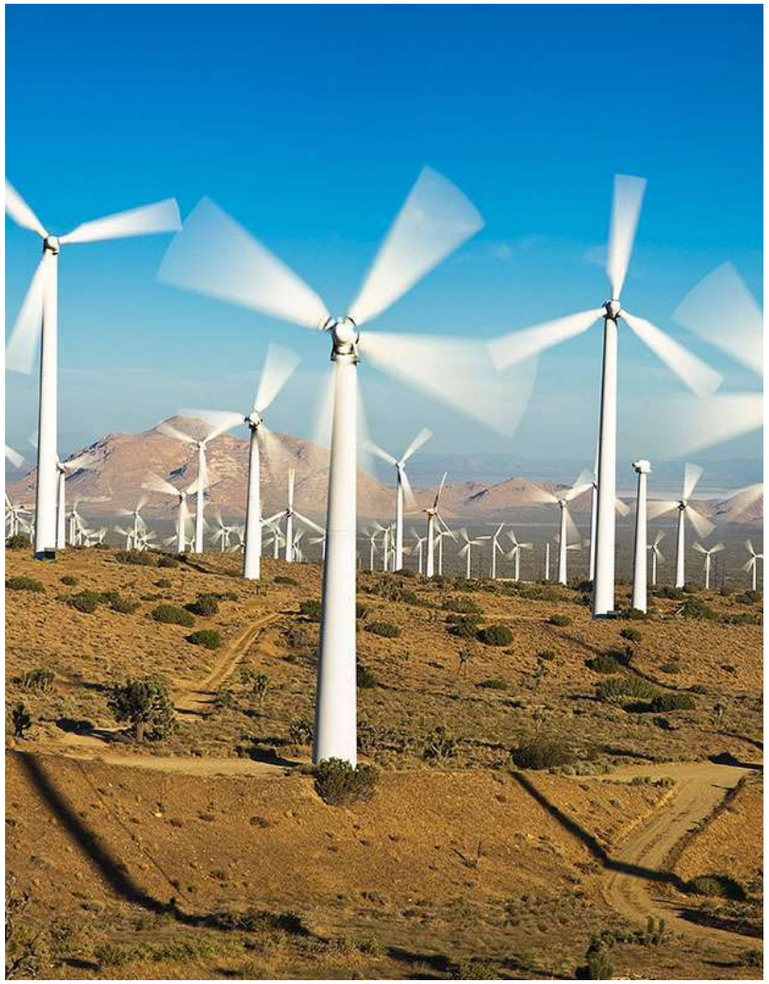
NUS-ISS
Problem Solving Using Pattern Recognition

