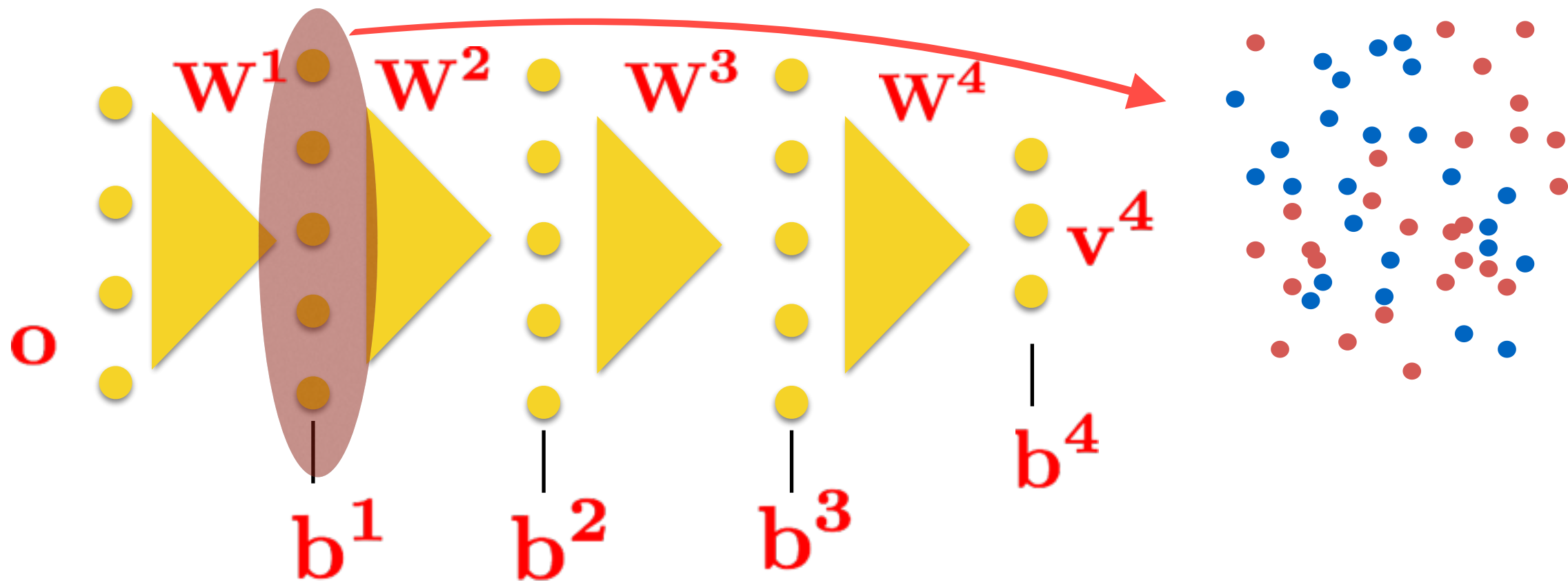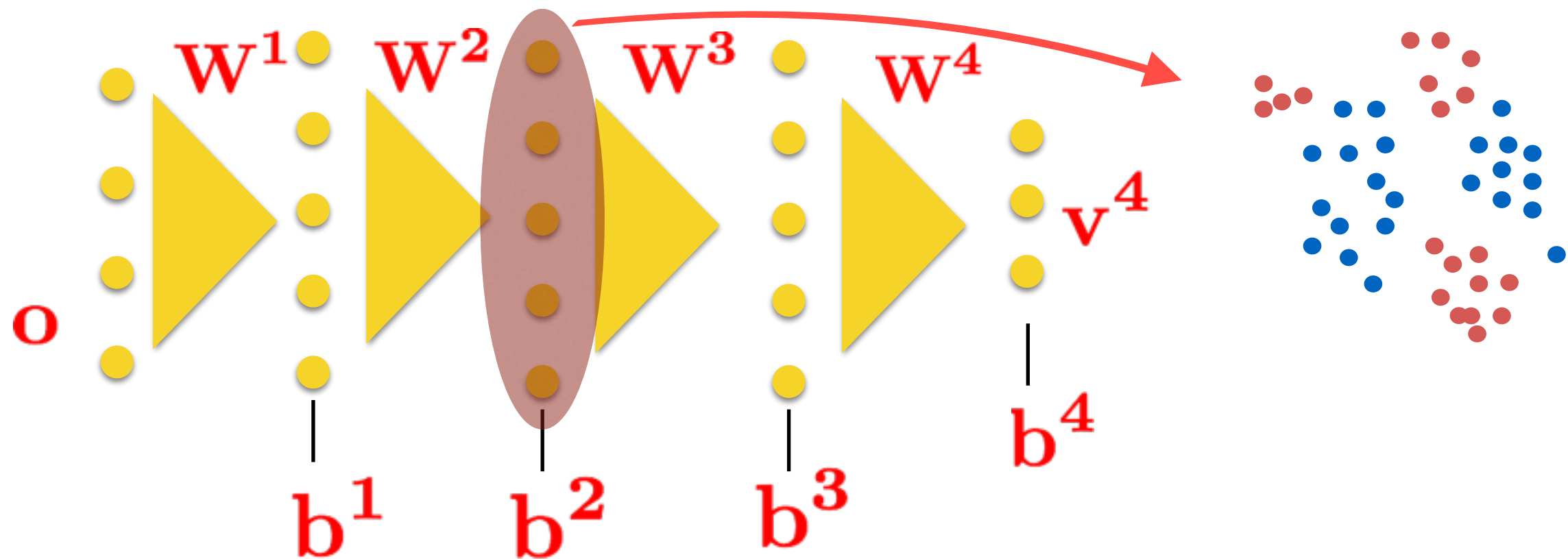