Computational Cognition and Deep Learning

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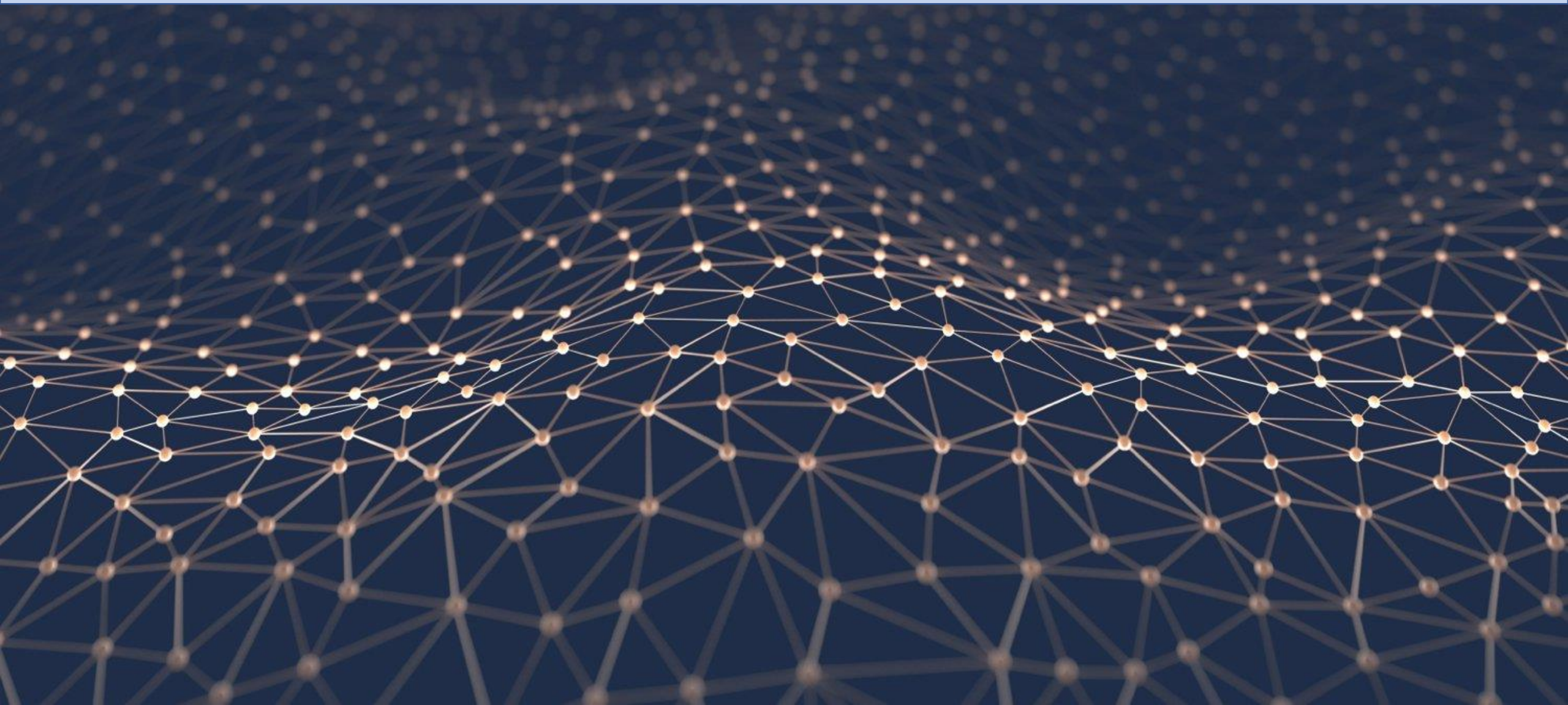
Intelligence Science

