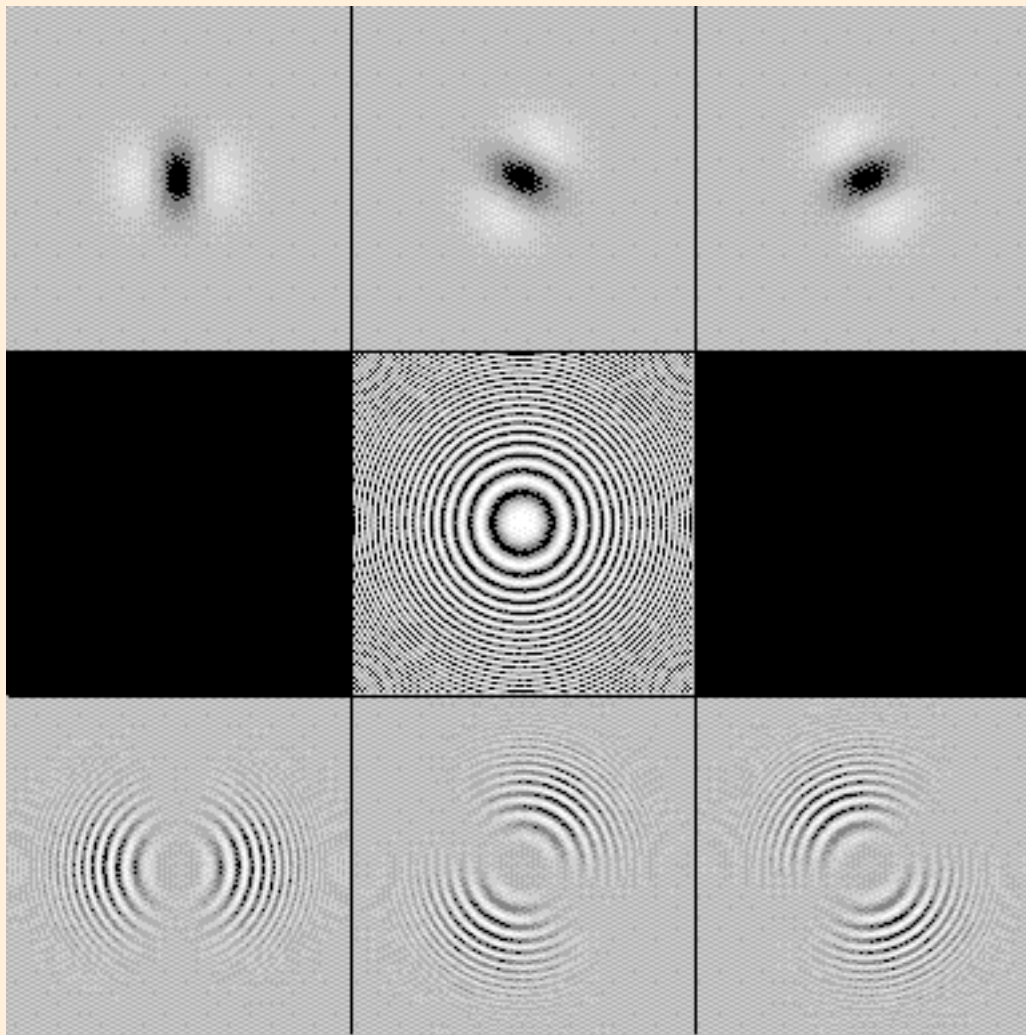


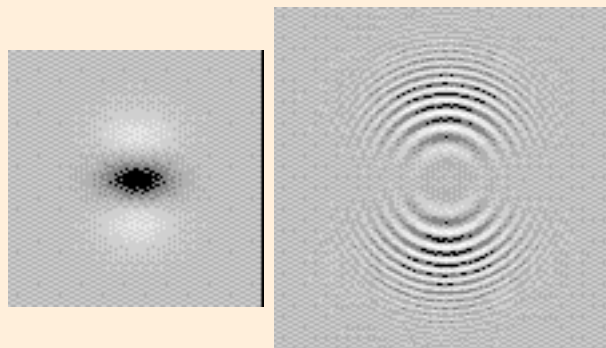
Steerable filters example

2nd derivative of Gaussian



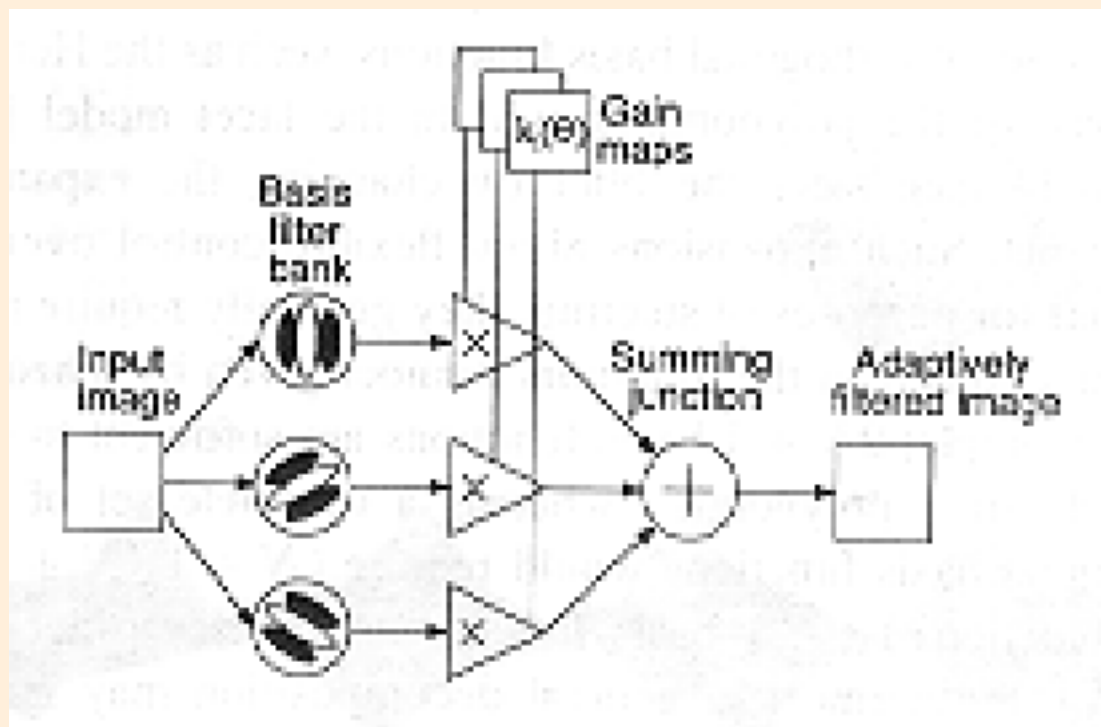
Example of steerable filters. Top line: three rotations of the second derivative of a Gaussian. That filter has three (complex) frequencies in polar angle, so a linear combination of three copies of the filter are sufficient to synthesize all rotations of the filter (see references). Middle: Zone plate test image. Bottom: By the linearity of convolution, the output, filtered to any orientation, can be synthesized as a linear combination of the outputs of the basis filters.

Synthesized filter and output

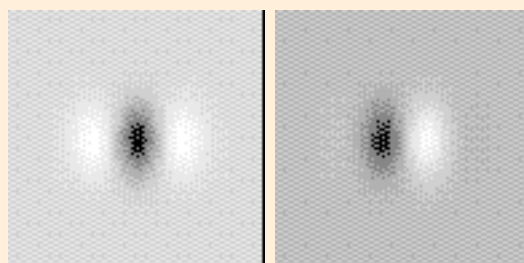


Rotated version of 2nd derivative of Gaussian, obtained as a linear combination of the basis filters above. The output of the zone plate to that filter was obtained as the same linear combination of the outputs to the basis filters.

Architecture for applying steerable filters



Steerable quadrature pair



A steerable quadrature pair allows for continuous control of the filter's phase and orientation, useful for contour analysis and enhancement. Seven basis filters span the space of all orientations and phases of this filter.

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