DEEP REINFORCEMENT LEARNING FOR GENERAL GAME PLAYING

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PROBLEM

- Deep reinforcement learning is a category where machines intelligently learn from actions
- An untrained agent vs a trained agent
- Most Deep RL agents are designed to play a specific type of game

PROBLEM

• Yet when the agent is used to play a different game, the agent performs poorly

• A trained agent on two different games
APPROACH

• To train three agents to play different scenarios based on different basic actions that can be done on VizDoom

  • VizdoomDefendCenter-v0
  • VizdoomHealthGathering-v0
  • VizdoomMyWayHome-v0

• Them to train an agent based on the previous scenarios
APPROACH

• The current approach would be to create three different agents to train

• It is more effective to create agents in a more general approach, so that human interaction is less needed during training

• The human design for each agent would depend in certain characteristic
**APPROACH**

- **Q-Learning**: It’s an algorithm that is trained to learn a policy by telling an agent what action to take under what circumstances.

- **Deep Q-Learning**: It’s an algorithm that is trained to learn a policy by telling an agent what action to take under several circumstances.
EVALUATION

• Have the three different agents play each scenario and another general agent to play them all.

• The agents use a reward system that goes from 1 to 80.

• Trials of 15 with episodes of 30 were given for each agent were use.

• The rewards are measure depending of the scenario.
EVALUATION

Reward:

- **VizdoomDefendCenter-v0**: Based on killing a monster
- **VizdoomHealthGathering-v0**: Based on how long it will keep itself alive and time
- **VizdoomMyWayHome-v0**: Based on time
EVALUATION

• Scenarios:
  • VizdoomDefendCenter-v0: Killing the monsters is good and when monsters kill you is bad
  • VizdoomHealthGathering-v0: How to survive without knowing what makes him survive
  • VizdoomMyWayHome-v0: Navigate in a labyrinth-like surrounding
EVALUATION

• Scenarios:
  • VizdoomDefendCenter-v0: Deep Q-Learning
  • VizdoomHealthGathering-v0: Q-Learning
  • VizdoomMyWayHome-v0: Deep Q-Learning
RESULT

• There is a drastic gap in performance between the specialized agents and the general one

• If the agents were trained for longer, the difference may be more drastic
RESULT

• The gap on VizdoomMyWayHome is possibly due to its random nature

• The gap on VizdoomHealthGathering is possibly due to the nature of the scenario

• The gap on VizdoomDefendCenter is the most standard case between the prior ones
CONCLUSION

• Help to improve the generality of the agents

• To design more general agents that can perform a variety of tasks well,

• Train agents on game from different genres to see how the agents will react to different environment and objects
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THANK YOU

ANY QUESTIONS?