
# SEEDS HackSciArt

# SEED 09-IA


## RESEARCHERS

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## *1. ESSENTIAL DIMENSION*

*(Objective descriptive information of the scientific seed)*

## NAME

“Exploration vs Exploitation”


## KEYWORDS

Machine learning, reinforcement learning.


## BRANCH

The area of Computer Science and Artificial Intelligence is usually part of the Computer Science branch, although it is also closely related to Logic and Mathematics.


## ABSTRACT

It is possible to design algorithms that optimize their behavior as they interact with the environment (directly or simulated), simply by analyzing the responses (or rewards) received at each moment. Some classic examples can be found in strategy games or robotics, but in recent years this has also been applied to many other areas such as autonomous driving, conversational systems or recommendation systems.

One of the key points in reinforcement learning is the balance between *exploring* new situations and *exploiting* the knowledge learned so far.

## METAPHOR

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## PHASES OF THE USUAL SCIENTIFIC METHOD

1. Formal description of the environment in which the agent operates.
2. Reinforcement learning algorithm.
3. Training.
4. Deployment in production.

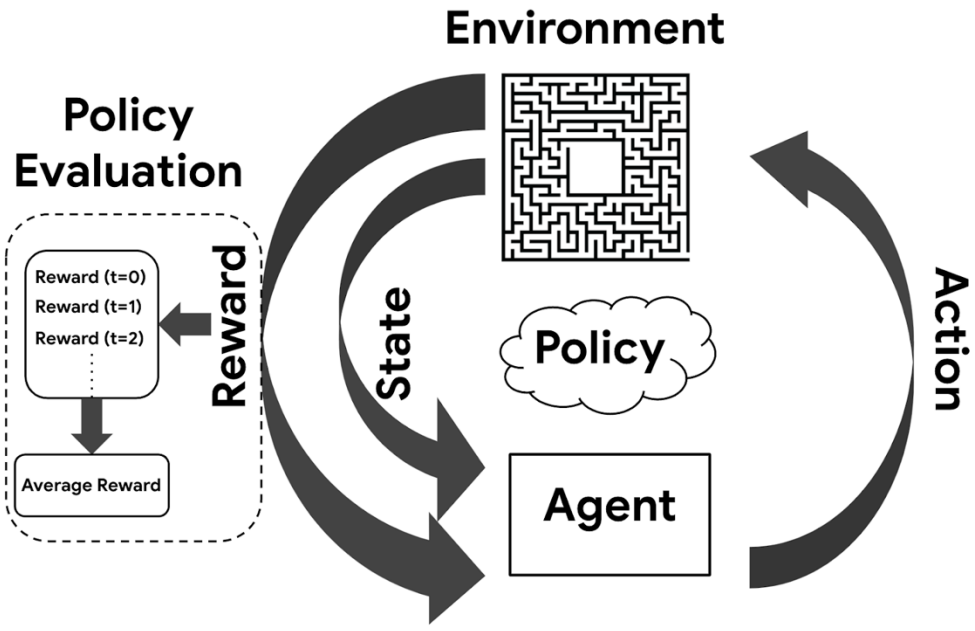
## TOOLS

Electron microscope, DNA sequencer, forensic facial reconstruction software.

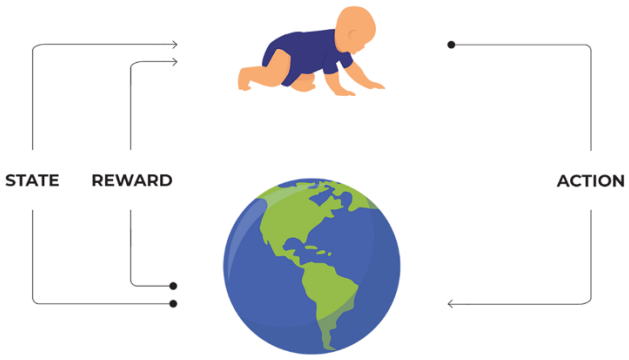
- Software: Gymnasium (https://github.com/Farama-Foundation/Gymnasium)
- Software: PettingZoo (https://github.com/Farama-Foundation/PettingZoo)

## RESOURCES

1) 01_Wikipedia_AlphaZero
   https://en.wikipedia.org/wiki/AlphaZero
2) 02_Informative Article
   https://neptune.ai/blog/reinforcement-learning-applications
3) 03_Wikipedia_Technical_Description
   https://en.wikipedia.org/wiki/Reinforcement_learning
4) 04_SummaryDiagram



5) 04_Figure




## *2. ADDITIONAL DIMENSIONS*

*(The following sections add subjective information from the scientific seed, in order to inspire creatives in the creation of a SciArt work. Some of the sections may not have information if the researcher chose not to specify anything.)*

### SCIENTIFIC MOTIVATION

We are interested in studying machine learning processes from computer simulations of real life possible situations. In particular, we are interested in how the notion of reward received in each episode of interaction with the environment can lead to modifying their behavior towards optimal strategies. This is what in Artificial Intelligence is known as Reinforcement Learning.

### METAPHYSICS

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### ETHICS

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### COLORS

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### AROMAS

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### FLAVORS

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### SOUNDS

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