AIL 862

Lecture 2

Understanding of the image

↑

Objects

↑

Edges, Lines, Corner points

↑

Pixels

Histogram

- Analysis, equalization

Histogram

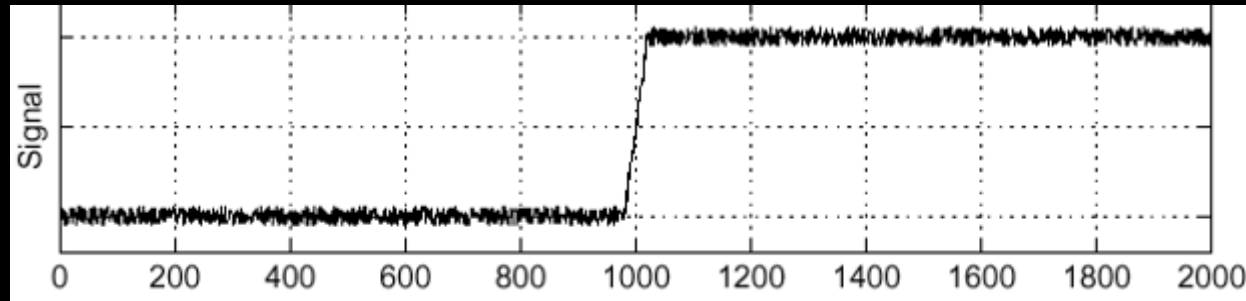| 13	14	2	14
10	2	5	9
15	15	3	15
15	8	13	1

Equalized

9	11	3	11
8	3	5	7
15	15	4	15
15	6	9	1

Histogram

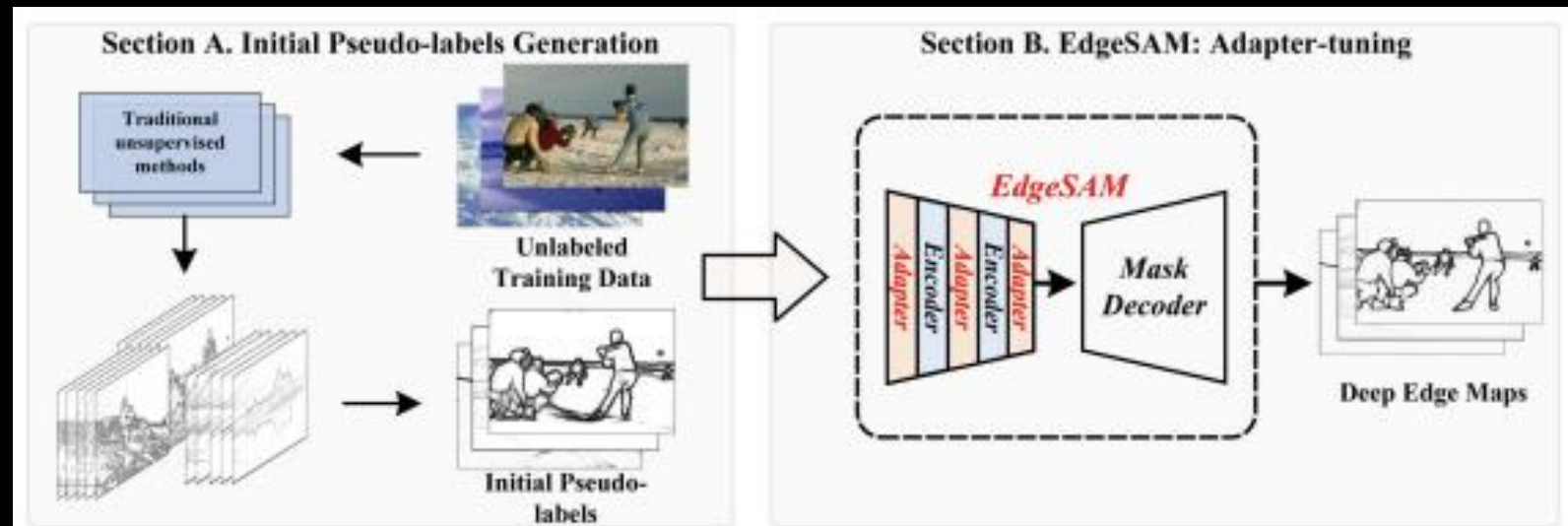| Gray level	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Count	0	1	2	1	0	1	0	0	1	1	1	0	0	2	2	4
Count equalized	0	1	0	2	1	1	1	1	1	2	0	2	0	0	0	4