Deep learning: Act

by Dr. Tan Jen Hong

Wind power output prediction

Better economic value



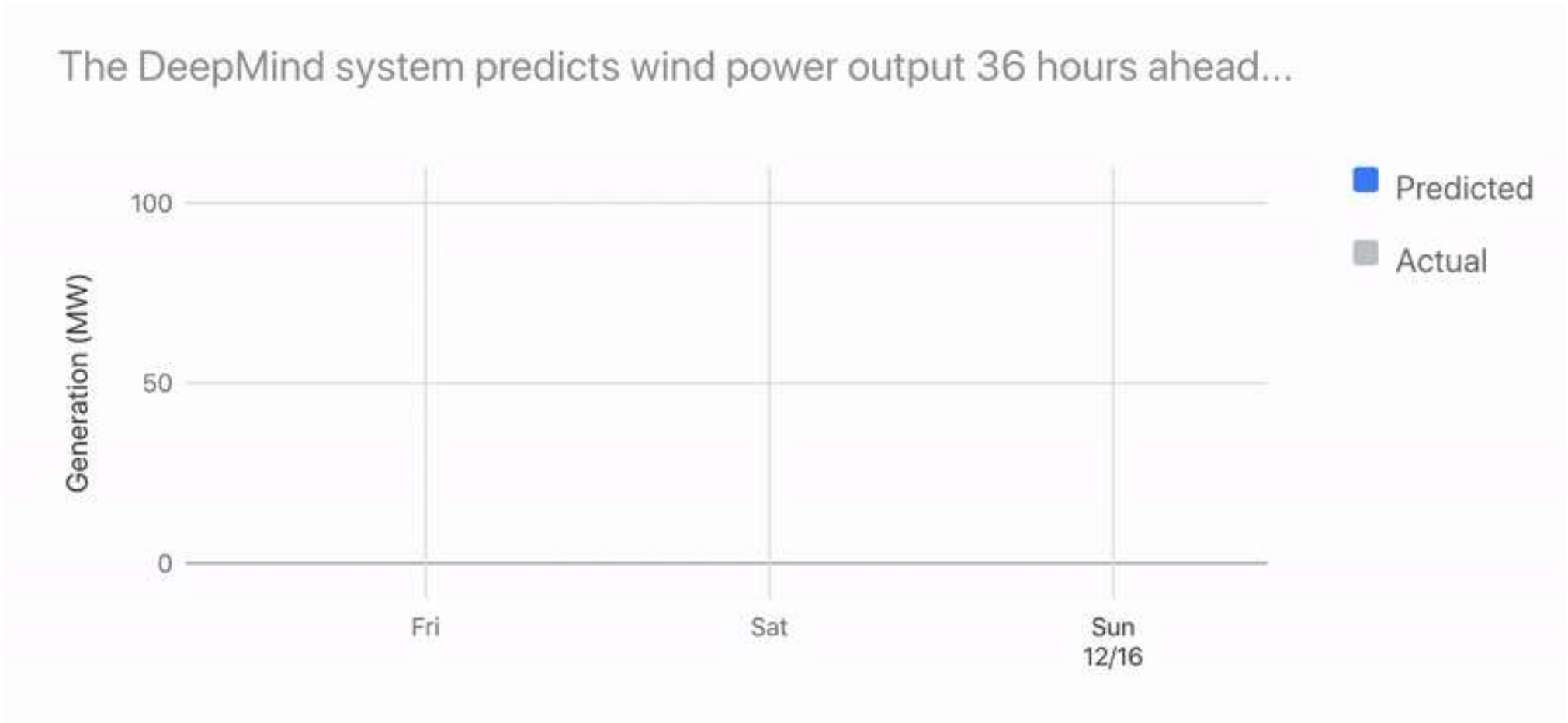
Source: https://deepmind.com/blog/machine-learning-can-boost-value-wind-energy/

- Use deep learning to predict wind power output ***36*** hours ahead of actual generation
- Based on predictions recommend optimal hourly delivery commitments to power grid a full day in advance
- Benefit: scheduled energy sources are more valuable to grid

