# Elective in Robotics

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# Artificial Vision: basic concepts

(slides prepared by L. Rosa)

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What do you see?

What are the interesting objects?


sk 1: Find the yellow taxi


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sk 2: Find all the yellow taxis

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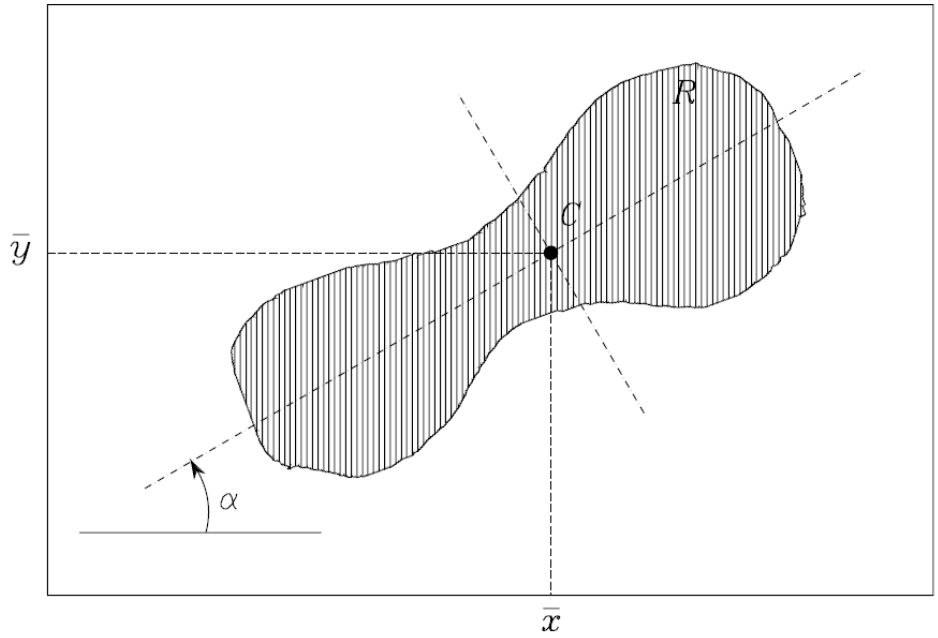
hanging the task...

very pixel of coordinates $(x, y)$ define the *Image Function*

Eg. In color images, we can define three functions: $I_r(x, y), I_g(x, y), I_b(x, y)$

