

## Summary of the Reinforcement Learning in Snake Game

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The paper discusses the use of reinforcement learning in games, where they ran an experiment on a variation of the snake game, adding the additional mechanic of avoiding poisonous candies. The SARSA algorithm is used for the snake's movement, which was able to learn at an efficient pace with the use of Deep Q-learning. They then went into the history of techniques and showed that Neuro Evolution was best at creating the Neural Network parameter, stating that other methods were not performative enough to be used in games.

The paper's strength is the ability to show that reinforcement learning could be used in games, and they have the code to prove it works. The explanation of the implementation was where this paper excelled, so even if the reader was confused while reading, they would at least be able to understand what the algorithm is trying to accomplish. Adding the source code also allows readers a chance to tinker with it themselves, which can speed up the learning curve rather than just looking at theory. They mentioned other algorithms that were not performative enough and provided examples of what previous games were using. The mathematical equations were presented, which I think is critical and often not emphasized enough in computer graphics papers.

However, the paper struggles with actually providing numerical data showcasing why those other techniques were not efficient and did not get into many technically specific details. Other weaknesses mainly stem from poor articulation and lack of background information. Many of the same talking points are repeated back to back with the redundancy of giving the same context as the sentence before it, making it unengaging for the reader. Not every paper needs to cater to readers without thorough knowledge of the field, but the best papers give enough background for anyone to follow along. I do not think readers without a background in machine learning would be able to understand this paper. As an example, the authors start talking about the SARSA algorithm, but the reader does not even see what the acronym stands for until the very last page. Q-Learning and other techniques names are mentioned, but not well defined. Those with no background in the field could easily get lost. The final results say that AI on average scores 50, with the recorded snake game score being 150, which is very vague and unclear. They were using it as one of the main stats to prove that reinforcement learning works, but it falls flat without them giving more explanation of what it means.

Overall, while the paper was not well-written and lacked some numerical analysis, it still showed results that could be reproduced and proved that reinforcement learning can be used in games. The main subject is good, and the paper could easily be improved with more data and editing. Having the implementation laid out allows for others to continue with the advancement and create more improvements, which, in my opinion, still makes the paper a worthwhile read.