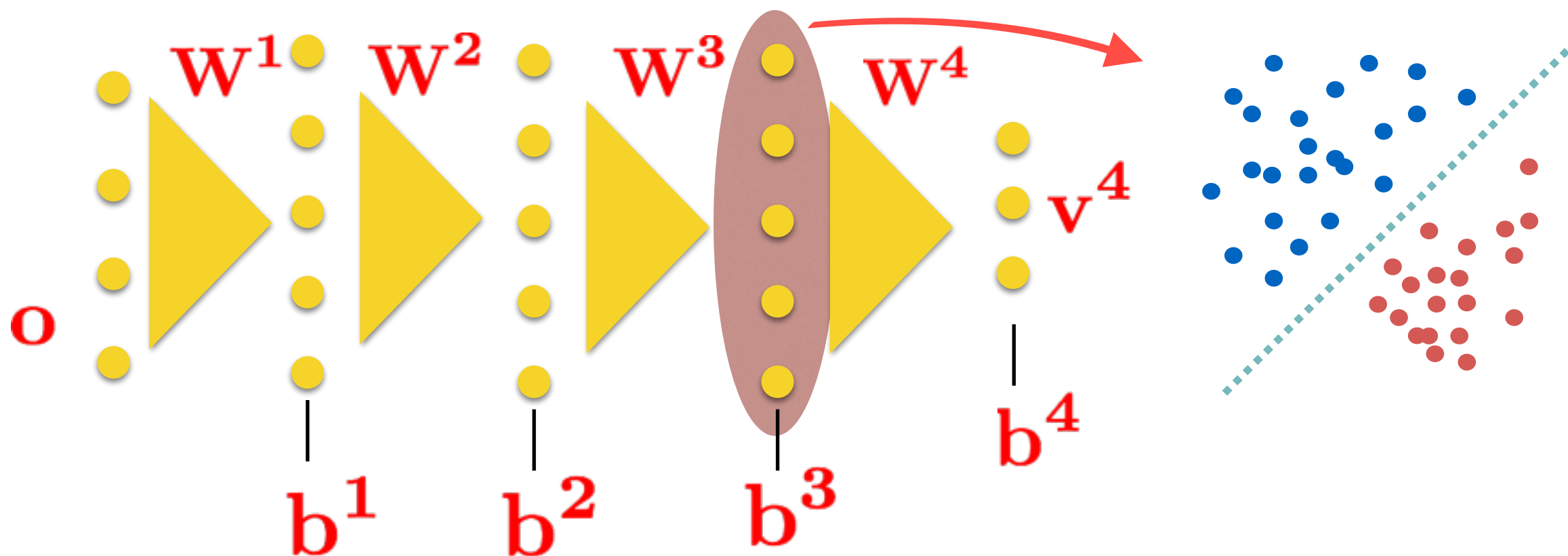# E9 261

