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« *a one-of-a-kind solution for learning artificial intelligence* »

Free training!
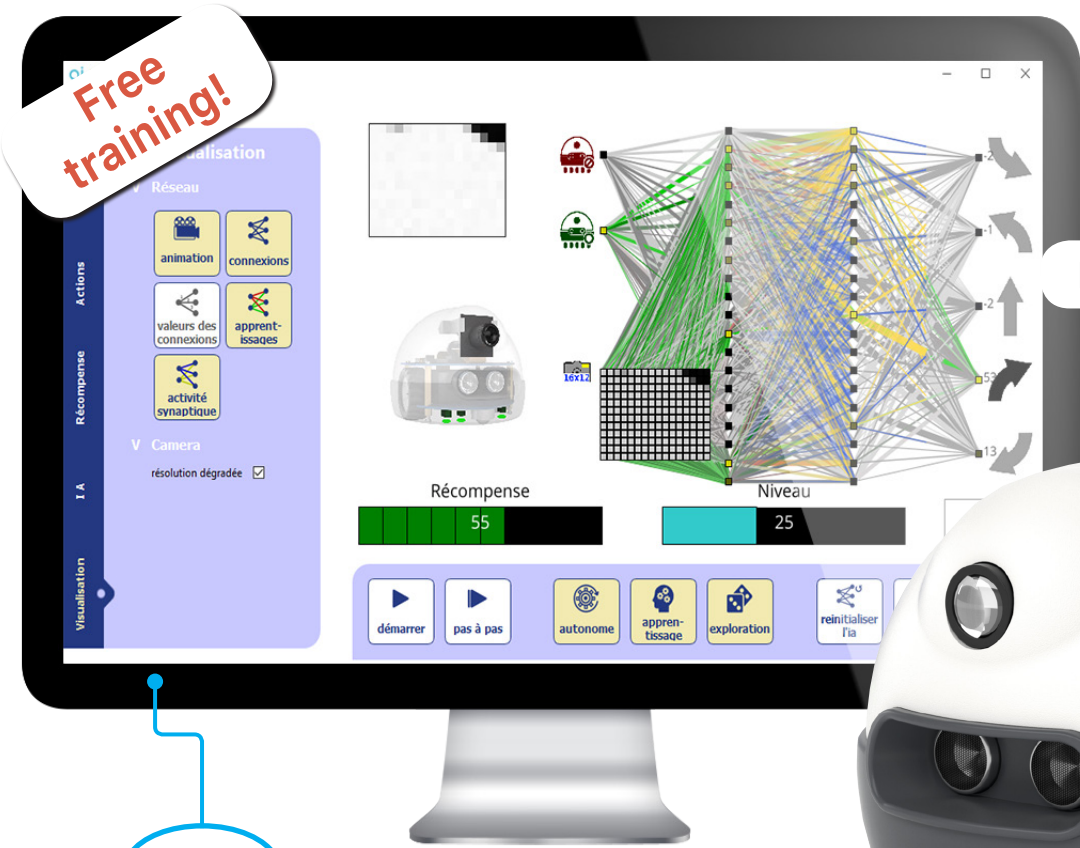
Graphic interface ergonomic

Learning robots
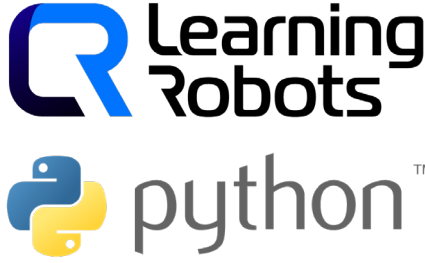
Machine learning

and for more of tests

Licence for the whole school

Python Programming

Supervised or unsupervised learning

Artificial intelligence

Reinforcement learning

K nearest neighbors

AI algorithms

Learning Robots

python™

ALPHAI ROBOTICS PACK

DESCRIPTION

AlphAI, Manipulation of Artificial Intelligence

The AlphAI software platform and the robot of the same name make it possible to manipulate artificial intelligence through the robot's real-time learnings, of which all the algorithmic details (artificial neural network, etc.) are exposed in the graphical interface.

The AlphAI solution comes from a CNRS project to teach Artificial Intelligence in a concrete and visual way.
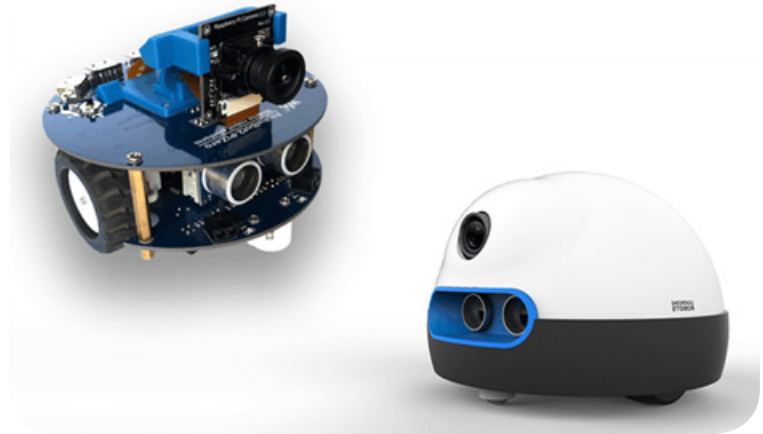
The software allows you to configure different types of robot learning and does not require any prior skills.

In supervised learning, the robot learns to reproduce the movements recorded during a first phase when it was piloted. In reinforcement learning, he conducts his own explorations to learn how to maximize a score, and according to the method of calculation of the latter will learn to move forward by avoiding obstacles, chasing a ball, improving his time on a circuit, etc.

