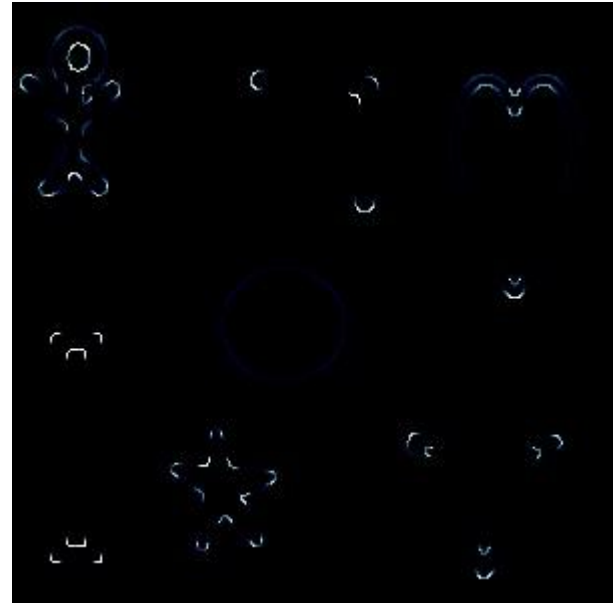
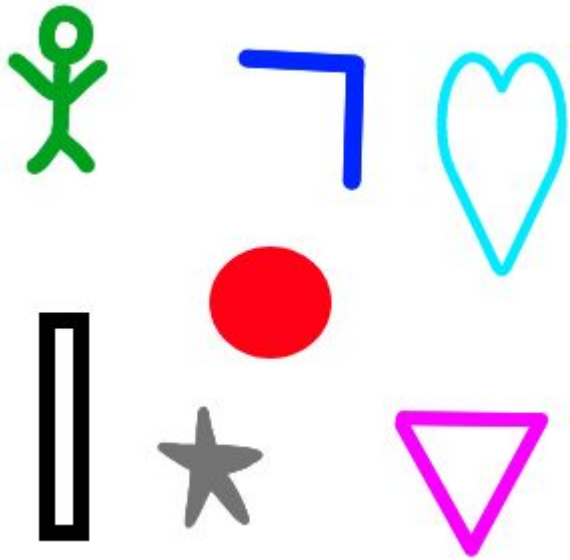


