## Function Approximation in Reinforcement Learning

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#### Demo!

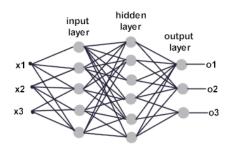
- ▶ Demo: http://www.youtube.com/watch?v=upoDIFzAets
- ► Code: https://github.com/gmaslov/rl-experiments

#### 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 ←→ 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.