Wind power output prediction

Better economic value

- Actual vs Predicted

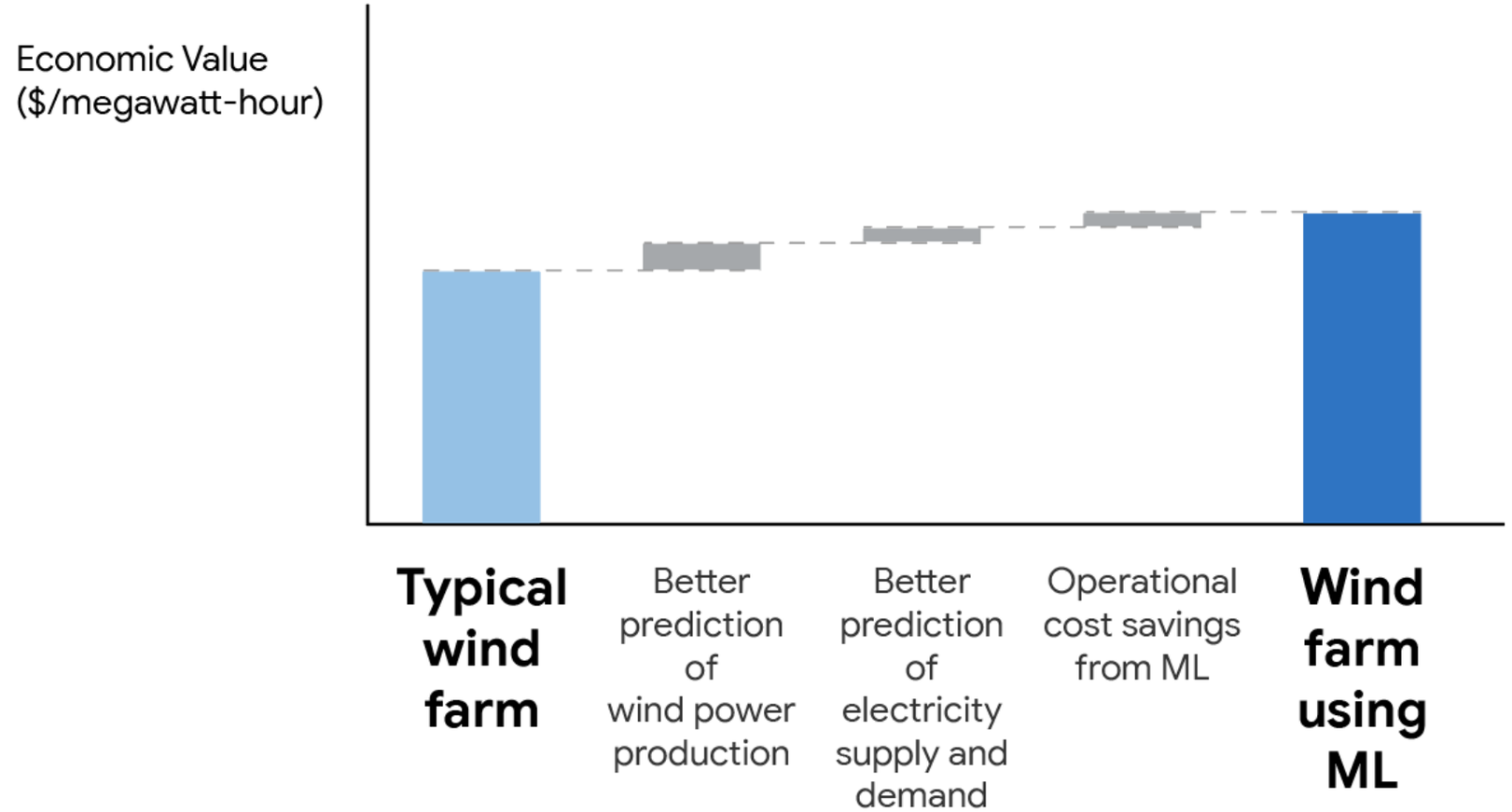


Source: https://deepmind.com/blog/machine-learning-can-boost-value-wind-energy/

Wind power output prediction

Better economic value

Machine learning can increase the value of wind energy

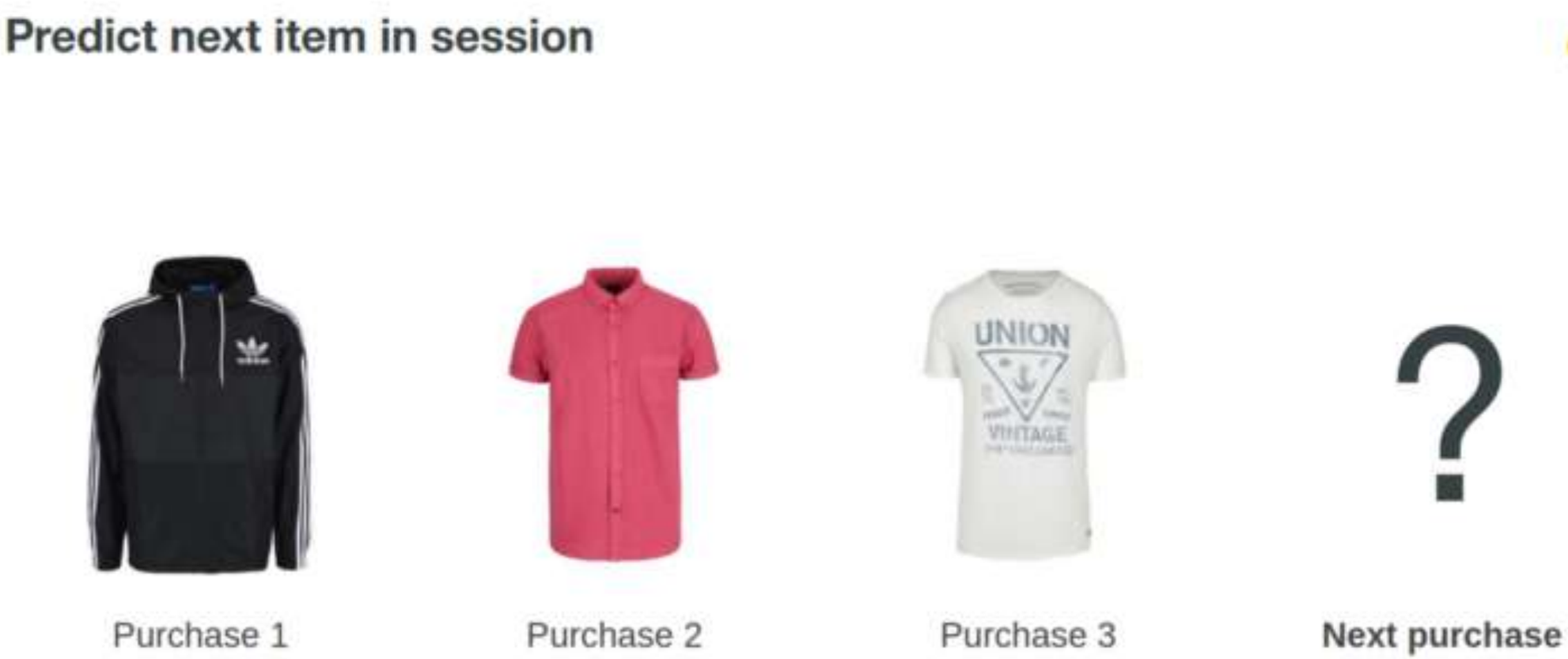


Illustrative results from 2018 Google/DeepMind field study

Source: https://deepmind.com/blog/machine-learning-can-boost-value-wind-energy/

Predict then recommend

What's next?



Source: https://medium.com/recombee-blog/machine-learning-for-recommender-systems-part-2-deep-recommendation-sequence-prediction-automl-f134bc79d66b

Recommend based on distance

This is how CNN sees the relations

Source: https://medium.com/recombee-blog/machine-learning-for-recommender-systems-part-2-deep-recommendation-sequence-prediction-automl-f134bc79d66b

Recommend based on distance

Poster recommendation

Source: https://medium.com/recombee-blog/machine-learning-for-recommender-systems-part-2-deep-recommendation-sequence-prediction-automl-f134bc79d66b