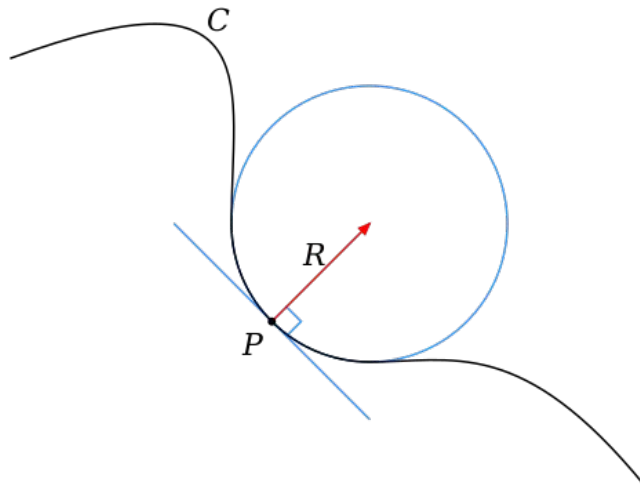
# Approximation de la courbure



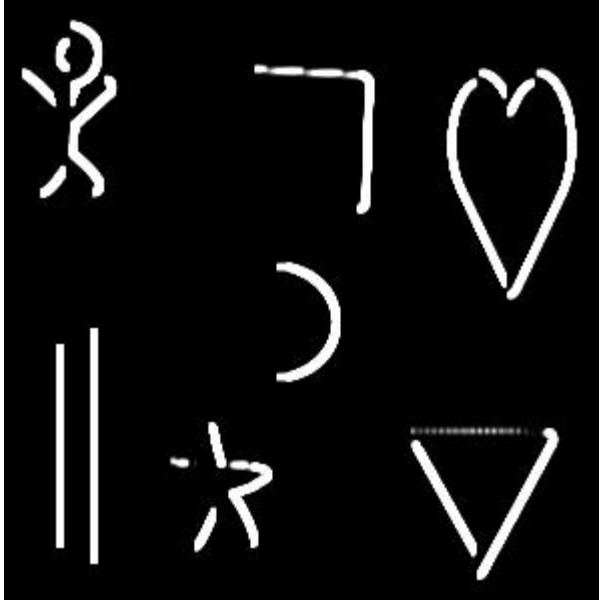
# Courbure

Mesure quantitative sur laquelle une courbe dévie d'une ligne droite

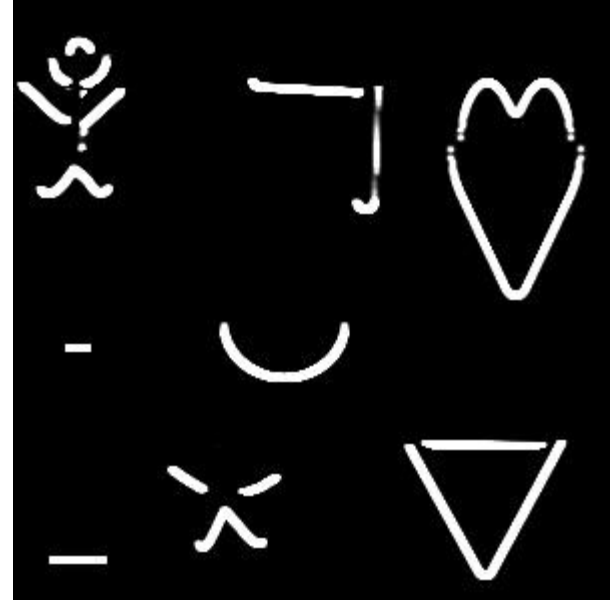
$$\kappa = \frac{|x'y'' - y'x''|}{(x'^2 + y'^2)^{3/2}}$$



# Algorithme

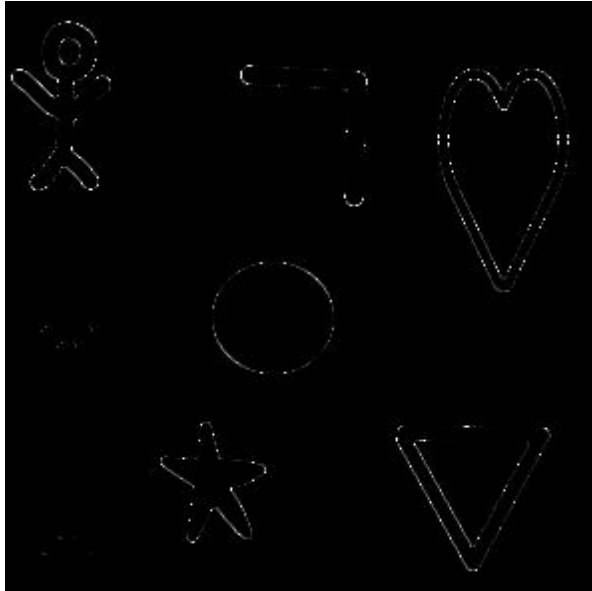


Sobel X



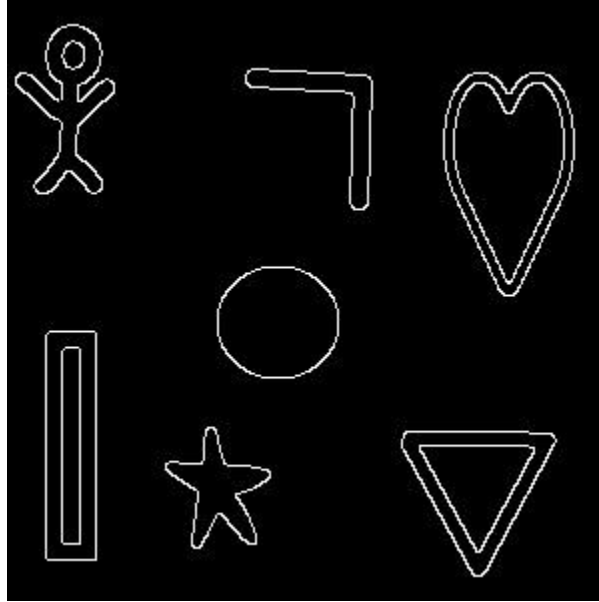
Sobel Y

# Premières tentatives



$$\kappa = \frac{|x'y'' - y'x''|}{(x'^2 + y'^2)^{3/2}}$$

# Algorithme



Canny

# Algorithme

COMPUTER VISION, GRAPHICS, AND IMAGE PROCESSING 30, 32-46 (1985)

