

Reinforcement Learning

IEEE UAV Drone

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- ① Understanding the Challenge
- ② Why Reinforcement Learning?
- ③ How Reinforcement Learning?

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The Challenge

Motivation: Currently, researchers take two major approaches when creating and evaluating their solutions for computer vision: (1) Curated datasets that contain camera-captured data with annotations or (2) Computer generated data with known characteristics

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Tasks:

- Chasing a programmable moving robot
- Recognize objects in a dynamic environment
- Assess a situation after disaster
- Efficient Computer Vision

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Deep Reinforcement Learning for Autonomous Driving: A Survey

B Ravi Kiran, Ibrahim Sobh, Victor Talpaert, Patrick Mannion,
Ahmad A. Al Sallab, Senthil Yogamani, Patrick Pérez

Fawzi, A., Balog, M., Huang, A. et al. Discovering faster matrix multiplication algorithms with reinforcement learning. *Nature* 610, 47{53 (2022). <https://doi.org/10.1038/s41586-022-05172-4>

A Deep Reinforced Model for Abstractive Summarization

Romain Paulus, Caiming Xiong, Richard Socher

Paulus, R., Xiong, C., Socher, R. (2017). A Deep Reinforced Model for Abstractive Summarization.
doi:10.48550/ARXIV.1705.04304

Discovering faster matrix multiplication algorithms with reinforcement learning

Alhussein Fawzi, Matej Balog, Aja Huang, Thomas Hubert,
Bernardino Romera-Paredes, Mohammadamin Barekatain, Alexander Novikov,
Francisco J. R. Ruiz, Julian Schrittwieser, Grzegorz Swirszcz, David Silver,
Demis Hassabis, Pushmeet Kohli

Fawzi, A., Balog, M., Huang, A. et al. Discovering faster matrix multiplication algorithms with reinforcement learning. *Nature* 610, 47(53) (2022). <https://doi.org/10.1038/s41586-022-05172-4>

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The Silver Bullet

1. We have the Gazebo Engine for PX4 Simulation.

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2. We have a competition specific scoring metric.

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1. We have the Gazebo Engine for PX4 Simulation.
2. We have a competition specific scoring metric.
3. Individual Components are developed and independently tested.
4. Competitors have already used the simulation environment for end-to-end testing.

Thank you!

Have an awesome rest of your day!

Slides: <https://cs.purdue.edu/homes/jsetpal/rl.pdf>