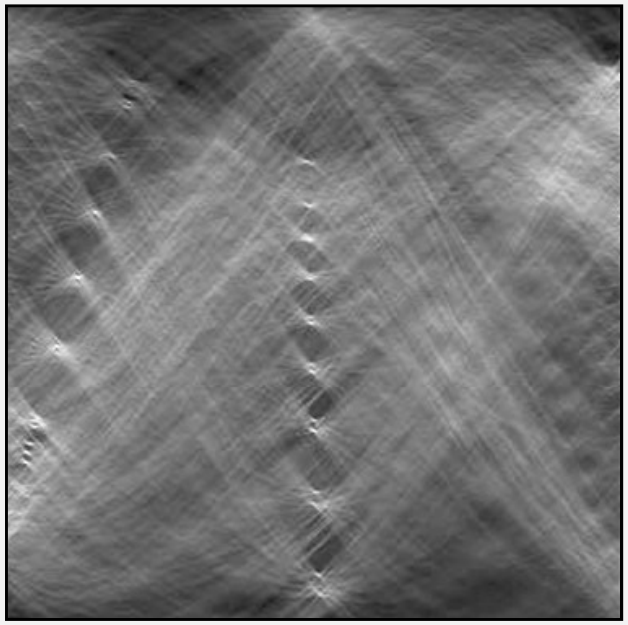
Department of Computer Science
University of Bristol

COMS30121 - Image Processing and Computer Vision

www.cs.bris.ac.uk/Teaching/Resources/COMS30121



Seminar Week 04

Hough Transform

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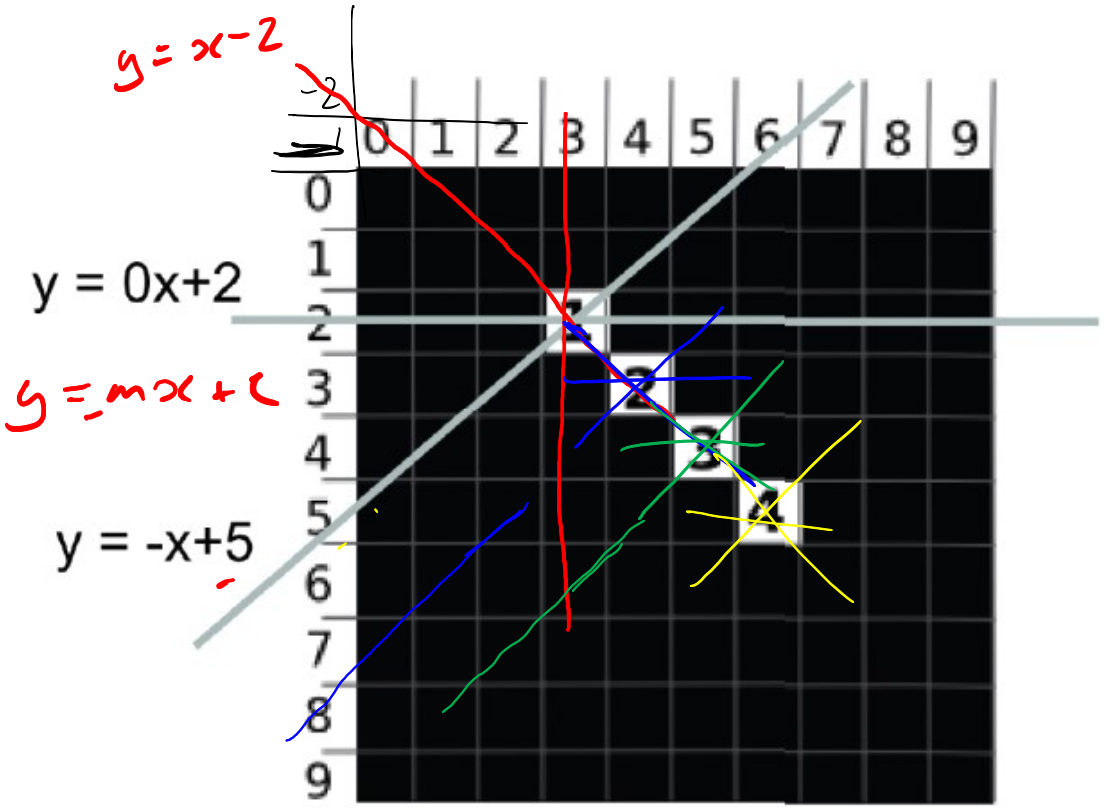
Challenge: Building the Hough Space

