Function Approximation in Reinforcement Learning

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Demo!

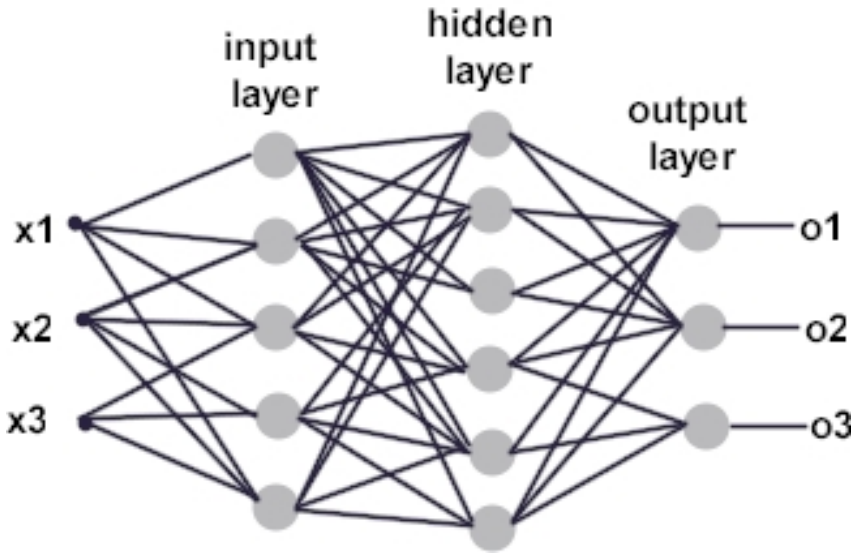
- Demo: http://www.youtube.com/watch?v=upoDIFzAets
- Code: https://github.com/gmaslov/rl-experiments

Q Learning

$$Q(s,a) \leftarrow (1-\alpha)Q(s,a) + \alpha \left[R(s') + \gamma \max_{a'} Q(s',a') \right]$$

- Function representation
  - Table
  - Task-specific model
  - Neural network

Multilayer Perceptron



- Combinatorial explosion $\longleftrightarrow$ Local minima
- Updates are nonlocal

Neural Fitted Q Iteration[2]

- Store training examples
- Batch update allows Rprop[1]
- Batch update constrains generalization

References

Martin Riedmiller.
Rprop - Description and Implementation Details.
Technical report, 1994.

Martin Riedmiller.
Neural fitted Q iteration - first experiences with a data efficient neural reinforcement learning method.
Machine Learning: ECML 2005, pages 317–328, 2005.