18-03-2016

What is Deep Learning ?

Neural networks with multiple hidden layers - Deep networks

What is Deep Learning ?

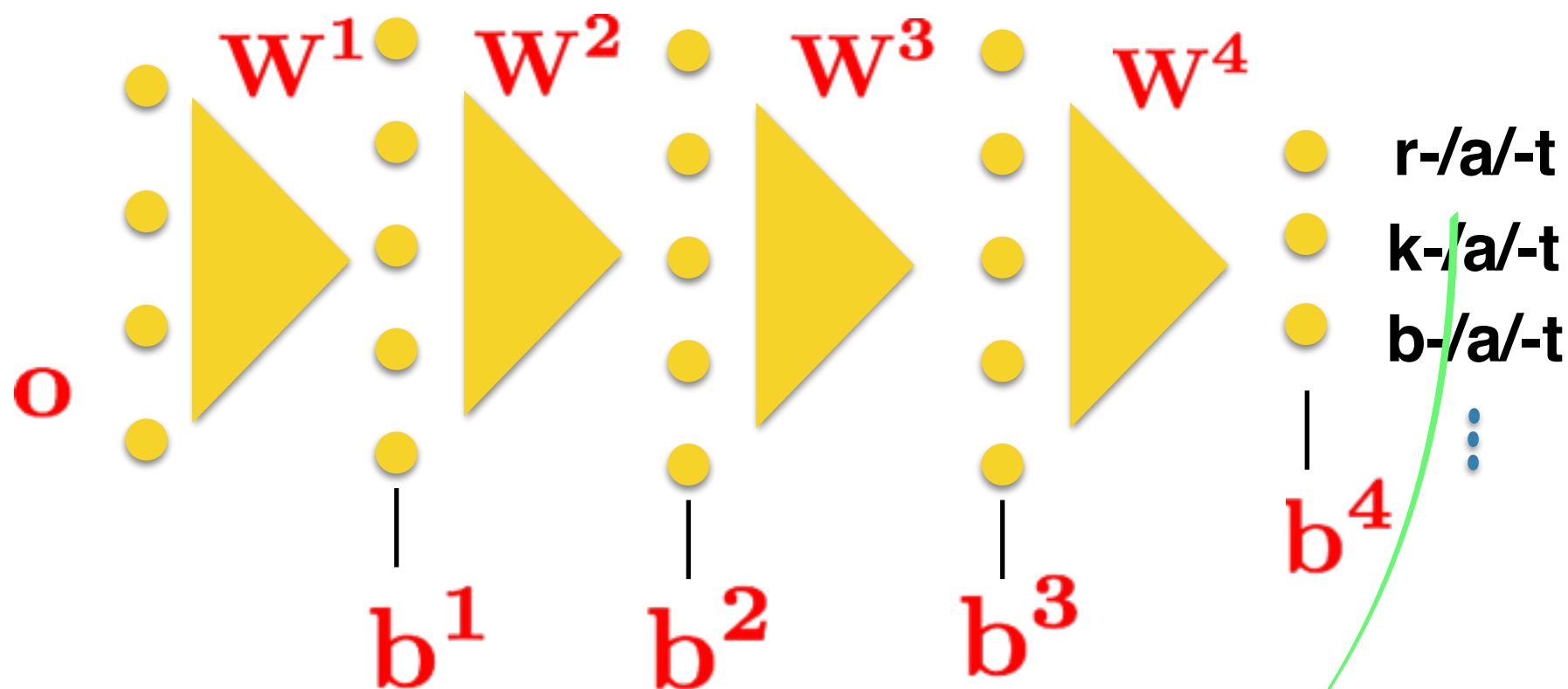Neural networks with multiple hidden layers - Deep networks

What is Deep Learning ?

Neural networks with multiple hidden layers - Deep networks

Deep networks perform hierarchical data abstractions which enable the non-linear separation of complex data samples.

Deep Learning for Speech Recognition

The targets are context dependent phoneme states (senones)

HMM-ANN hybrid system [Bourlard, 1993]

$$p(\mathbf{x}_t | q_t = s) = p(q_t = s | \mathbf{x}_t) \, p(\mathbf{x}_t)/p(s)$$

The standard HMM decoder with this modification for ASR

Bourlard, Herve, and Nelson Morgan. "Continuous speech recognition by connectionist statistical methods." *Neural Networks, IEEE Transactions on* 4.6 (1993): 893-909.

Considerations in DNN