

# Multi-Agent Reinforcement Learning

## Assignment

Mirco Musolesi

[mircomusolesi@acm.org](mailto:mircomusolesi@acm.org)

# Assignment

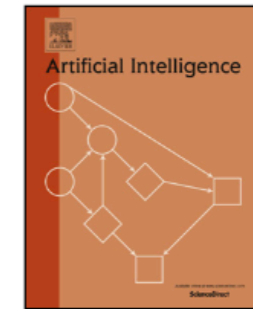
- ▶ Essay: “A Critical Discussion of Silver et al. “Reward is Enough”. *Artificial Intelligence*. 299. 2021”
- ▶ You should take into consideration the material presented during the module.
- ▶ Length: 3000 words max plus references.



Contents lists available at ScienceDirect

# Artificial Intelligence

[www.elsevier.com/locate/artint](http://www.elsevier.com/locate/artint)



## Reward is enough

David Silver<sup>\*</sup>, Satinder Singh, Doina Precup, Richard S. Sutton



### ARTICLE INFO

*Article history:*

Received 12 November 2020

Received in revised form 28 April 2021

Accepted 12 May 2021

Available online 24 May 2021

*Keywords:*

Artificial intelligence

Artificial general intelligence

Reinforcement learning

Reward

### ABSTRACT

In this article we hypothesise that intelligence, and its associated abilities, can be understood as subserving the maximisation of reward. Accordingly, reward is enough to drive behaviour that exhibits abilities studied in natural and artificial intelligence, including knowledge, learning, perception, social intelligence, language, generalisation and imitation. This is in contrast to the view that specialised problem formulations are needed for each ability, based on other signals or objectives. Furthermore, we suggest that agents that learn through trial and error experience to maximise reward could learn behaviour that exhibits most if not all of these abilities, and therefore that powerful reinforcement learning agents could constitute a solution to artificial general intelligence.

© 2021 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).