Edge

We talked about edges as gradients but in most practical cases its not that simple

SAM Everything Mode

Boosting Deep Unsupervised Edge Detection via Segment Anything Model

Lowpass, highpass filtering

- Lowpass filtering is used for deliberate blurring to remove unwanted details and reduce noise content of image

- Averaging filter is lowpass filter

- High frequency components – large changes in gray levels over short distances

- Highpass filter – edge detection

Finding Lines

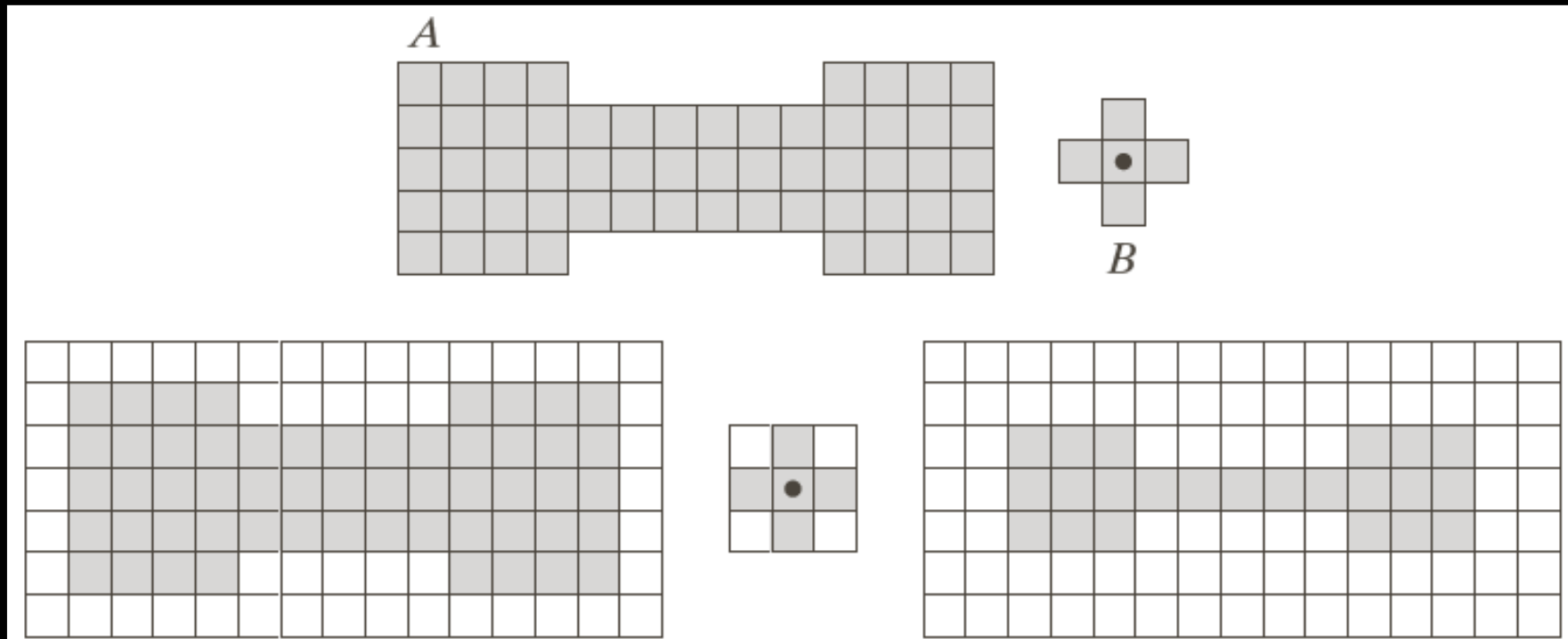image space → Hough space

$y = m_0 x + b_0$
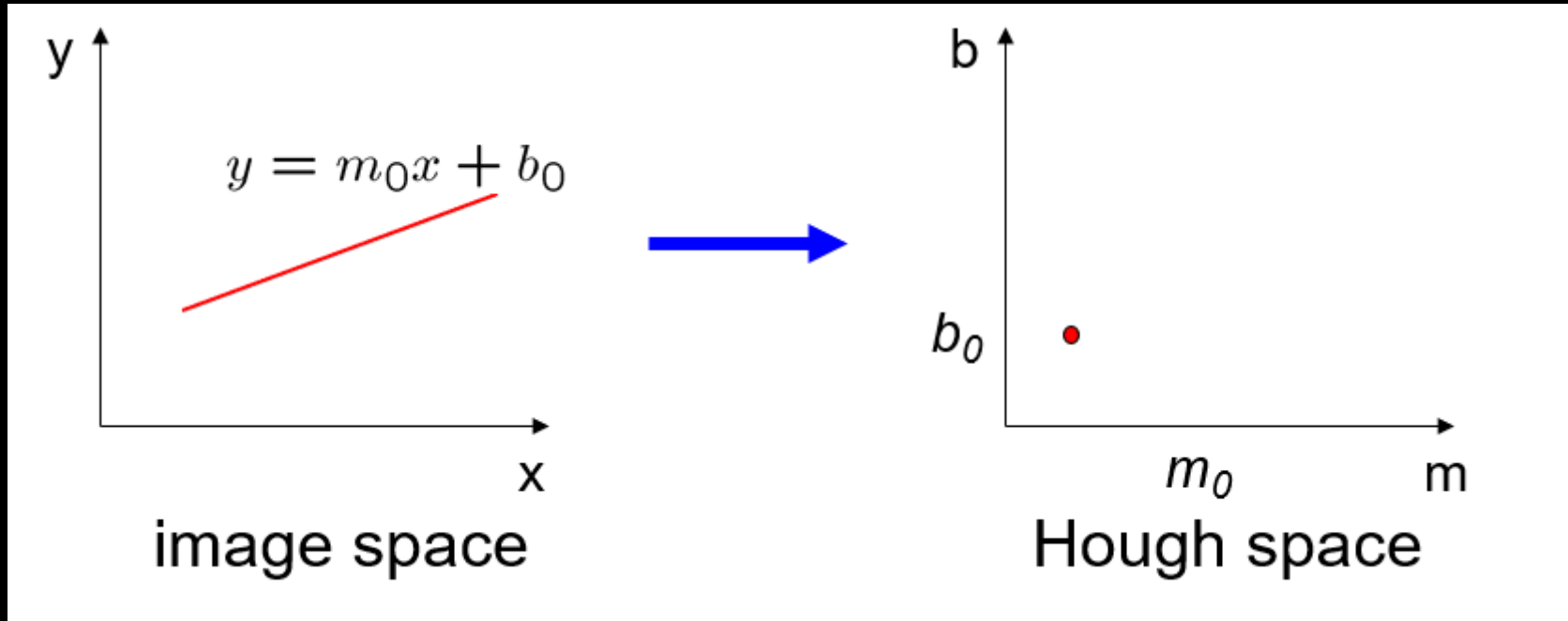
Superpixel

- A superpixel can be defined as a group of pixels that share common characteristics

- Consider both color and pixel coordinates

https://www.epfl.ch/labs/ivrl/wp-content/uploads/2018/08/54082_combo.jpg

Morphology

Modern Deep Learning

- Modern deep learning – convolutional neural network and other variants

- Convolution is a mathematical way of combining two signals to form a third signal

Usual Recipe

- Understand your task: domain, classes etc.
- Collect a lot of images accordingly.
- (Somehow) annotate those images.
- Use images and the labels (annotations) to train a (CNN) model.
- Deploy: use trained model from now on the test data.