- Vision
- Reinforcement learning
- Natural Language Understanding

The Neuron



Computational Cognitive Neuroscience

- Cognitive modeling
- Connectionist approach
- Artificial Neural Networks

Deep Learning

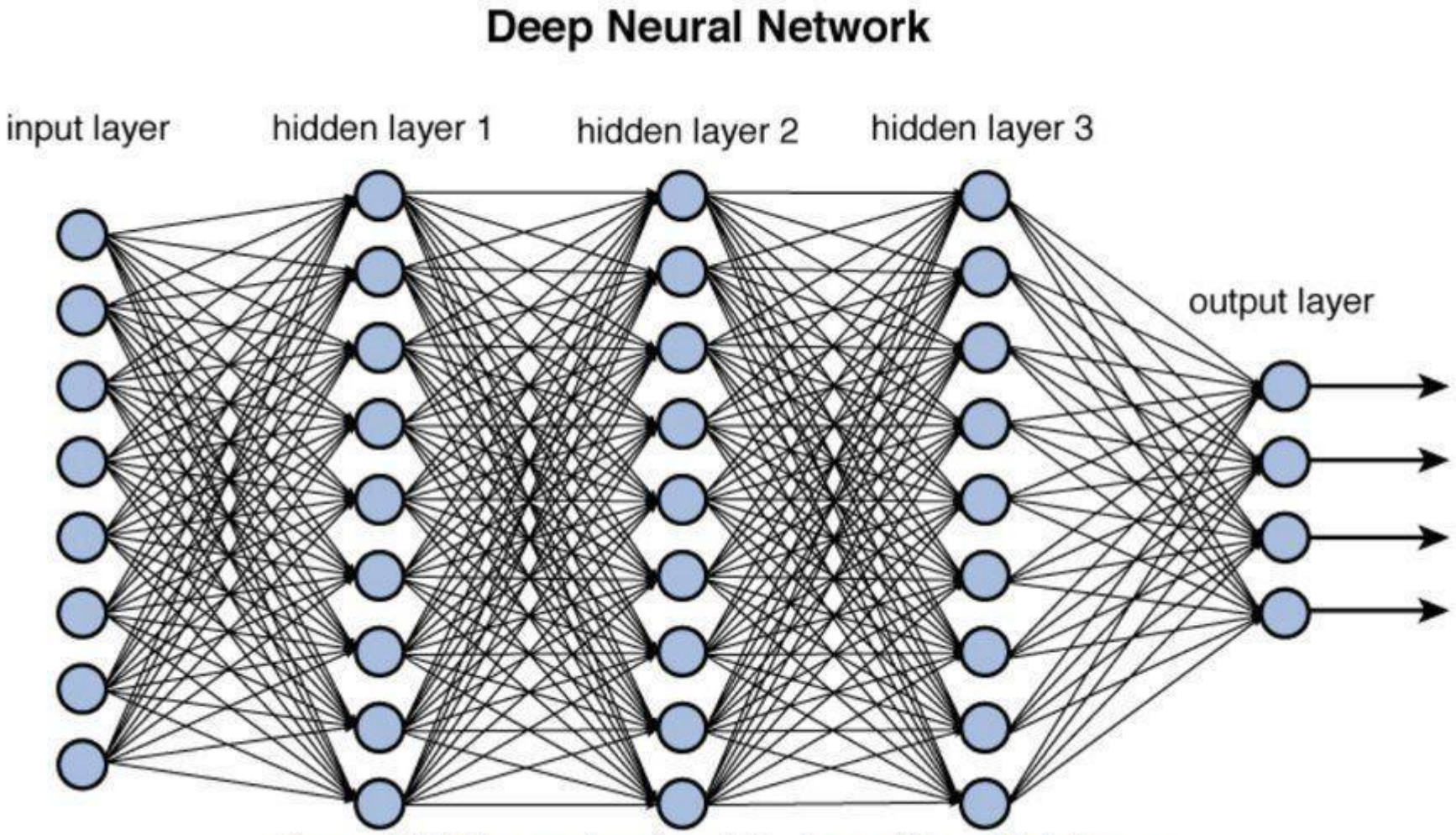
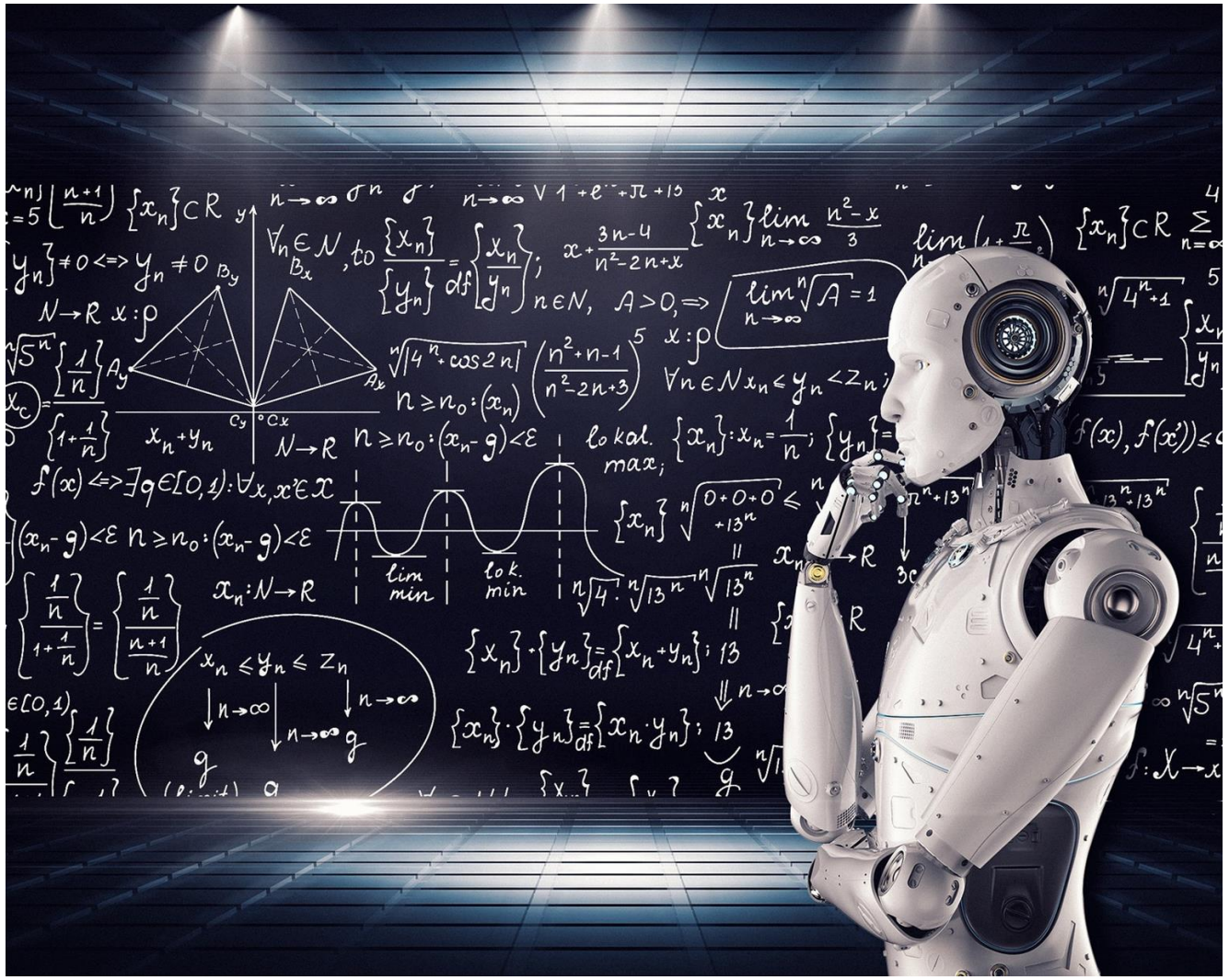


