

Automatic Bookshelf Inventory

A Project by
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Goals of the Project

- To detect books inside an image
- The books have to be detected no matter the position

Library and Language

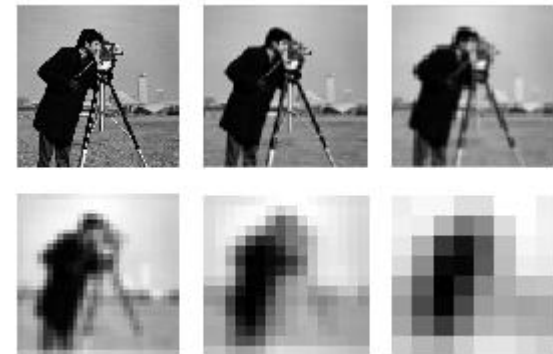
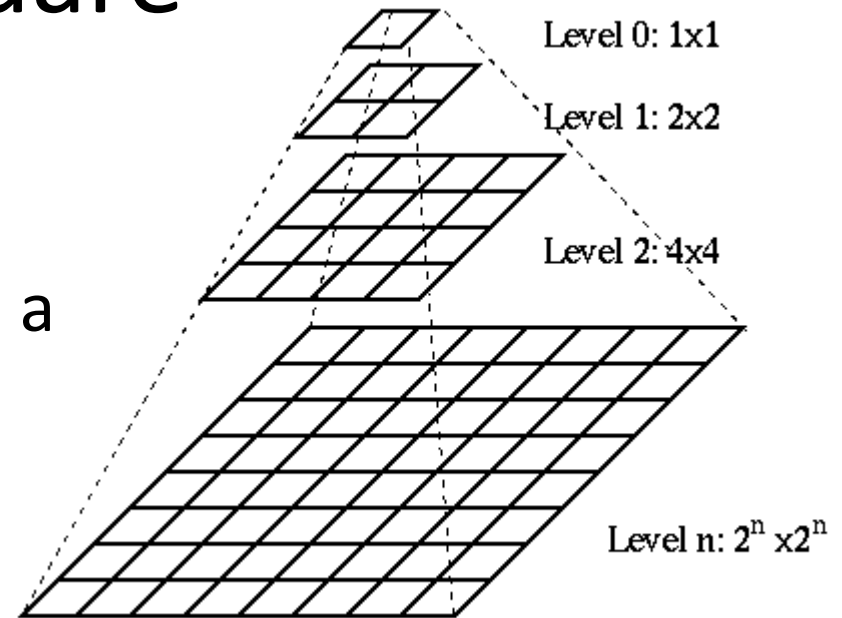
- Utilization of the digital image processing library OpenCV
- Program coded in C

The Functions

findSquare

- Image Pyramids

- Used to filter the noise in a digital image
- First, Gaussian Pyramid, successive scale down of the image convoluted with a Gaussian filter
- Then the image is rebuilt without the noise



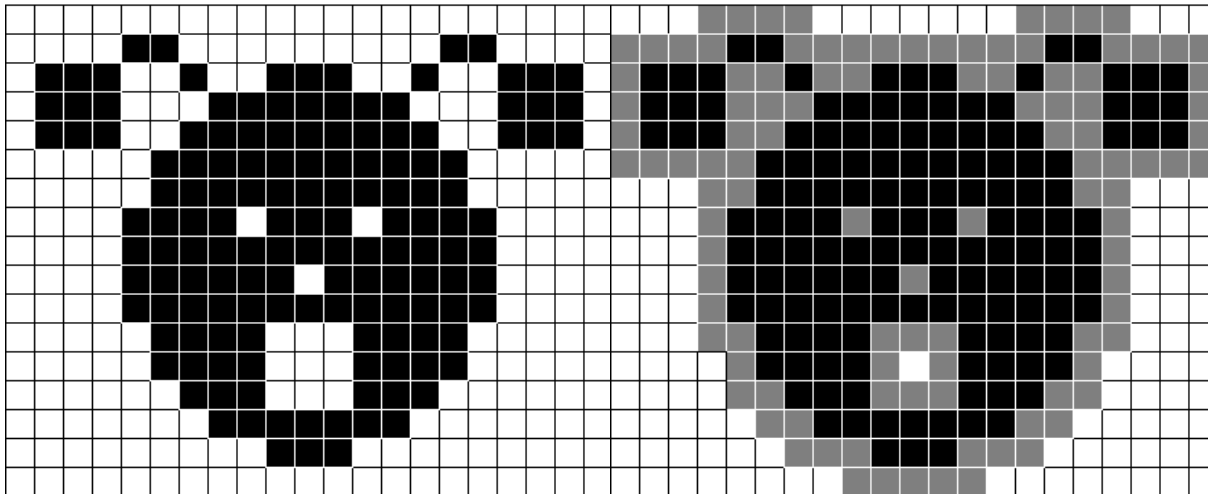
The Canny Edge Detector

- Laplacian filter with Hysteresis threshold
 - The gradient value of each pixel is compared with the upper and the lower threshold
 - If its norm is $>$ than upper threshold \rightarrow pixel = 1
 - If norm $<$ lower threshold \rightarrow pixel = 0
 - If lower $<$ norm $<$ upper \rightarrow pixel = 1 if one of its neighbors is 1



