

# Taxi Driver

---

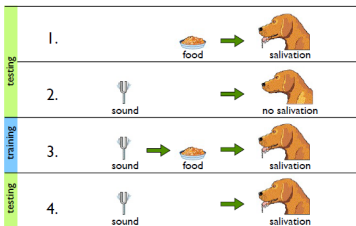
Kick-off

T10 - Artificial Intelligence

---

T-AIA-902

# Reinforcement Learning



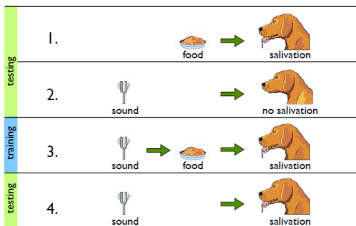
Implement a learning agent

Run an agent

with a specific strategy who will learn to play a game.



# Reinforcement Learning



Implement a learning agent

Run an agent

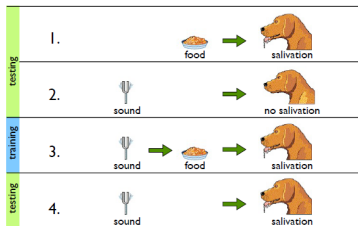
with a specific strategy who will learn to play a game.

**Modelisation**

Define state, action and reward ...



# Reinforcement Learning



**Implement a learning agent**

Run an agent

with a specific strategy who will learn to play a game.

**Modelisation**

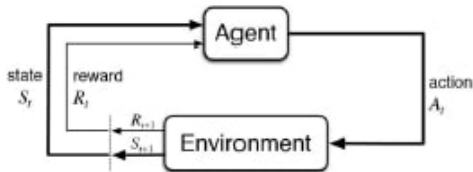
Define state, action and reward ...

Many applications: video games, finance

















# Learning frameworks

model-based vs model-free
























# RL algorithm

	stimulus	action	stimulus	action	reward
Trial 1:					
Trial 2:					
Trial 3:				zzz...	
Trial 4:	...				

Q-learning

















# RL algorithm

	stimulus	action	stimulus	action	reward
Trial 1:	←  →	 →	 		   
Trial 2:	←  →	 →	 		
Trial 3:	←  →	 ←		zzz...	  
Trial 4:	...				

Q-learning  
SARSA



# RL algorithm






















	stimulus	action	stimulus	action	reward
Trial 1:					
Trial 2:					
Trial 3:				zzz...	
Trial 4:	...				

Q-learning  
SARSA  
Deep Q-learning





# RL algorithm

	stimulus	action	stimulus	action	reward
Trial 1:	←  →	 →	 		   
Trial 2:	←  →	 →	 		
Trial 3:	←  →	 ←		zzz...	  
Trial 4:	...				

Q-learning

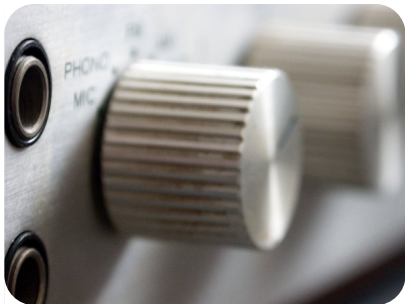
SARSA

Deep Q-learning

Monte-Carlo methods



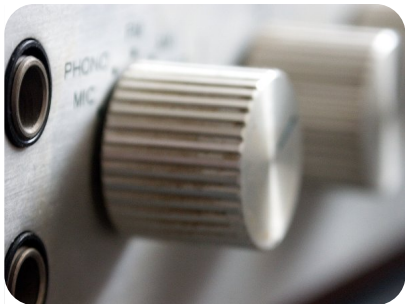
# Optimizing parameters



Tuning parameters to maximize your metrics



# Optimizing parameters

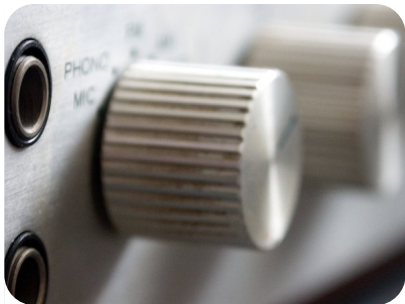


Tuning parameters to maximize your metrics

**Algorithms parameters:** Learning rate, discount factor



# Optimizing parameters



Tuning parameters to maximize your metrics

**Algorithms parameters:** Learning rate, discount factor

**Game parameters:** rewards, state, actions



# Taxi Driver



- Train an agent to solve a game



## Taxi Driver



- Train an agent to solve a game
- Use **Reinforcement Learning** to solve games *quicker* and with *better* results than other non probabilistic methods



## Taxi Driver



- Train an agent to solve a game
- Use **Reinforcement Learning** to solve games *quicker* and with *better* results than other non probabilistic methods
- Evaluate your result and do **parameters optimization** to obtain better performances



# Any questions

---

?