## Topological Structural Analysis of Digitized Binary Images by Border Following

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*Graduate School of Electronic Science and Technology, Shizuoka University,  
Hamamatsu 432, Japan*

AND

KEIICHI ABE†

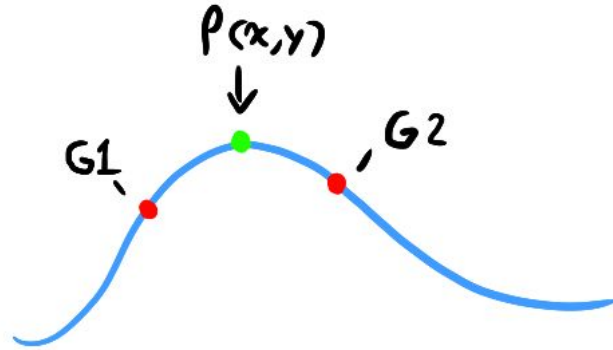
*Department of Computer Science, Shizuoka University, Hamamatsu 432, Japan*

Received December 16, 1983

Two border following algorithms are proposed for the topological analysis of digitized binary images. The first one determines the surroundness relations among the borders of a binary image. Since the outer borders and the hole borders have a one-to-one correspondence to the connected components of 1-pixels and to the holes, respectively, the proposed algorithm yields a representation of a binary image, from which one can extract some sort of features without reconstructing the image. The second algorithm, which is a modified version of the first, follows only the outermost borders (i.e., the outer borders which are not surrounded by holes). These algorithms can be effectively used in component counting, shrinking, and topological structural analysis of binary images, when a sequential digital computer is used. © 1985 Academic Press, Inc.

cv::findcontours

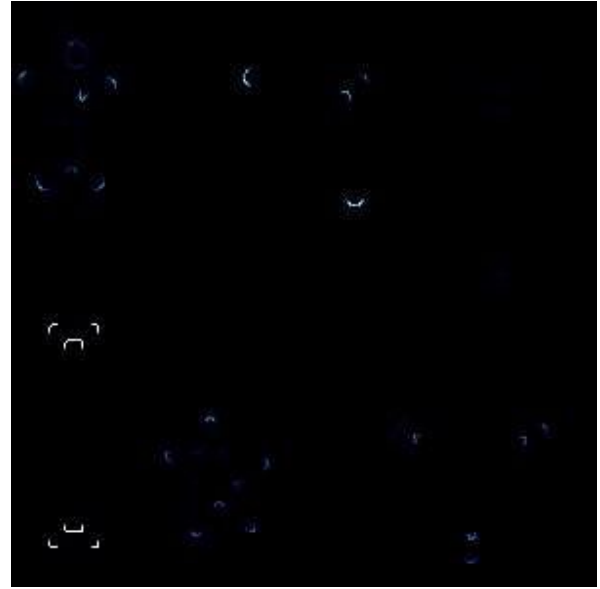
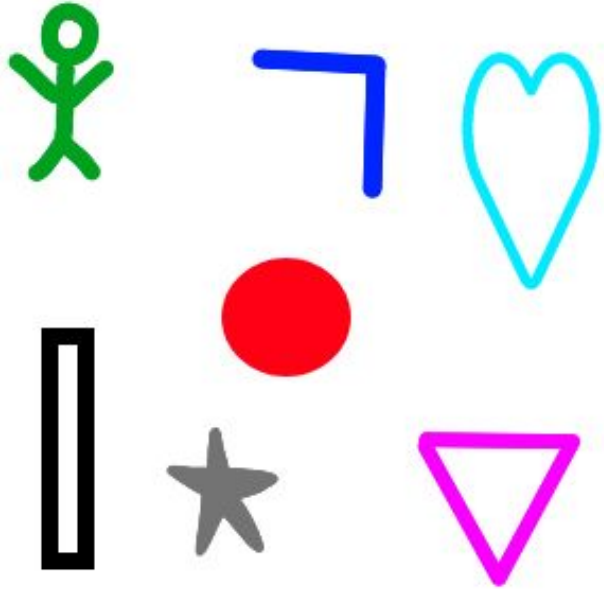
# Différence de taux de variation