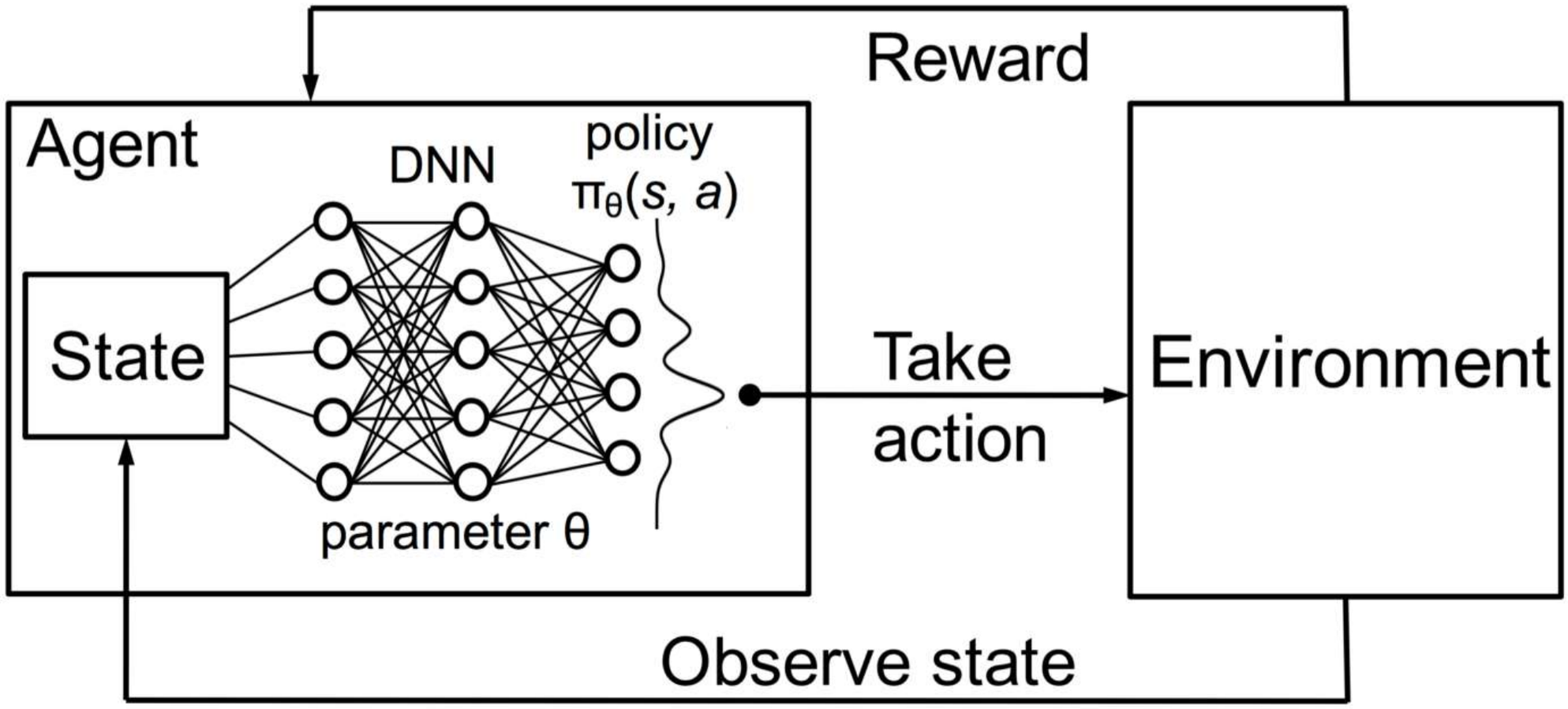
Freekick please

Fifa 18

Source: https://towardsdatascience.com/using-deep-q-learning-in-fifa-18-to-perfect-the-art-of-free-kicks-f2e4e979ee66

Deep Reinforcement learning

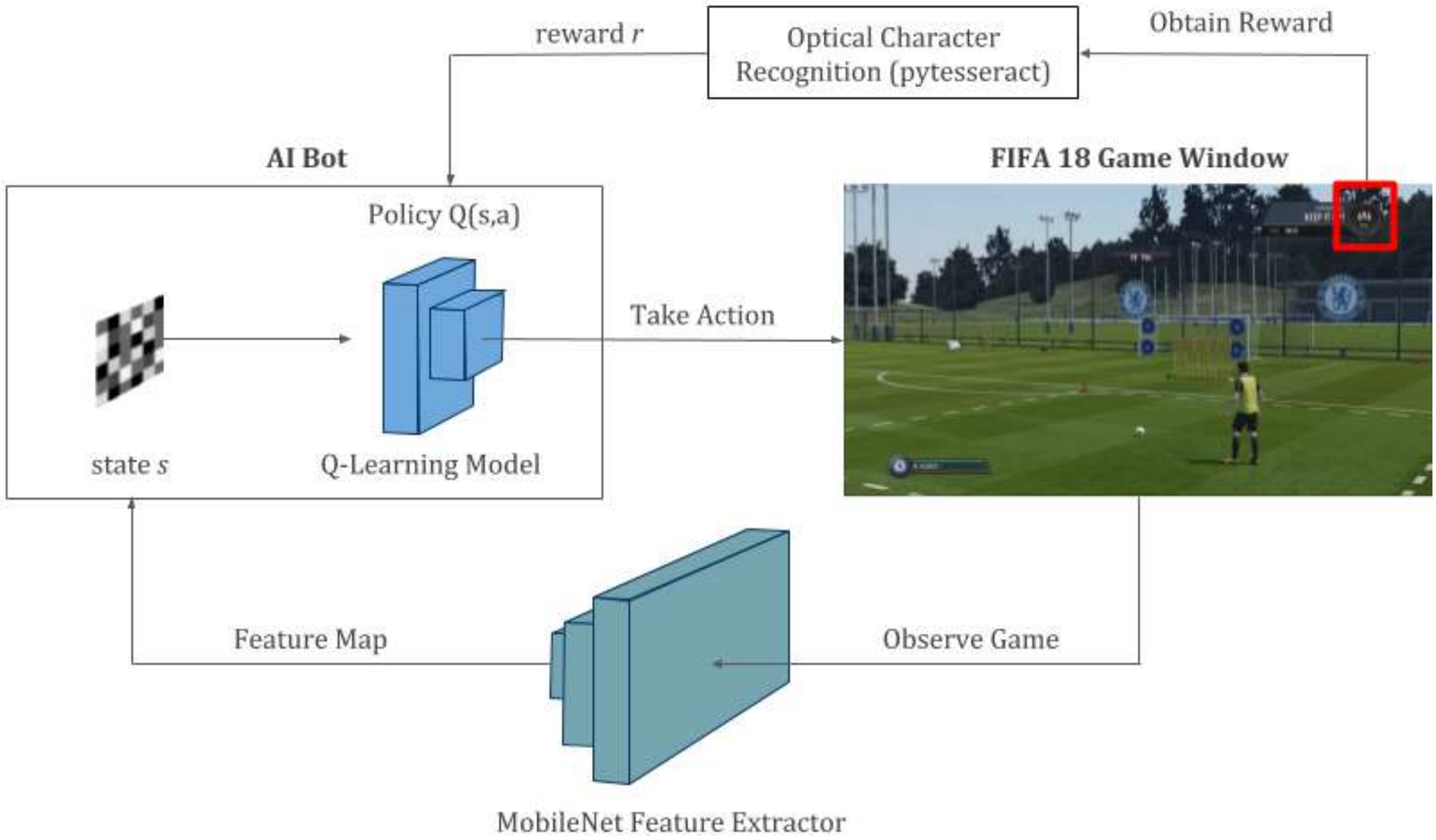
Deep Q-learning



Source: https://towardsdatascience.com/using-deep-q-learning-in-fifa-18-to-perfect-the-art-of-free-kicks-f2e4e979ee66

