Exercise 1 – Background Subtraction

Bluescreen / Greenscreen

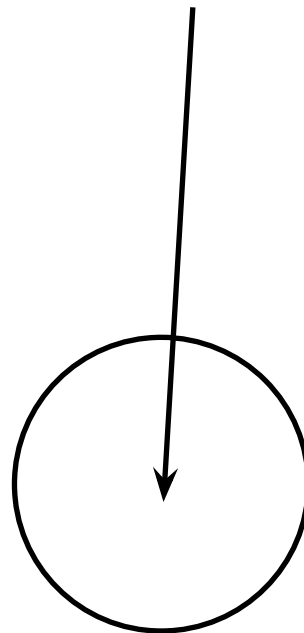http://www.iwatchstuff.com/images/2006/01/superman-greenscreen.jpg

http://www.theavclub.tv/behind_the_scenes/greenscreen/

Bluescreen

- Represent background with a single color value
  - Classification based on absolute distances

$$|[r, g, b] - [r0, g0, b0]| < t.$$

Bluescreen

- Represent background with a set of color values

  – Classify new RGB values based on Mahalanobis distance

$$(\mathbf{x} - \mu)^T \Sigma^{-1} (\mathbf{x} - \mu) > t$$

- Covariance Matrix

$$\Sigma_{ij} = E\left[(X_i - \mu_i)(X_j - \mu_j)\right]$$

- Estimation from n data points

$$\frac{1}{n-1} \sum_{i=1}^{n} (x_i - \overline{x})(x_i - \overline{x})^T$$

Bluescreen

Pixelwise Color Model

- Mean and covariance for each pixel

- One threshold for all pixels (Mahalanobis distance)

Pixelwise Color Model

Exercise Platform

- We will use Microsoft Azure Notebooks with Python3

    - you need to have a Microsoft account

    - you need to clone the exercise project

    - go to Exercise/W2/

    - then have happy coding!

- More details on the exercise notebook

- Solutions will be explained at the end of the session and published on Friday

Exercise Project Link

https://notebooks.azure.com/ta-visual-computing/projects/visual-computing

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