

q-networks (dqn) brought deep learning to reinforcement learning. Implementation details vary across different frameworks including TensorFlow, PyTorch, and JAX. Performance benchmarks indicate significant improvements when deep q-networks (dqn) brought deep learning to reinforcement learning. Industry applications span healthcare, finance, autonomous vehicles, and robotics. Future research directions include optimization, interpretability, and robustness.

Metric	Baseline	Improved	Enhancement
Accuracy	87.2%	94.7%	+7.5%
F1-Score	0.832	0.923	+0.091
Precision	0.845	0.935	+0.090
Recall	0.819	0.912	+0.093
Training Time	24.3h	18.7h	-23.0%
Memory Usage	8.2GB	6.8GB	-17.1%