$$\delta = G1 - G2$$

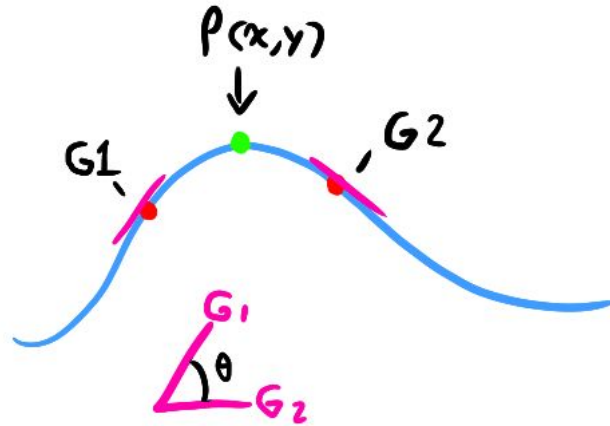
$$\rho(x,y) = \delta \cdot \delta$$

# Différence de taux de variation



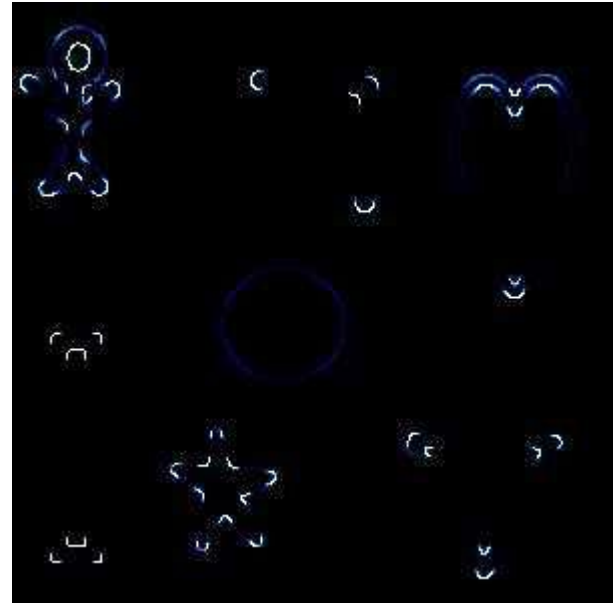
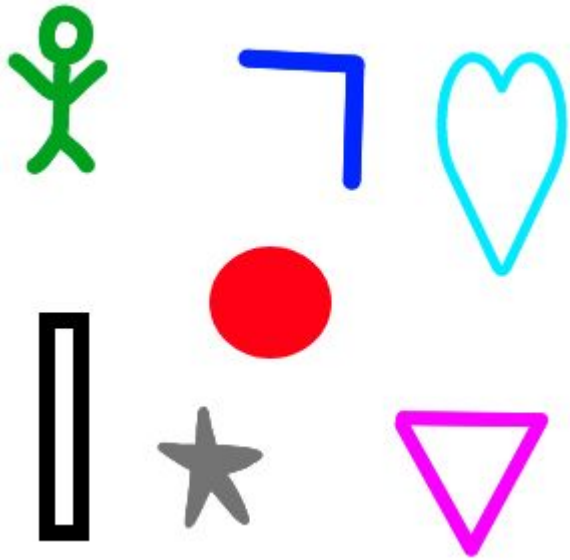


# Angle entre les taux de variation



$$\cos \theta = \frac{G_1 \cdot G_2}{|G_1| |G_2|}$$

# Angle entre les taux de variation



# Problème

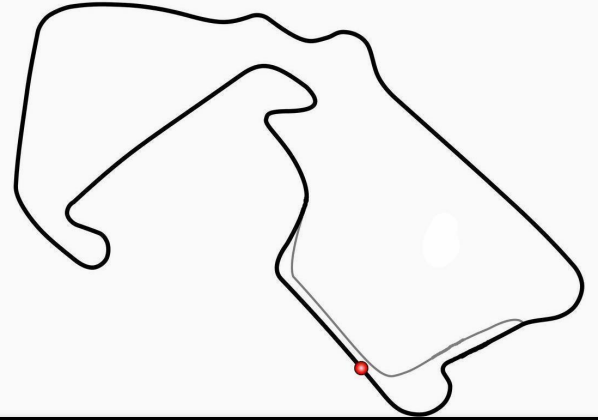
- Approximation
- Besoin de paramètre  $N$
- Sensible!



# Utilité



**CorelDRAW<sup>®</sup>**  
GRAPHICS SUITE



# Autre projet

