

# Performance Evaluation project: Optimizing cars' trajectory with AI

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## Part I

## Introduction

The goal of this project is split into five parts:

- Creating racing car environment to simulate simple 2D racing car model
- Implementing Deep Q-learning and Genetic algorithms to optimize the behaviour of a car on tracks so that the car can have the best trajectories possible.
- Evaluate the performances of Deep Q-learning and Genetic and compare them.
- Evaluate the performances of Deep Q-learning depending of the hyperparameters.
- As a bonus: evaluate the performance of our best car's behaviour.

## Part II

# Deep Q-learning

- 1 Markovian decision process
- 2 What is Q value?
- 3 What is Q learning

## Part III

# Genetic algorithms

- 4 What are genetic algorithms
- 5 Markov Chain modelisation
- 6 NEAT

## Part IV

# Car Racing environment

- 7 Cars' physics
- 8 Technical aspects of the environment
- 9 Rewards

## Part V

# Performance Evaluation

- 10 Algorithms
- 11 Best car