Figure 12.2 Deep network architecture with multiple layers.

Artificial General Intelligence

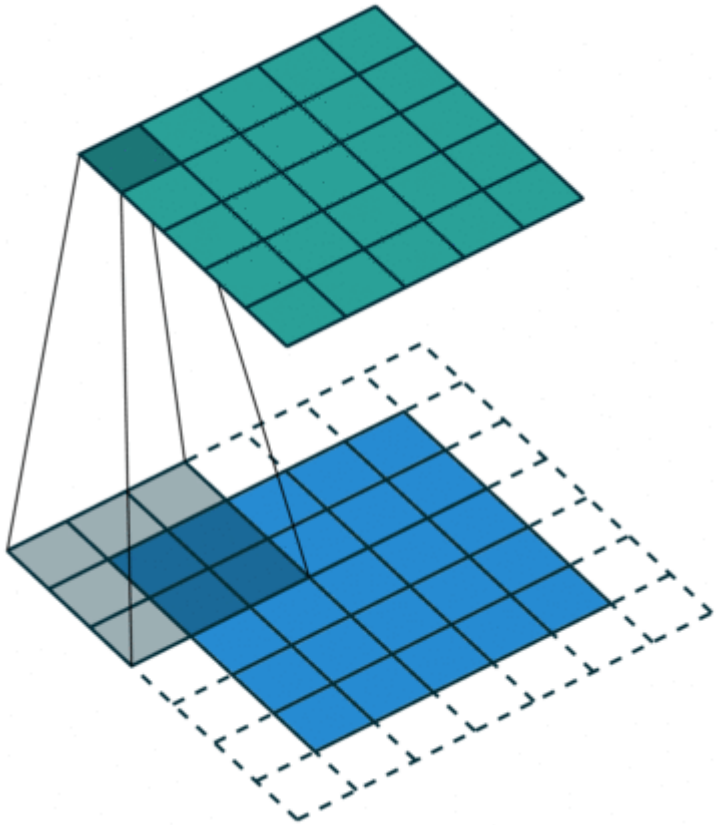
- Healthcare
- Environment
- Finance
- Resource management