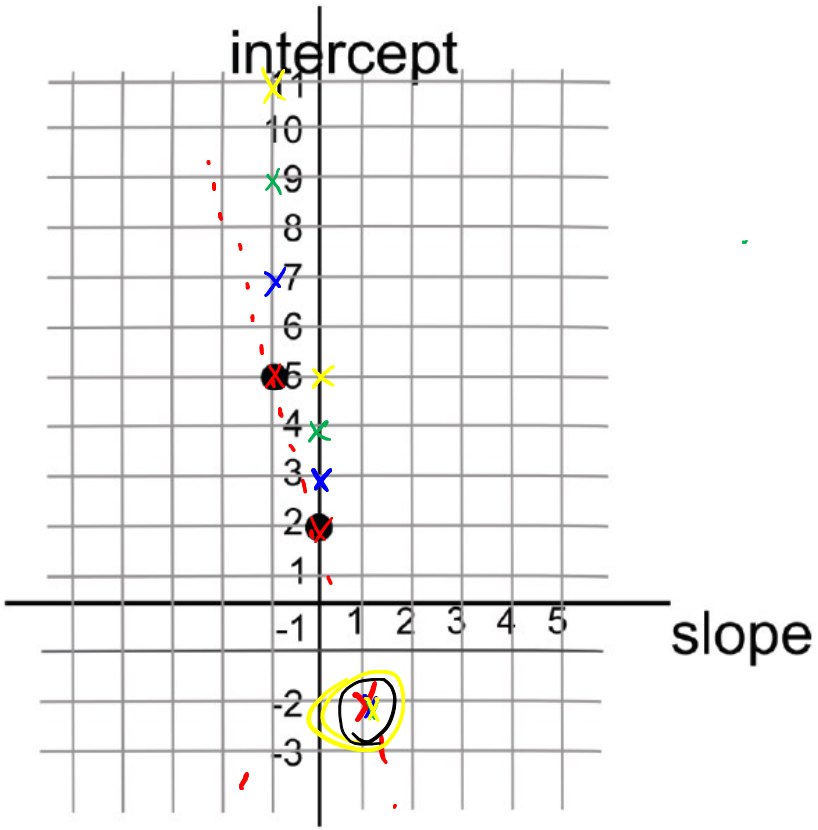
You are given a 10x10 pixel image that contains four edge pixels.

a) Plot the slope vs intercept for lines (say quantised at 45 degree steps) passing through the edge points. The figure below shows 2 of the 4 quantised lines for point 1. What problem do you encounter when trying to plot the remaining lines using slope and intercept?

b) Can you still detect the line in the image using the plot from a)?

c) Convert the slope versus intercept plot to the Hough space (encoding angle and distance to origin). Can you detect the line in this space?

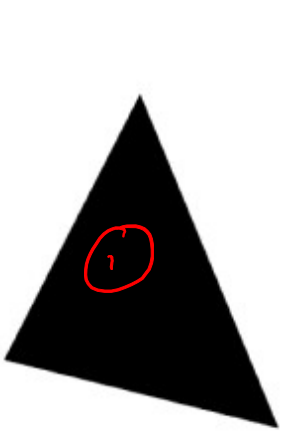


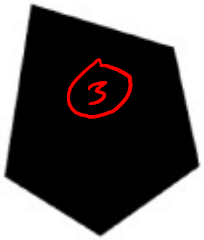


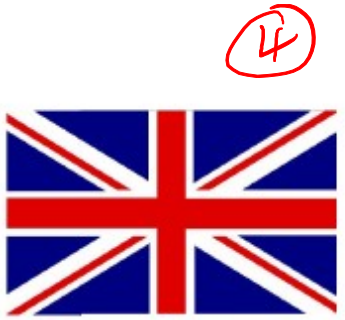
Challenge: Interpretation of the Hough Space

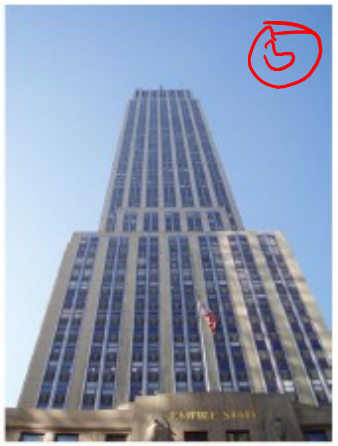
You are given five images and their Hough spaces (for line detection), however, the correspondence relation has been lost. Your first task is to link each image to its corresponding Hough space and explain your decision.

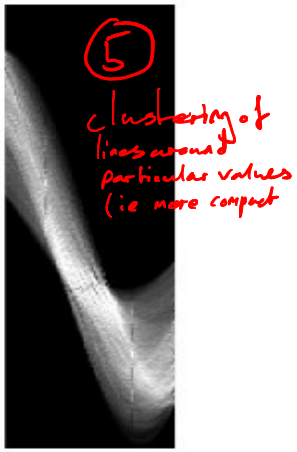
Hint 1: Start with the simplest shape, and see whether you can find its corresponding Hough space, then move on…
Hint 2: You don't need to make explicit calculations for this task - look at properties of the shapes found in the images.

