

Organization of Data in an Image

value = gray level of pixel at each position

3	3	0	0	72	72
3	2	0			

255 = white

med. gray

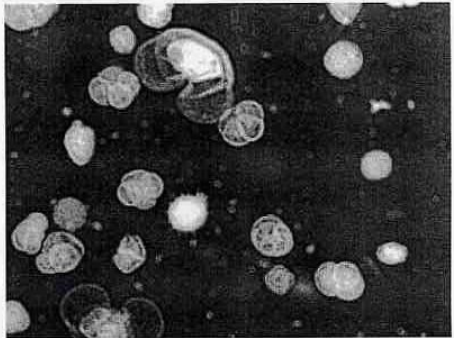
0 = black

Digital image is stored in a matrix.

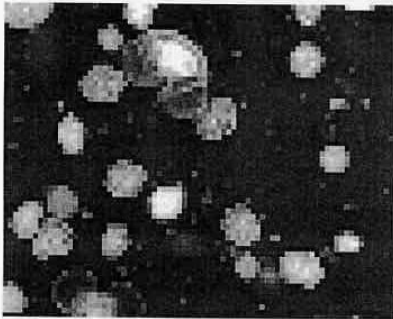
Size of matrix is determined by the number of spatial lines

Digital Image of Pollen

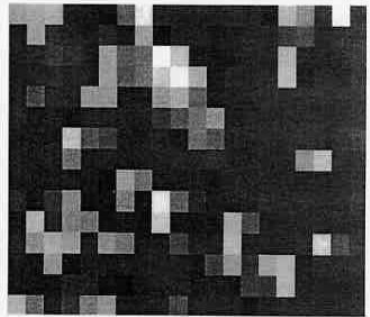
- spatial lines =
320 x 240
- brightness
levels = 256



Processed Image of Pollen



spatial lines = 80 x 60



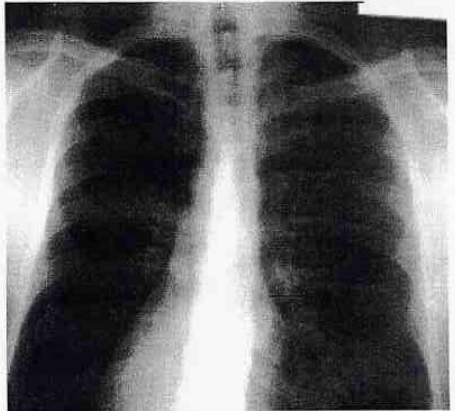
spatial lines = 20x15

DIGITAL XRAY IMAGE

Spatial lines:
320 x240

Brightness levels:
256

Lines located at
approximately
 $x = 190$ to $x = 210$
 $y = 150$ and $y = 170$



Enlarged Section of XRay

Contrast
stretching

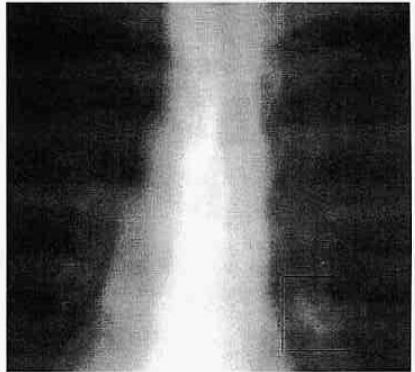
x 1.4

Dark goes darker

Bright goes brighter

Scaling (zoom
in)

X 2

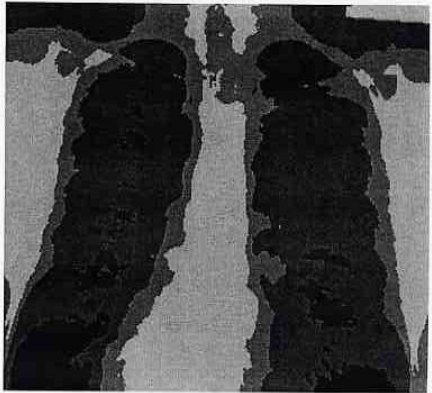


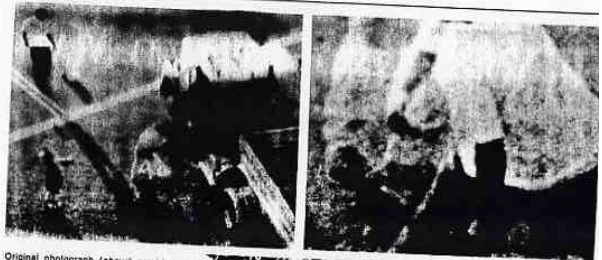
XRay in Four Level of Brightness

- Identify four shades of gray

3 = white

0 = black





Original photograph (above) provided to Cognitech for enhancement as part of the prosecution's effort to identify Damien Williams (center of photograph, wearing dark shorts) as the man who attacked Reginald Denny (closest to the open truck door). Cognitech focused on a speck on the arm of the man believed to be Williams, first using an expansion technique to produce an enlargement (above right) of the original photograph, which contains film grain noise but no artifacts. The spot on the subject's arm is still visible but unidentifiable; close inspection also reveals that the subject is wearing two shirts, one over the other (see text). Cognitech's segmentation algorithm was then used to produce the segmentation map (near right), from which the segmentation map (far right) was reconstructed. The image shown is consistent with the rose tattoo on Williams's arm.

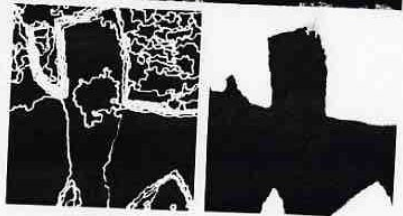


Image Processing Makes Its Mark in Court. December 1993 SIAM News