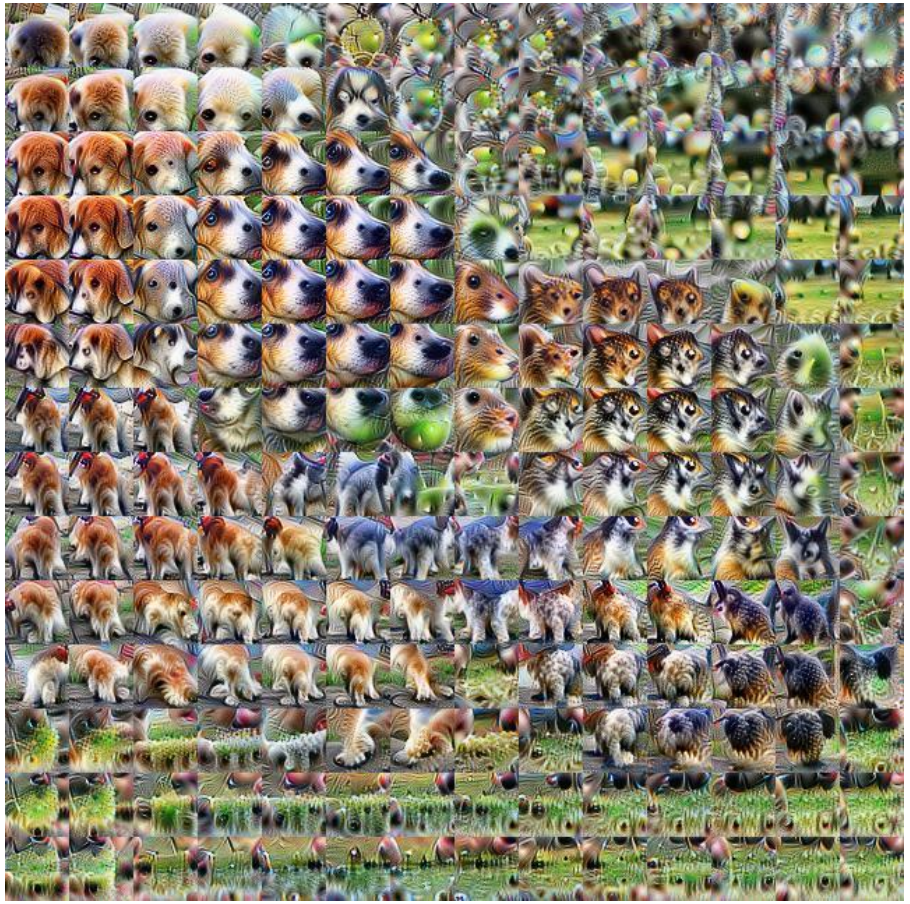


Vision

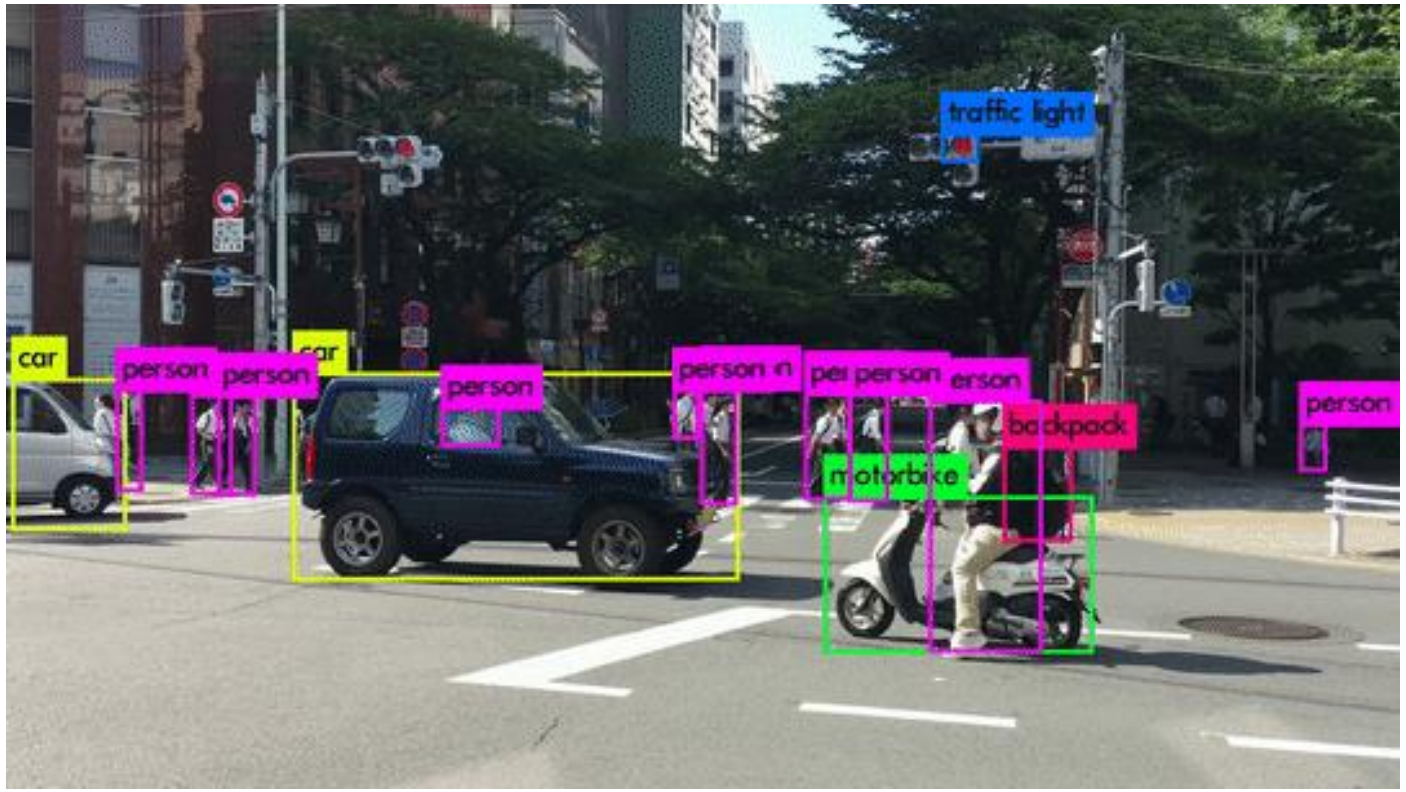
- 2D – 3D modeling
- Primary visual cortex

