Deep Reinforcement Learning

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Reinforcement Learning uses data to find reactions that maximize rewards

Reinforcement Learning (RL)

- Relationship to other Algorithms
- RL in Anesthesia
- Deep RL
Most closed-loop anesthesia delivery uses control theory, which pre-defines how the controller should react to an input:

Set Point (i.e., BIS = 50)

Agent

Observation (i.e., reading BIS)

Action (i.e., dosing propofol)

Environment

Reinforcement learning is the ML approach to sequential decision-making tasks:

Unsupervised Learning
- patient clustering

Supervised Learning
- diagnosis

Reinforcement Learning
- sequential decision support

Applications for Reinforcement Learning in anesthesia:
- vascular access
- securing airways
- medication administration
- ventilation
Reinforcement Learning applied to Closed-Loop Anesthesia

Learning to titrate propofol based on brainwaves

Deep Reinforcement Learning
Deep Reinforcement Learning Animates Complex Spaces

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