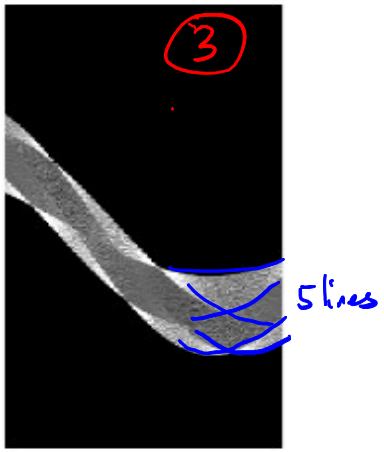


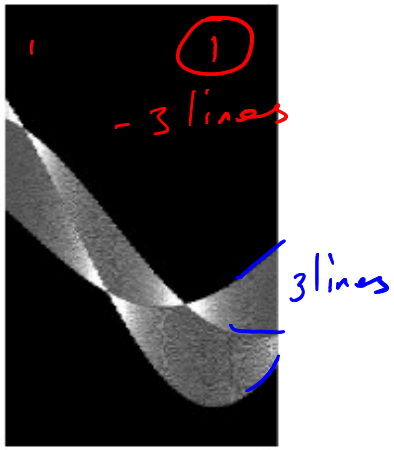


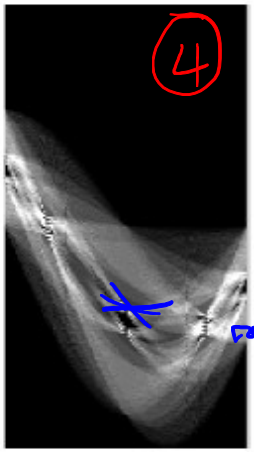


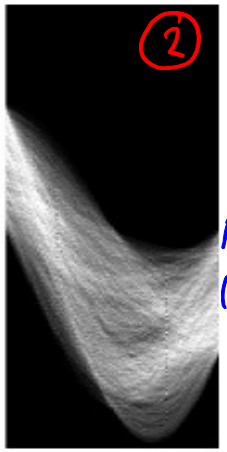






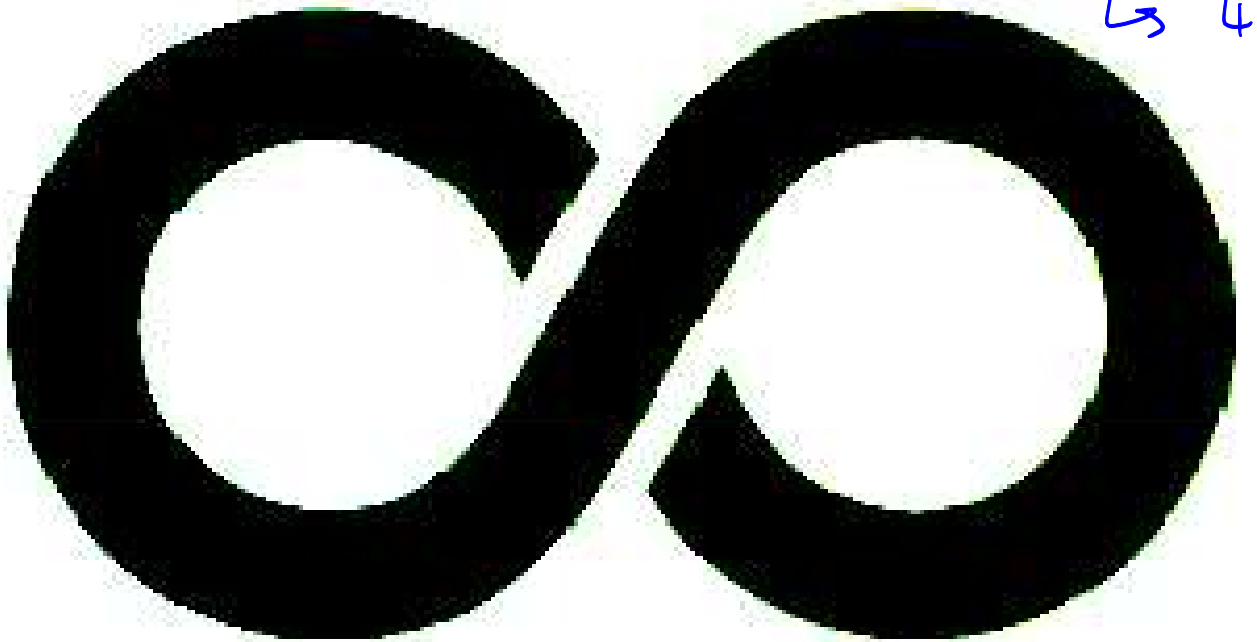






Challenge: Logo Identification System

The InfinityXYZ company suspects that their logo has been used online without their permission. They ask you to design a system that uses the principles of the Hough transform to detect their logo in images. Describe your system, its key components and argue why your design is effective and efficient for finding the below logo in images.



Consider 2 cases
↳ 4D dimensional array
(2 extra for scale, rot.)

- Encode for 2 circles.