

# Reinforcement Learning in Video Games

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**Resum**– Resum del projecte, màxim 10 línies. ....  
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**Paraules clau**– Paraules clau del treball, màxim 2 línies . ....  
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**Abstract**– Versió en anglès del resum . ....  
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**Keywords**– Versió en anglès de les paraules clau. ....  
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## 1 INTRODUCTION

### 1.1 Preliminary Information

**R**EINFORCEMENT learning, or RL, is a type of machine learning that revolves around how an intelligent agent should behave in an environment in order to achieve an specific goal. Unlike other machine learning paradigms, like supervised learning or unsupervised learning,

RL’s goal is to generate an intelligent agent that learns on its own while interacting with a dynamic environment. Through trial and error, the agent must chose which of the possible actions yield the most reward(both immediate and long-term), until achieving the necessary ”knowledge”to go through the environment without any problems and solving it.

### 1.2 Objectives and expected results

The goal of this project is to dive into the world of Reinforcement Learning while using the Gym library effectively. Starting with fundamental concepts, the project aims to progressively go through various objectives, ending in the creation of agents capable of mastering complex gaming envi-

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ronments. The following objectives mark the trajectory of this project:

- Develop a foundational understanding of Reinforcement Learning and proper use of the Gym library.
- Implement basic algorithms such as Q-learning to create an agent capable of solving simple environments.
- Study and comprehend more advanced algorithms like policy-based methods and Deep Q Networks (DQN).
- Apply the acquired knowledge to solve more complex and sophisticated environments, enhancing the agents' capabilities.
- Generate a series of agents, each more complex, capable of achieving desired results in various games, while documenting findings and utilizing visualization tools to ensure a thorough exploration of Reinforcement Learning in video games.

### 1.3 Metodology

I have chosen to work using the Agile methodology for my project, working in iterative sprints, each lasting two weeks, which will be shown in the Gantt Diagram. Using this methodology allows continual reassessment and adjustment if necessary since reinforcement learning is a dynamic field and it will need some adaptability. The tasks shown in the Gantt Diagram will be accomplished in sprints of up to two weeks, depending on the workload. Through the regular review sessions with my tutor, we will check the gradual progression of the project, and provide checkpoints for evaluation, adaptation, and resolution of new obstacles as they appear.

### 1.4 Planning

The project planning is visualized through a Gantt diagram. This will be a dynamic tool to help the development of the project. At first it shows the main objectives and milestones necessary and, over time, using the Agile methodology, the Gantt diagram will show more, depending on the obstacles faced and the necessary changes that appear in the process. [Fig. 1]

## 2 CONCLUSIONS

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## SPECIAL THANKS

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## REFERÈNCIES

## APPENDIX

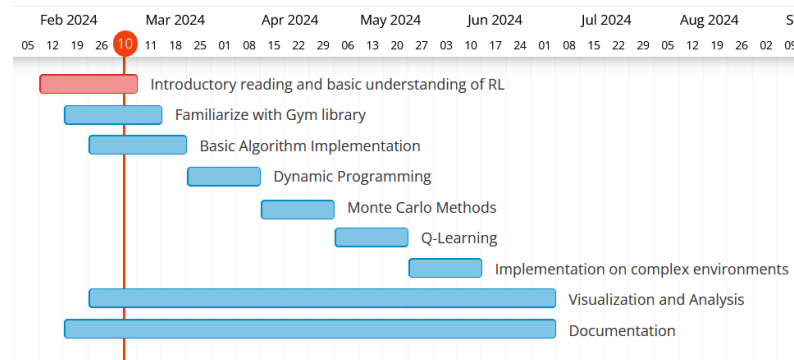


Fig. 1: Gantt Diagram