

ENHANCED DEEP REINFORCEMENT LEARNING



INVENTION

Deep Reinforcement learning (DRL) have recently gained popularity after introduction of base line algorithms like Deep Q-Networks (DQN) and method of training such a network.

This invention introduces a pre-processing step that can simplify DQN by improving training time and performance.

MARKET NEED

AI and machine learning have the potential to create an additional \$2.6T in value by 2020 in Marketing and Sales, and up to \$2T in manufacturing and supply chain planning¹.

The cognitive and AI systems market is expected to achieve 37.3% compound annual growth rate (CAGR) from 2017-2022.

It is forecasted that Software market will be growing fast at a CAGR of 43.1%. The market would cover 40% of cognitive/AI spending %2.

APPLICATIONS

DQN networks have applications in

1. Resource management in computer clusters
2. Robotics
3. Web-system configuration
4. Optimizing chemical reactions
5. Personalized recommendations
6. Automated Price bidding
7. Search Algorithms for Neural Architecture Search

ADVANTAGES

- Reduces training time when compared to vanilla version of DQN.
- This technique can be used for any Deep RL algorithm.
- Easy availability of pretrained feature extractors

PROJECT STATUS

- Computer based simulation has been tested.
- Tested on games like Pong and VizDoom.
- Achieved up to 29.5% reduction in training time.

PATENT PROTECTION

Provisional US patent application 62/780546

ABOUT KFUPM

King Fahd University of Petroleum & Minerals is a leading educational organization for science and technology. KFUPM Innovation & Technology Transfer office is tasked with taking innovation from lab to marketplace.

For further information please contact:

Name: Tayyab Mujahid

Email: tayyabm@kfupm.edu.sa

Telephone: +966-13-860-8360

¹ McKinsey Global Institute, Visualizing the uses and potential impact of AI and other analytics, April 2018.

² IDC Worldwide Spending on Cognitive and Artificial Intelligence Systems Forecast, 2018