Deep Reinforcement learning

Fifa 18



Source: https://towardsdatascience.com/using-deep-q-learning-in-fifa-18-to-perfect-the-art-of-free-kicks-f2e4e979ee66

AI vs AI

Ryu is played by AI that learned by itself to play

Source: https://www.youtube.com/watch?v=eWSbIXSbMis

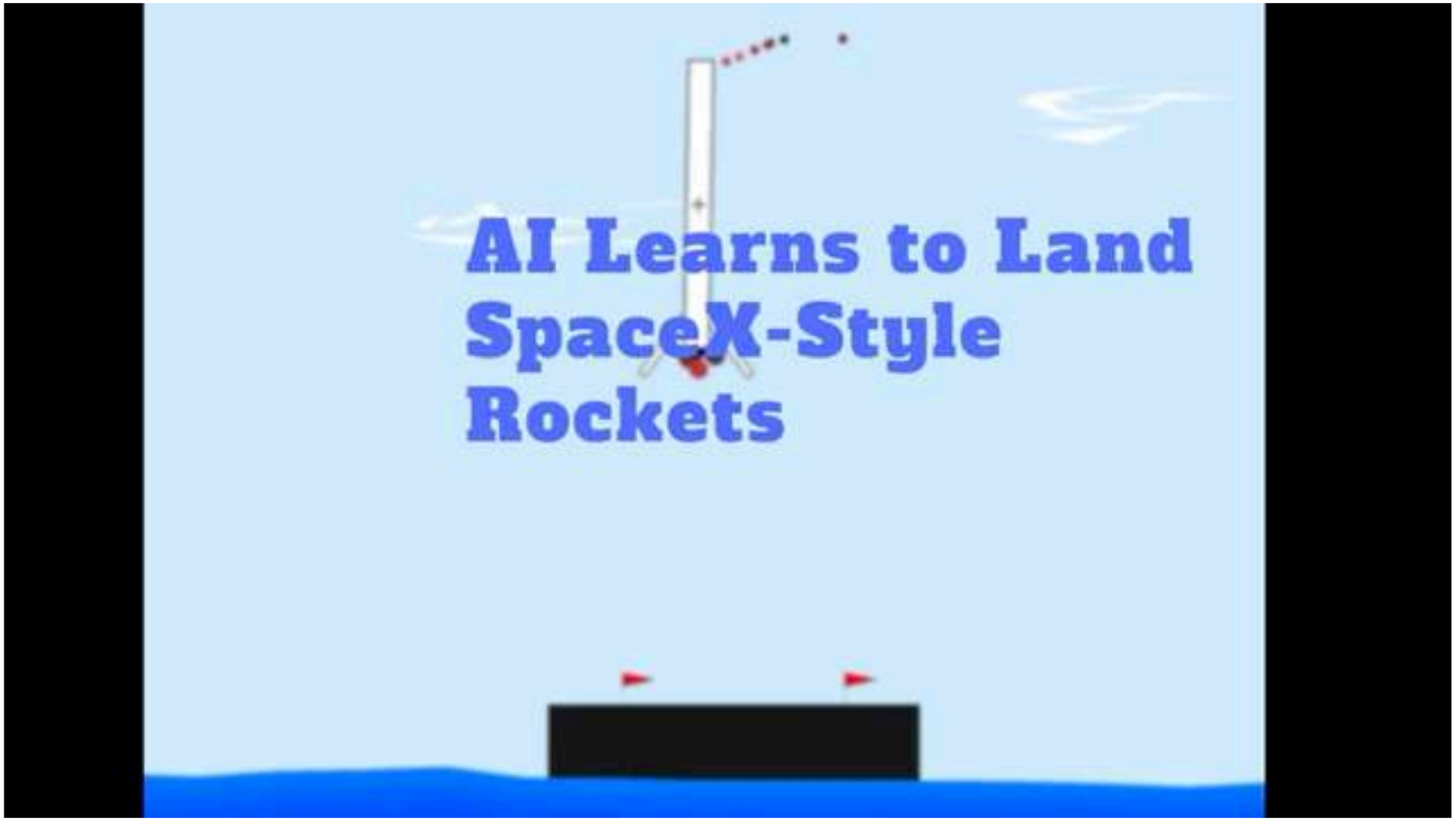
Any idea about SpaceX?