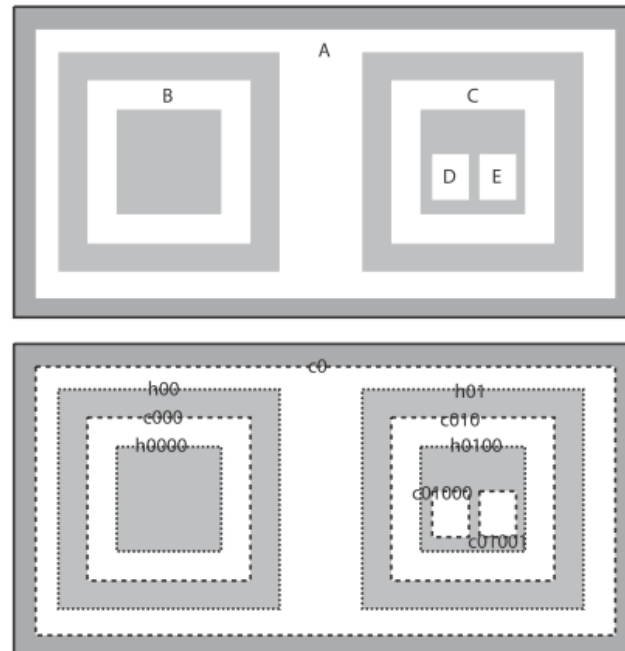
Dilatation

- Morphological operation
- Used to close the edges
- A 3x3 kernel is passed through the image
- If the value of the pixel at the center of the kernel is 0 and one of its neighbors is 1 then the pixel becomes 1



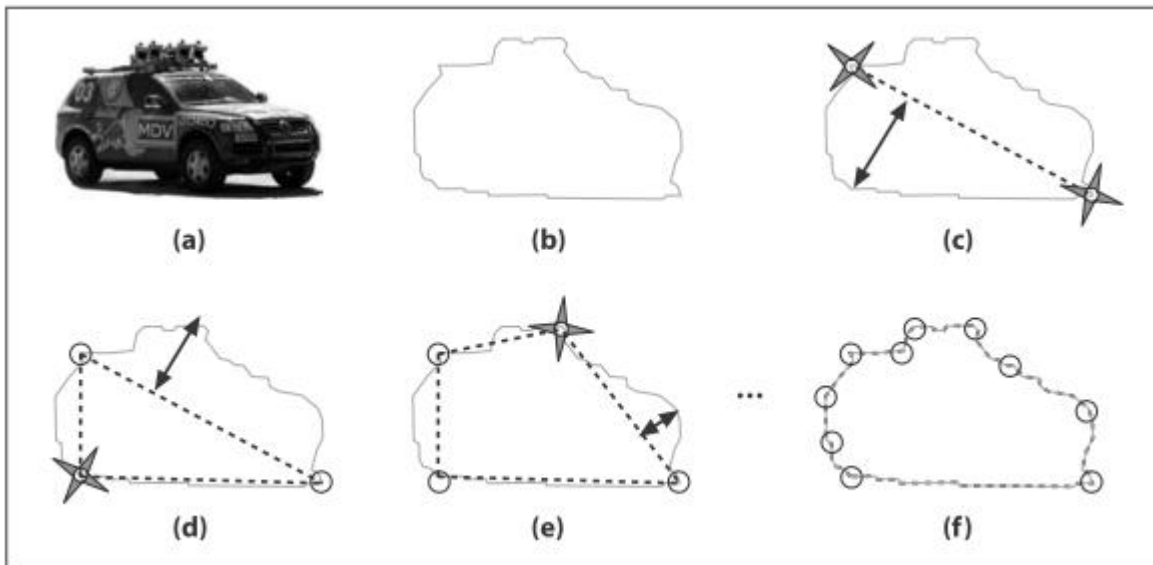
Contours finding

- The contours have to be stored as sequences to be used
- OpenCV provide a function for that



Polynom Approximation

- After finding the contours OpenCV needs Polygons to find the Squares
- An other OpenCV function calculates it



Filtering of the Polygons

- The polygons need to have 4 vertices
- The area has to be not too small
- The angles should be around 90°

Results