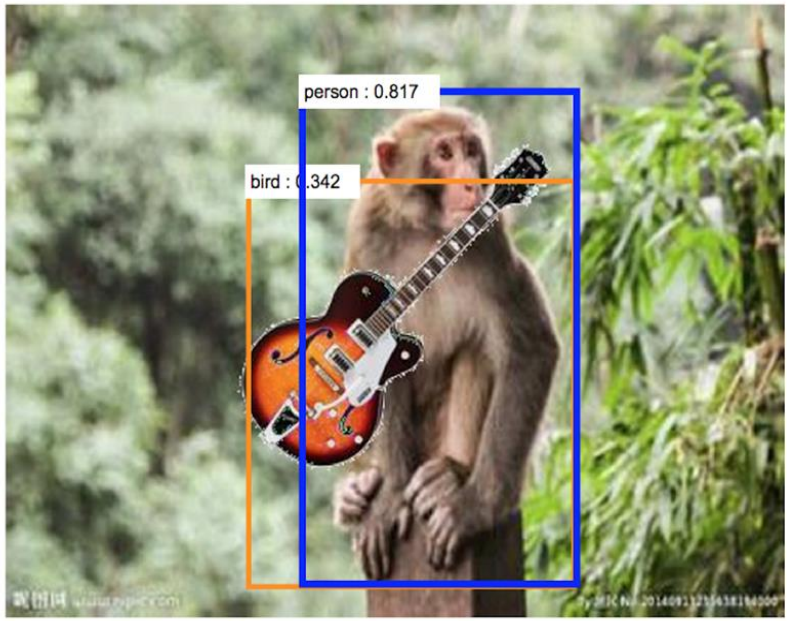
Convolutional Neural Networks



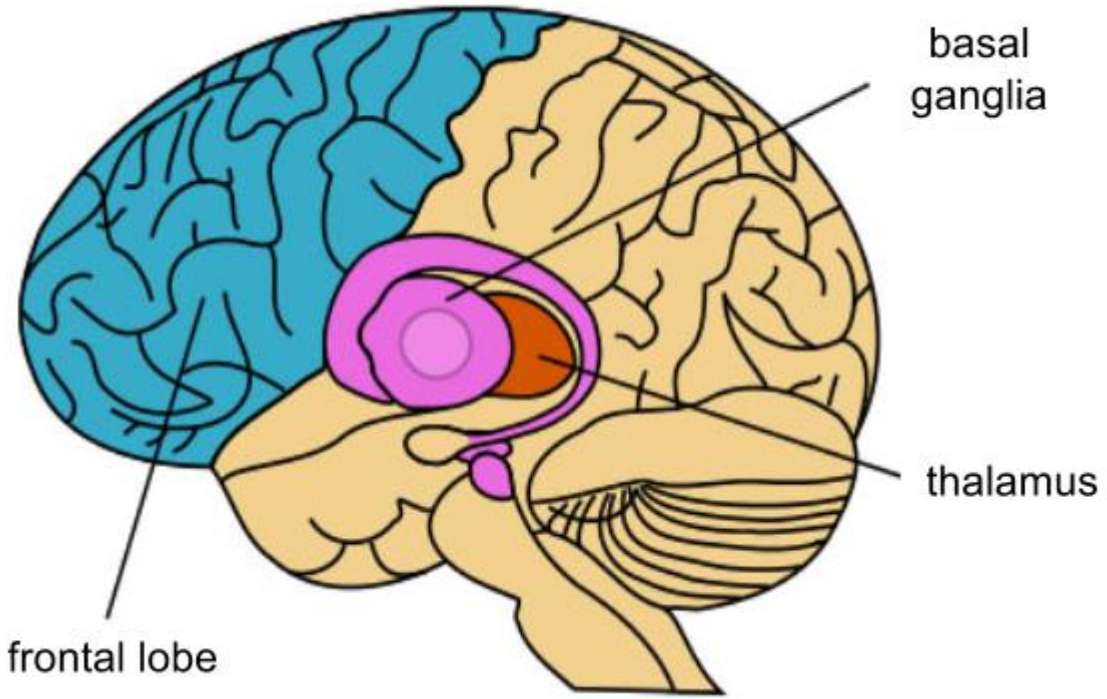


Limitations of Convolutional Neural Networks

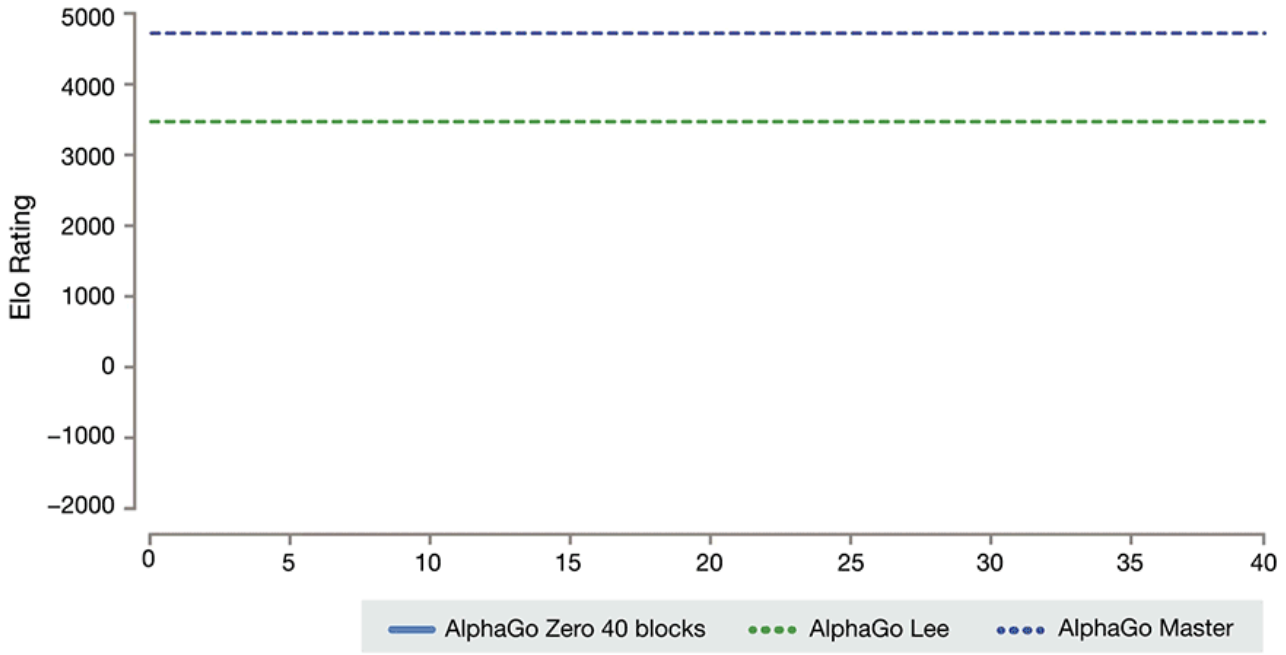




Reinforcement Learning



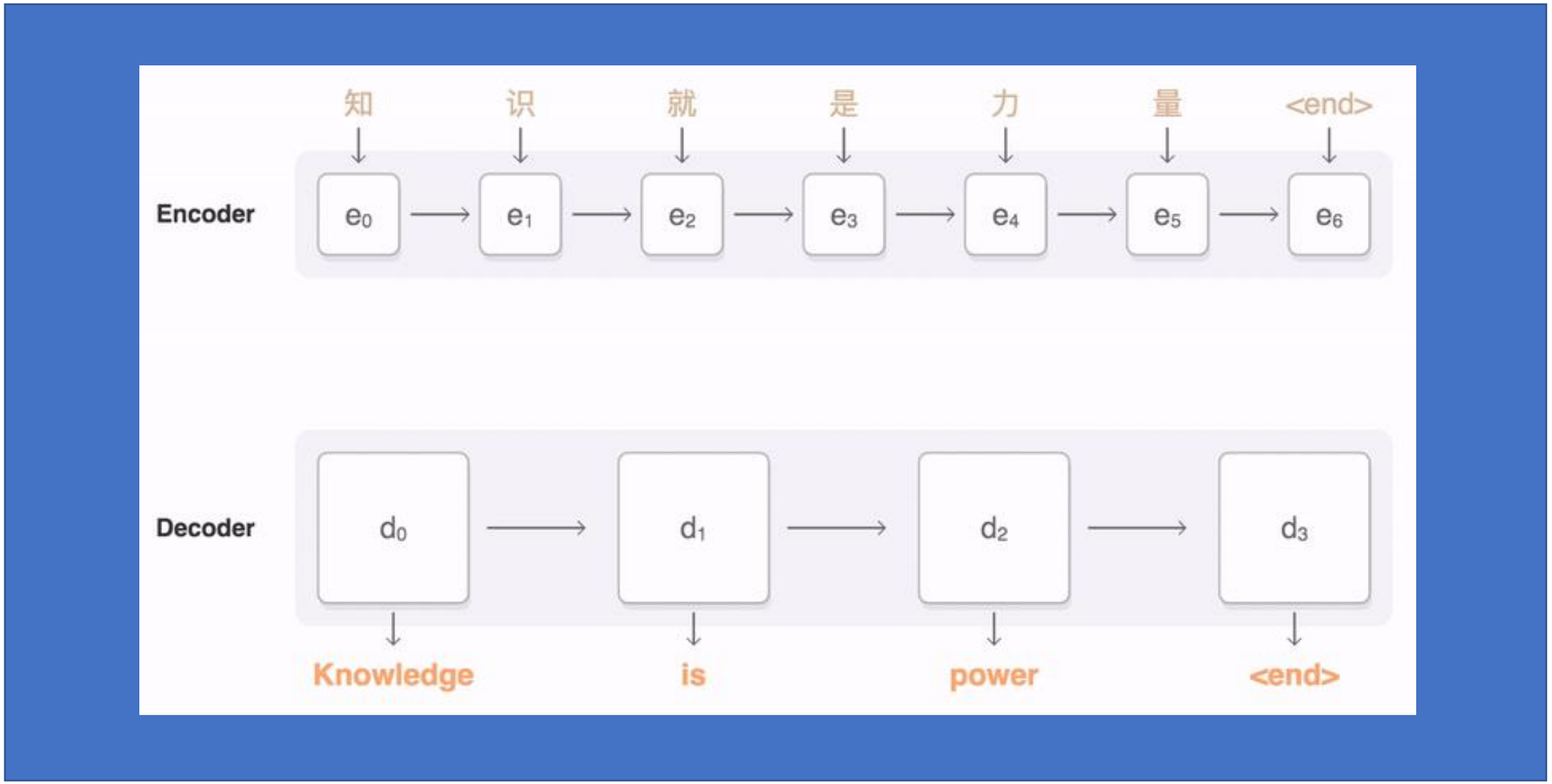
Reinforcement Learning



Natural Language Understanding

- Semantic representation
- Natural Language Processing (NLP)
- Recurrent Neural Networks

Neural Machine Translation



Spatial Invariance

I cnlduo't bvleiee taht I culod aulaclty uesdtannrd waht I was rdnaieg.

Unisg the icndeblire pweor of the hmuan mnid, aocdcrnig to rseecrah at Cmabrigde Uinervtisy, it dseno't mttaer in waht oderr the lterets in a wrod are, the olny irpoamtnt tihng is taht the frsit and lsat ltteer be in the rhgit pclae. The rset can be a taotl mses and you can sitll raed it whoutit a pboerlm. Tihs is bucseae the huamn mnid deos not raed ervey ltteer by istlef, but the wrod as a wlohe. Aaznmig, huh?

(O'Reilly et al., 2012)

The Future

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