

- Using the perspective geometry in Assignment 3 to estimate camera center, focal length, mirror orientations



Topic 1. Geometry of a painting

- The intrinsic geometric constraints (*assumptions*) are the following:

- size of frame $W * H$

- All three mirrors are rectangular.

- The two flanking plane mirrors have the same inherent shape and are arranged vertically, each rotated by an unknown angle, and that the central plane mirror is viewed frontally, tipped forward by an unknown angle.

- The back edges of the two flanking mirrors are at the same distance.

- The aspect ratio of the image is 1:1.

$$x = f \frac{z}{z - mm}$$
 (with z in mm)

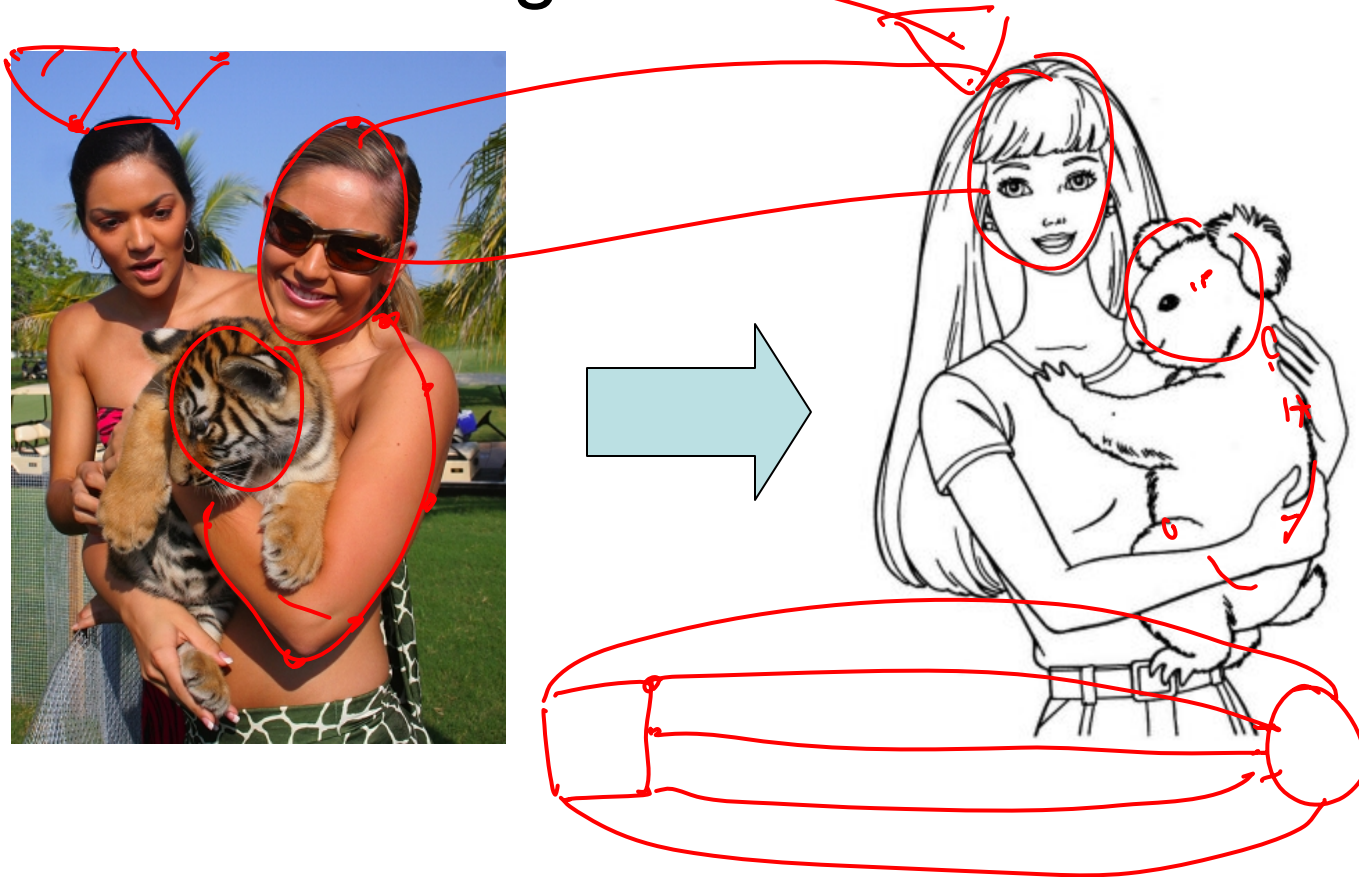


(1) (x_0, y_0) } J_0
 (2) f } J_0

(3) eq. of each mirror
 $n \cdot z = d$

Topic 2. Sketch Generation ^(60%) & Morphing (40%) Real-time

- Sketch generation using edge detection methods in Assignment 2.



Topic 2. Sketch Generation

- Gradient image using Sobel, etc.
- Adaptive thresholding to cope with different spatial details and/or dynamic ranges at different portions of an image.
- Contour extraction by Hough Transform (see lecture notes!) or edge tracking. (check the textbook or online materials).
- Morphing from Sketch 1 to Sketch 2
100 views

Topic 3. Stereo Vision

- Stereo matching using the fundamental matrix you have obtained in Assignments 4.



Topic 3. Stereo Vision

- Stereo matching using the fundamental matrix you have obtained in Assignments 4.
- Select matching primitives - e.g. square window, corner, edge, etc.
- Determine matching criterion (SAD, SSD, etc.).
- Perform matching (try to develop an efficient algorithm); please do a time analysis
- Visualization to show 3D or disparities

Topic X. Self-Selected Topics

- Medical Imaging
- Robotic Vision
- Others???