

ANR ExTra-Learn

Extraction and Transfer of Knowledge in Reinforcement Learning

A. LAZARIC

ANR Réunion de lancement projets, Paris

SequeL

INRIA Lille – Nord Europe

Consortium

ANR "Jeunes Chercheurs Jeunes Chercheuses" Programme



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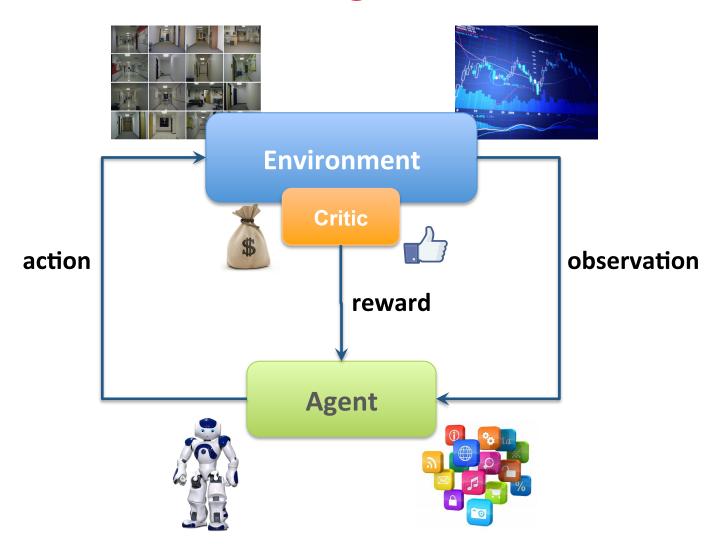
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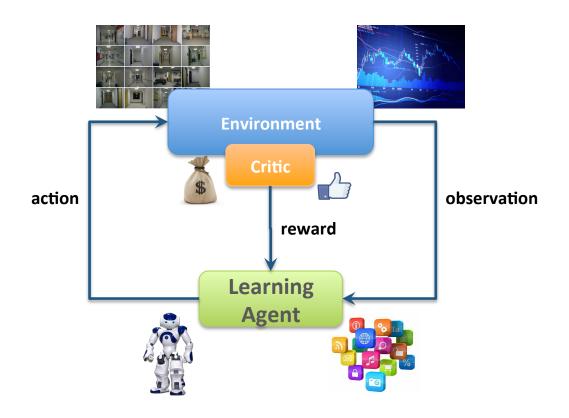
Reinforcement Learning





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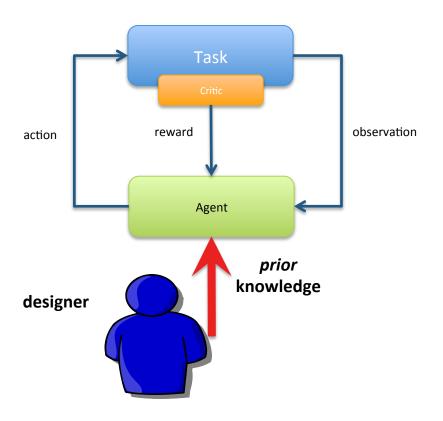


Learning of a behavior strategy (a policy) which maximizes the long term sum of rewards (delayed reward) by a direct interaction (trial-and-error) with an unknown and uncertain environment.



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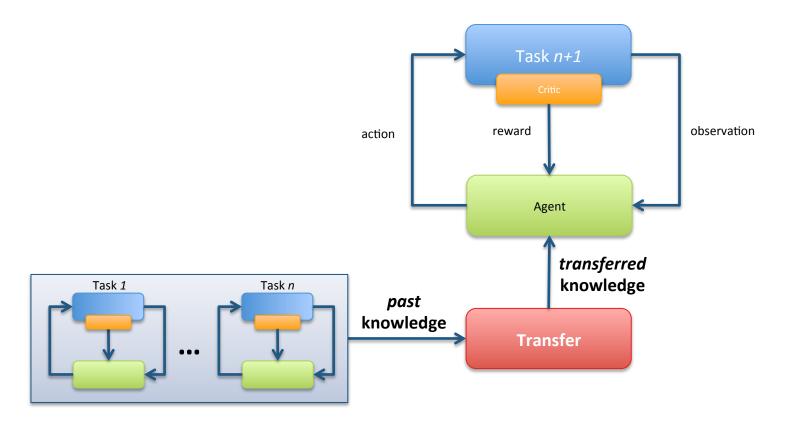
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Transfer in Reinforcement Learning