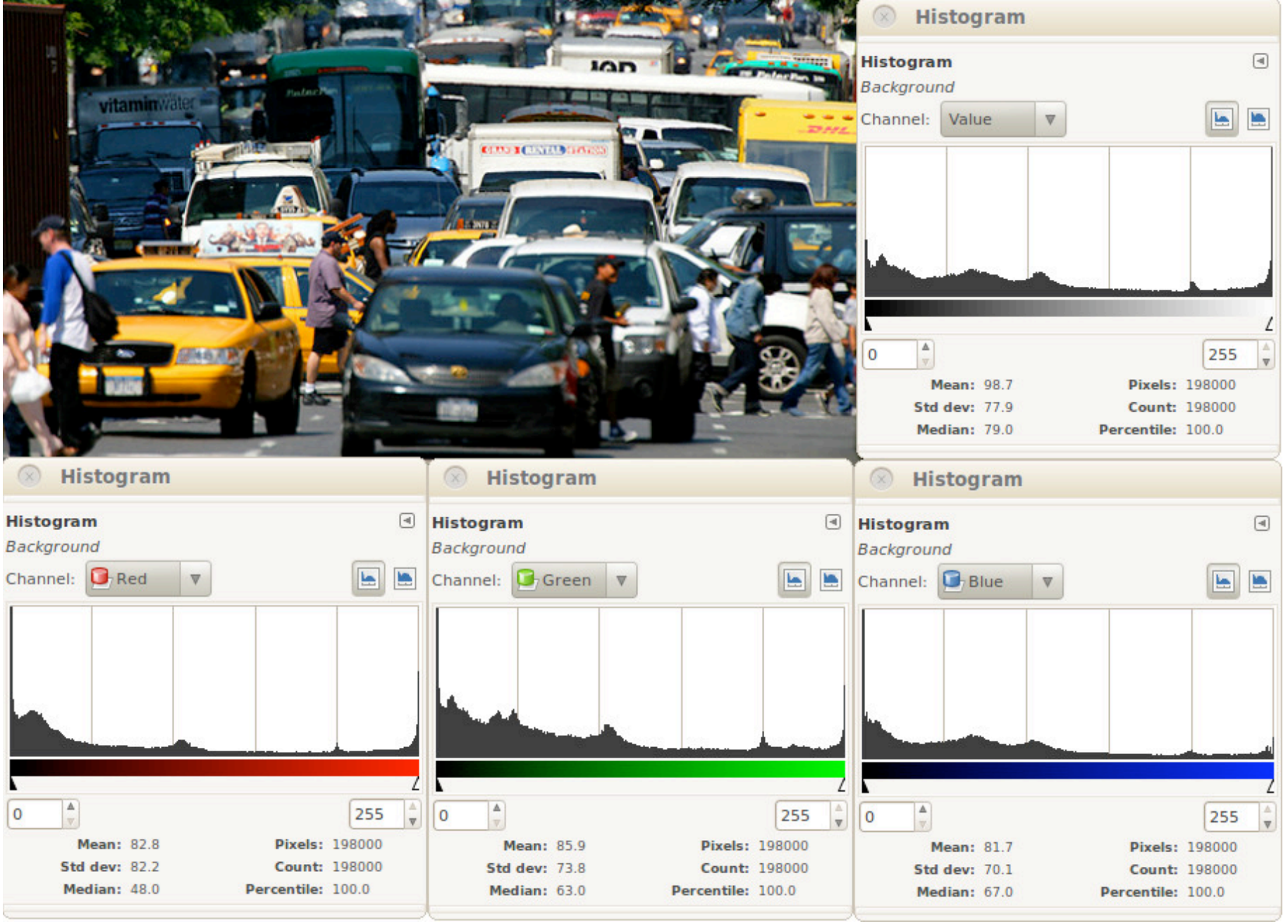
those functions, we can group a set of pixels, creating a *region*




ion of the image can be characterized by its *image moments*

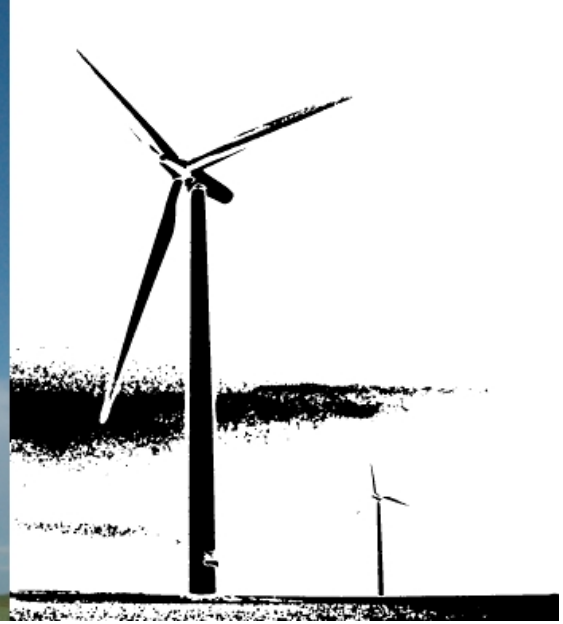
$$n_{i,j} = \sum_{x,y \in R} I(x, y) x^i y^j \longrightarrow \bar{x} = \frac{m_{1,0}}{m_{0,0}} \qquad \bar{y} = \frac{m_{0,1}}{m_{0,0}}$$

*Centroid* coordinates




Return information about color distribution in the image.

Can be used to perform **segmentation**.



Binary segmentation:
discard pixel having value above a fixed/varying threshold

egmentation based on
obel operator (gradient analysis):

$$=\{I(x+1,y-1)+2I(x+1,y)+I(x+1,y+1)\}$$

$$-\{I(x-1,y-1)+2I(x-1,y)+I(x-1,y+1)\}$$

$$=\{I(x-1,y+1)+2I(x,y+1)+I(x+1,y+1)\}$$

$$-\{I(x-1,y-1)+2I(x,y-1)+I(x+1,y-1)\}$$