Landing?

Source: SpaceX

Controlled landing

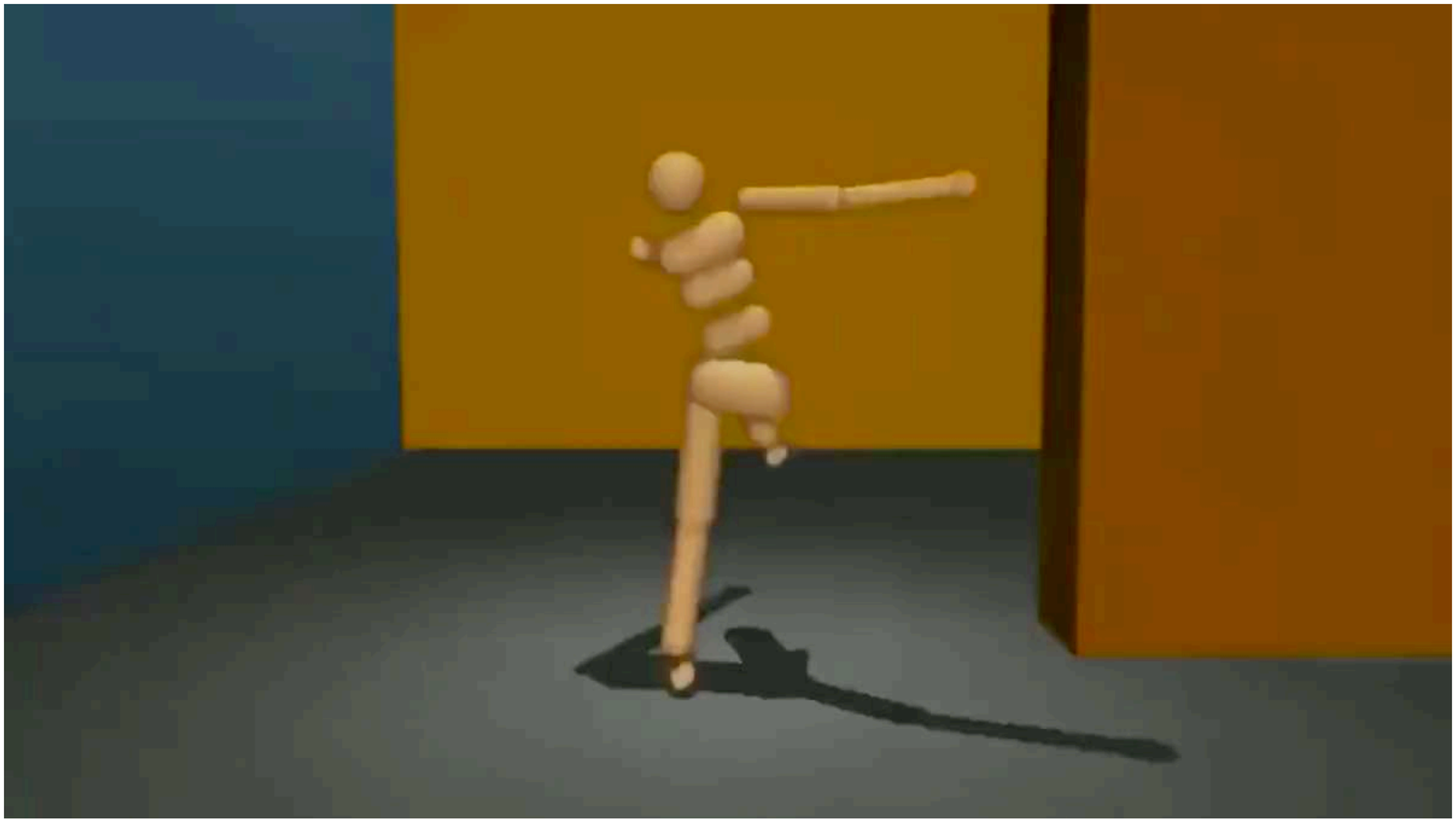
Simulation



Source: SpaceX

Walk in style

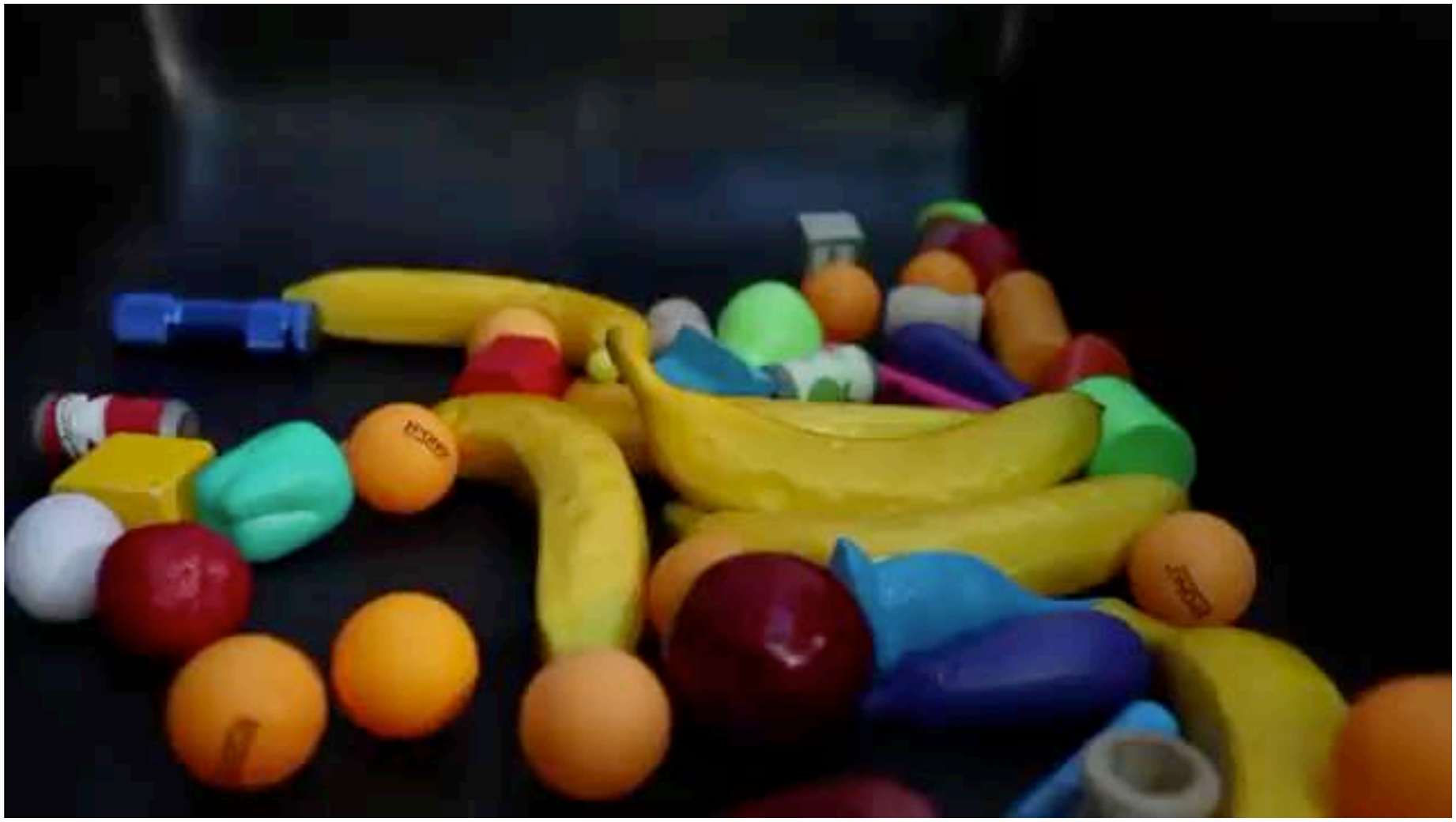
Learn like a kid



Source: https://twitter.com/randal_olson/status/1111683751874945025

Throwing

Robot follows



Source: https://twitter.com/andyzengtweets/status/1110655184642936832

Grasping

Shared learning

Source: https://ai.googleblog.com/2018/06/scalable-deep-reinforcement-learning.html

Autonomous vehicle

Drive by self-learning

Source: https://techcrunch.com/2019/04/03/wayve-claims-world-first-in-driving-a-car-autonomously-with-only-its-ai-and-a-satnav/

Autonomous vehicle

Tesla autopilot

Source: https://www.tesla.com/autopilotAI