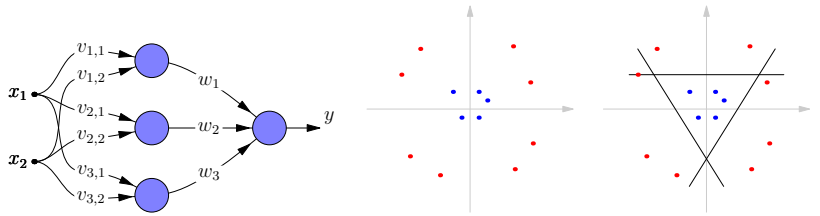
Multi Layer Networks

Multi Layer Feed-Forward Networks

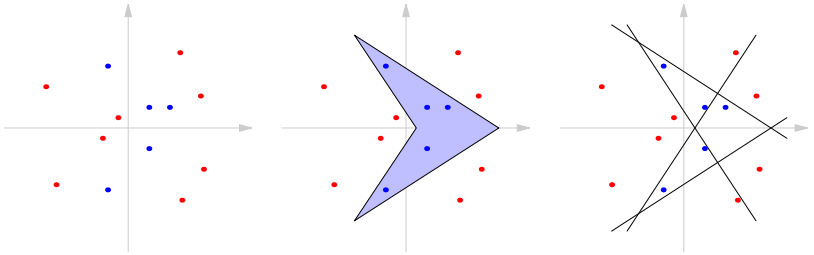
What can a thresholded two layer network compute?



With $w_1 = w_2 = w_3 = 1$ and $\theta = 2.5$ the second layer operates as an AND-gate.

Multi Layer Feed-Forward Networks

What happens if the area is not convex?

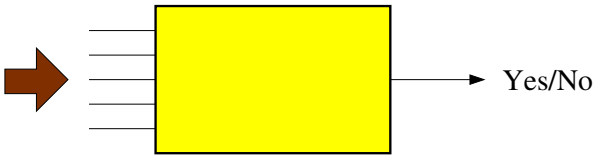


Arbitrarily complex areas can be extracted provided there are enough hidden units

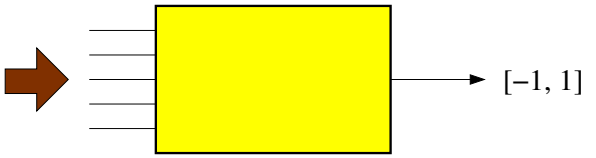
Capabilities

Operates like a general "Learning Box"!

Classification



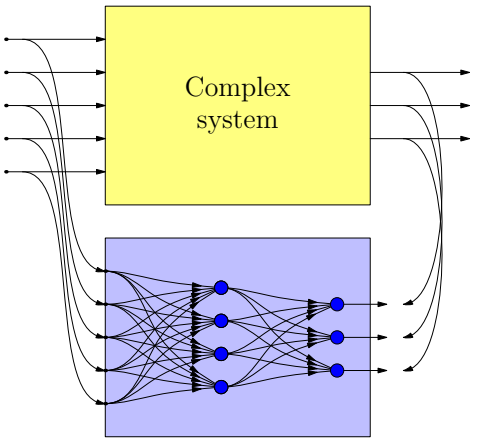
Function Approximation



Multidimensional Mapping

System Identification

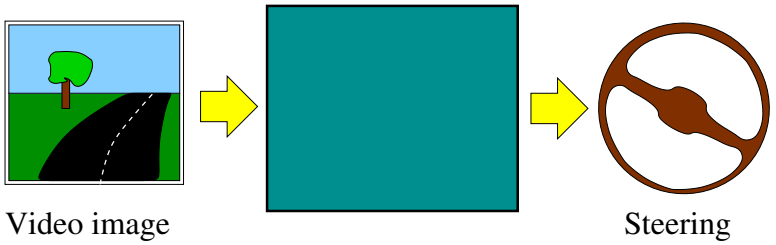
"Mimic" an existing system



ALVINN

ALVINN

Autonomous driving

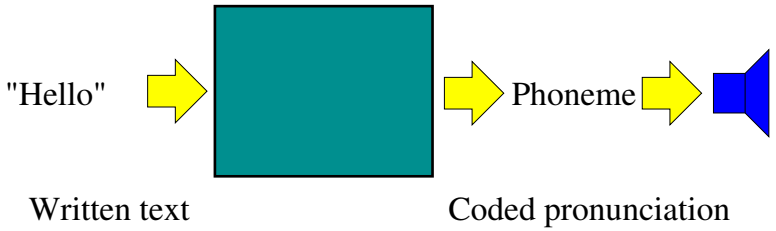


Trained to mimic the behavior of human drivers

NetTalk

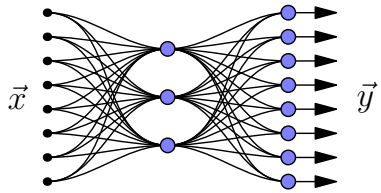
NetTalk

Speech Synthesis



Trained using a large database of spoken text

Data Compression



Hour-Glass form

Train with $\vec{x} = \vec{y}$ (auto-association)
Forces the network to use a compact encoding of the patterns.