

The application of Machine Learning and Neural Networks in Game Development

Abstract

Machine Learning has become a buzz word for the public, often actually referring to the wider field of artificial intelligence. This recent popularization has taken place as a result of the increased scientific attention that the topic has received in the last few decades. As prominent companies around the globe such as Facebook, Google and Amazon invest into their machine learning solutions, it becomes more obvious that the technology is powerful and widely applicable. This paper will serve to develop a coherent understanding of the application of neural networks to games and game development. We will explore design patterns that take advantage of machine learning and related techniques, and propose methods of applying these techniques to game design and game development.

What is your research problem statement?

The purpose of this research is to find suitable areas of application for machine learning and neural networks in game development.

Why your research is important?

In the interest of finding powerful tools/methods for game developers to use in their game development. Ideally, the resulting theoretical applications can be tested, and if they are efficient and effective, they will be tools for future game development.

What is the existing research literature in the area?

The existing literature is heavily influenced by one A. L. Samuel, who wrote a famous paper in 1967 documenting his findings of a machine learning algorithm learning to play checkers.

Most current literature is tasked with discussing other games that it can be applied to, and various optimizations or methodologies to do with machine learning.

What is your proposed research methodology?

We will be collating and summarizing the results of our research.

What resources will you need to carry out the research?

Access to the articles that we will be collating, referencing, and drawing from,
Computer resources available at Media Design School,
The electronic/physical library resources available at Media Design School.

Will your research need approval from an ethics committee?

As the subject matter of our research has no linked moral/ethical considerations, and we do not intend on conducting any surveys or studies of our own, we will not need approval from an ethics committee.

References

- Samuel, A. L. (1959). Some Studies in Machine Learning Using the Game of Checkers. *IBM Journal of Research and Development*, 3(3), 210-229. doi: 10.1147/rd.33.0210
- Bowling, M., Fürnkranz, J., Graepel, T., Musick, R. (2006). Machine Learning and games. *Mach Learn*, 63, 211-215. doi: 10.1007/s10994-006-8919-x
- Goldberg, D. E., Holland, J. H. (1988). Genetic Algorithms and Machine Learning. *Machine Learning* 3, 95–99. doi: 10.1023/A:1022602019183
- Michie, D. (1968). “Memo” Functions and Machine Learning. *Nature* 218, 19–22. doi: 10.1038/218019a0