**Title:** Machine learning strategies applied to videogames

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**Summary:**

Machine learning is one of the most interesting areas of Artificial Intelligence due to its capacity to induce knowledge to a computer through a computational process. In this tesis we want to investigate the application of said techniques in a typically human-controlled environment to compare the learning process that our agents can follow with the one that govern the decisions of a human person.

Our goal will consist in implementing different Artificial Intelligence techniques in either a 2D environment (Space Invaders, Tetris or Cuphead), or 3D (DOOM, Minecraft), to test if it’s possible for our agent to get a performance similar, or even superior than an experienced human player. To achieve this goal, we will need to take into account the particularities that each case of study can present, and using the appropiate learning strategies for each case. For example, in games such as DOOM or Cuphead, the agent will need to follow different strategies depending in the stage of the level it is in, so it would be appropiate working with a curriculum learning strategy, in which the agent will follow certain general strategies, but at the same time it will take into account the particularities it is facing at each given time.

The challenges we face with this project consist in creating an adequate learning environment that should analyse through convolutional neural networks the graphic output of a videogame and learns the appropriate actions to follow in order to obtain the highest reward, as well as giving an adequate training time to our agents which, for more complex games, could increase exponentially. This problem could be solved using a parallel executions for our learning environments, which would be refined by an evolutive process that selects those agents closer to a correct solution.