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Applications of Reinforcement Learning

Reinforcement Learning is a part of machine learning where it learns from interaction and optimise decision making. Application of Reinforcement learning what I am going to focus on this exploration is its uses in Game Testing and Autonomous Car.

If you try to Download FIFA 23, Football game, it requires 100 GB space on your Hard disk. Thousands of people work behind it to develop and they made the characters abilities abundant. The scenarios are same if you look into other games like Call of Duty modern warfare, Borderlands etc., human testing will be no longer possible in some of them. Game testing requires prompt response and adaptive skills depend upon the action or the hurdle in the game. This type of testing cannot be done or less likely done by Supervised and Unsupervised learning, where these requires dataset, or the input which is predetermined, or a group and here the goal is not to cluster data or label data but to advance by adapting the skills. Using RL, a self-learning mechanism is introduced to the game testing framework and it is capable of exploring reinforced reward signal which is user defined reinforced reward signa. Learner or Agent in Reinforcement Learning system interact with environment and take suitable action (called as policy as per RL system) and the outcome will be observed and needed modification is applied and rerun the process until it succeeds. After some games the Agent will advance in the game and may accomplish the task. Like the case of AlphaGo, a computer programming using RL trained by playing against itself, in a board game Go and the latest version of it took just 40 days to beat the champion of the Game

The other most important use of RL is in Self driving Cars. Self-driving Cars or Autonomous driving car will rule our road in coming decades. As per studies it is said that Accidents are occurring because of Human interventions. If it is completely automated chances to make errors are significantly less. Supervised Learning and Unsupervised learning is also used in Autonomous car, for interpreting objects detecting signs checking whether etc. But in real world these are not enough , cars has to make decision like trajectory optimization, motion planning, dynamic pathing, controller optimization, and scenario-based learning policies for highways. etc. These decision can only be taken with the help of Reinforcement Learning. Recently Wayve.ai has successfully applied reinforcement learning to training a car on how to drive in a day. Amazon Web Server is offering developers a chance to simulate with a cloud based 3D simulator race powered by reinforcement Learning (https://aws.amazon.com/fr/deepracer/). As it can learn the actions without the help of a supervisor in an unseen environment that result in eventual success, reinforcement learning is a very powerful algorithm.

References

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