Image Processing and Computer Vision (MPHY39600/CS35600)   (Kenji Suzuki)

Problem Set 8 (Due: the class after the next class)

Solutions should include relevant images and original code (written in your favorite computer language, e.g., C, C++, Matlab, IDL, etc.) of the algorithms developed, along with any discussion requested.   All the images are on the Chalk website at http://chalk.uchicago.edu and in the uncompressed TIFF format.

(1) Explain why the polar coordinate representation of a line, $x \cos(t) + y \sin(t) = r$, is more suitable for line detection by use of the Hough transform than the standard line representation, $y = k x + q$.

(2) Explain why the lines generated by the Hough transform are infinite in length.

(3) Develop a Hough transform that detects circles, and implement and apply it to the image img_hough_circle.tif for detecting the boundaries of the coins.   Use the manually measured radius of the coins for the Hough transform.   Report the overview of the algorithm and a resulting image.