Transfer of knowledge across tasks to improve the performance of the learning process



Objectives

ExTra-Learn (2014-2017)

Objective 1

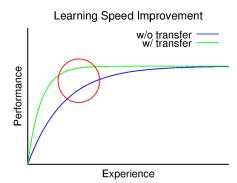
Reduce sample complexity

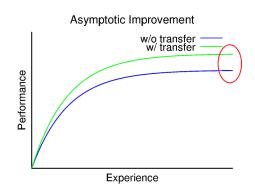
Objective 2

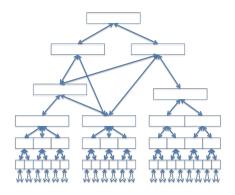
Improve accuracy

Objective 3

Solve problems with complex structure

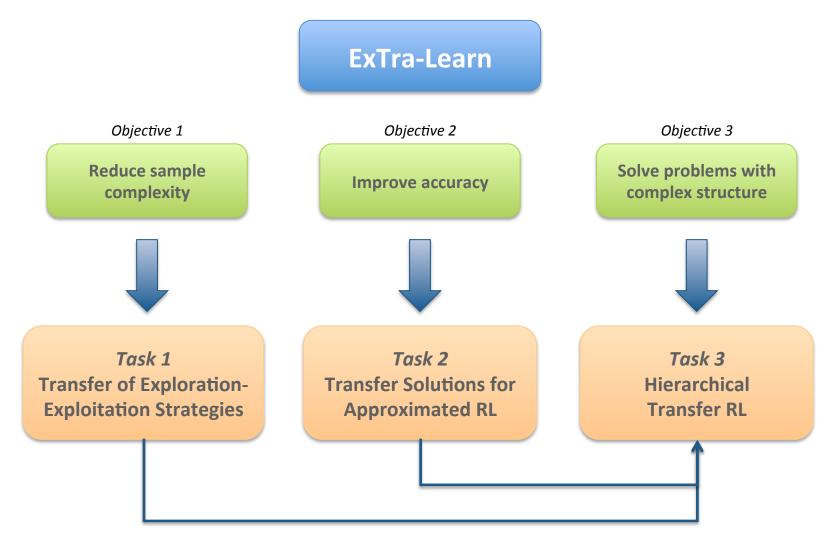








Tasks





Expected Results

Objective 1

Reduce sample complexity

Task 1
Transfer of ExplorationExploitation Strategies



Algorithms with provable smaller regret

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Objective 2

Improve accuracy

Task 2
Transfer Solutions for Approximated RL



Algorithms with provable smaller prediction error

Objective 3

Solve problems with complex structure

Task 3
Hierarchical
Transfer RL



Models and algorithms for automatic hierarchical decomposition



Expected Impact

Objective 1

Reduce sample complexity

Task 1
Transfer of ExplorationExploitation Strategies

Algorithms with provable smaller regret



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Objective 2

Improve accuracy

Task 2
Transfer Solutions for Approximated RL

Algorithms with provable smaller prediction error



Objective 3

Solve problems with complex structure

Task 3
Hierarchical
Transfer RL

Models and algorithms for automatic hierarchical decomposition



Novel learning algorithms with potential application to recommendation systems, games, education online trading, autonomous robotics, online advertising, energy management...



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ExTra-Learn

https://project.inria.fr/ExTra-Learn/
(under construction)



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