The graphical interface allows you to configure in beginner or expert mode the sensors to be used, the calculation of the reward, the parameters of the AI, in particular of the artificial neural network which learns.

The robot named AlphAI, integrates different sensors (camera, ultrasound, infrared). It is programmed with Python on a Raspberry development base.

The ergonomic interface helps to understand the heart of machine learning: the brain of the robot.

Highly customizable and modular, it is a turnkey tool to understand and deepen the elements that interest you.
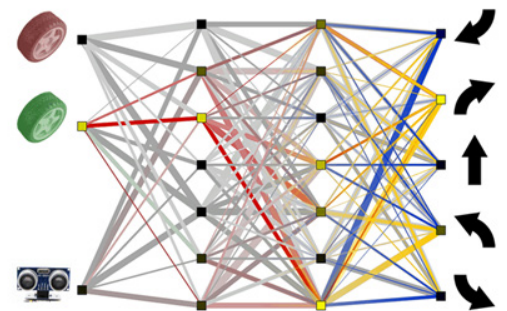
User training

A 1h30 training is offered free of charge by videoconference to new customers !

VIDEO EXAMPLES

Simple learning

objective : to maximize speed.

Complex learning with camera

objective : avoid the walls

Learning intermediate with ultrasound

objective : avoid the walls

Complex learning with camera

objective : shoot the ball

The system makes it possible to address the skills and knowledge of Engineering Science programs, and in particular :

	N°	Sequence designation	Description of the sequence
Overall	1	Introduction to AI	Initialization to AI through the presentation of the two main learning modes. Supervised: Image recognition. Reinforcement: Navigation blocked/moving. Highlighting the differences/similarities between supervised and reinforcement.
	2	Line tracking	Classic control vs. app. supervised or by reinforcement
	3	Optimization of a trajectory	Classic mechanical calculation vs. AI (e.g. lap, or braking)
Python programming	4	AlphAI «turtle»	Beginner programming: move the AlphAI robot forward with simple instructions, use «if» and «for» loops to make decisions based on the state of the sensors and make a simple path.
	5	Remote control interface	Programming of an interface allowing remote control of the robot.
Supervised learning	6	Robot race	Basic principle of supervised learning (training then use) through a fun activity.
	7	Human-robot interaction	The same principles applied to the creation of courses, or choreographies, where the robot reacts to hand movements, and leaving room for the imagination of the students.
	8	KNN algorithm	Visualization and application of the algorithm to the K nearest neighbors program to teach the robot to avoid obstacles.
	9	KNN programming	Programming of the K nearest neighbors algorithm (in the program) in Python and implementation to teach the robot to avoid obstacles.
	10	Intruder detection	Detailed understanding of neural networks through an activity based on robot ultrasound.
	11	Neuron programming	Programming in Python of decision making and learning of a single artificial neuron.
	12	Character recognition	Comparison of different supervised algorithms on one or more same datasets.
Reinforcement learning	13	Discovery Reinforcement Learning	Successions of guided «mini-scenarios», to introduce neural networks and reinforcement learning: - manual network editing - stuck/motion machine learning - obstacle avoidance learning with camera - «soccer» learning
	14	Discovery Reinforcement Learning (Advanced)	More advanced version of the «Discovery Learning by Reinforcement» lab where the user discovers the equations in play and manipulates their parameters.
	15	Q-learning programming	Q-learning programming and implementation for stuck/in-motion machine learning. Manipulation of a 2D array.
	16	Line tracking (reward programming)	Programming of the reward function that the robot receives for carrying out original learning: following a line with the camera, … or something else!

PROJECT SUPPORTS

Modular learning track for the AlphAI robot

The modular learning track for the AlphAI robot has been specially designed in its choice of surfaces and colors to make the AlphAI robot learn reproducibly in arenas of variable size, from the individual 80x80 cm track that can fit on a table to large arenas for the organization of famous robot races!

The AlphAI learning track has been optimized to perform effective demonstrations with the AlphAI robot.

Indeed it simplifies the environment of the robot thanks to a strong color contrast, allowing rapid learning. It preserves the equipment: the carpet on the ground protects against dust while the flexibility of the wood absorbs shocks and allows the robot to increase its speed. In particular, the robot can be trained to roll on the printed track.

The individual track, 80cm square, is placed on a large table and can accommodate one or two robots. By combining several tracks, we form large arenas on the ground that can accommodate many robots.

The learning tracks consist of:
- *80cm long planks*
- *a printed tarpaulin intended to be placed on the ground or on a table*
- *"feet" type supports*

Charger and two games batteries included

8 colors available

The **ALPHAI ROBOTIC PACK** teaching system is supplied in the form of :
- **a license for the whole school** on the AlphAI software (installation on up to 30 workstations simultaneously);
- **an AlphAI Robot :** «AlphaBot2» robotic base, Raspberry Pi zero, wide-angle Pi camera, ultrasonic sensor, infra-red line tracking sensors, protective shell (8 colors available), set of 14500 batteries and battery charger

TO **ORDER**

The system to be taught is offered in three references :

- Reference **SIDD4500** - *AlphAI robotics package* includes an establishment license and a robot
- Reference **SIDD4501** - *1 robots AlphAI supplémentaire*
- Reference **SIDD4509** - *«Team» package* includes an establishment license and 6 robots
- Reference **SIDD4510** includes the basic **modular learning** track
- Reference **SIDD4512** includes the modular **«big race» track**
- Reference **SIDD4513** for **carrying bag**