N E Cotter

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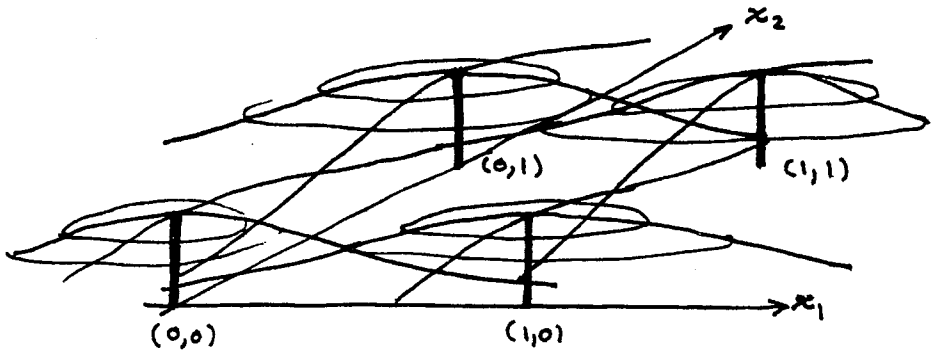
tool: The output of a radial basis function network may reach its maximum value between the center points of the radial basis functions.

In other words, output function peaks may occur where they are unexpected or undesirable.

ex: Consider four gaussian radial basis functions:



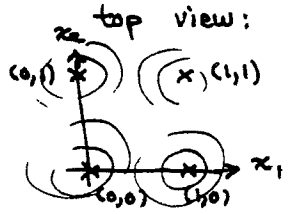
$$r_1(\vec{x}) = e^{-|\vec{x}-(0,0)|^2}$$

$$r_2(\vec{x}) = e^{-|\vec{x}-(1,0)|^2}$$

$$r_3(\vec{x}) = e^{-|\vec{x}-(0,1)|^2}$$

$$r_4(\vec{x}) = e^{-|\vec{x}-(1,1)|^2}$$

top view:



$$f(\vec{x}) = \sum_{j=1}^{4} w_j r_j(\vec{x})$$ Assume $w_1 = w_2 = w_3 = w_4 = 1$.

at center pt $f(\vec{x} = (0,0)) = 1 \cdot e^{-0} + 1 \cdot e^{-1} + 1 \cdot e^{-1} + 1 \cdot e^{-2}$

$= 1 + .368 + .368 + .135$

$= 1.871$

peak is at $f(\vec{x} = (\frac{1}{2}, \frac{1}{2})) = 1 \cdot e^{-\frac{1}{2}} + 1 \cdot e^{-\frac{1}{2}} + 1 \cdot e^{-\frac{1}{2}} + 1 \cdot e^{-\frac{1}{2}}$

(by symmetry) $= 4 \cdot .606$

$= 2.43$

$f(\vec{x})$ is one large bump with peak between center points.