

Train AI to Play Game

PROJECT SYNOPSIS

Machine Intelligence

BACHELOR OF TECHNOLOGY- V Sem CSE
Department of Computer Science & Engineering

SUBMITTED BY

Batch No:- 3

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Abstract and Scope:

Games and Machine Intelligence are two very exciting and deeply sought-after topics worldwide. In this project we aim to apply the concept of Machine Intelligence in testing and benchmarking game. In case of games, each state in the game demands a different action to achieve the desired result. We use Reinforcement Learning with an approach as in the Markov Decision Process. This involves the possible states in the game, goal state, reward function and the different models/transitions.

Using Deep learning, the algorithm optimizes the output (action) to a specific input (state) trying to maximize the expected reward, which makes predictions better over time. This way the Artificial Intelligence gets better at playing the game as it learns more and more about it.

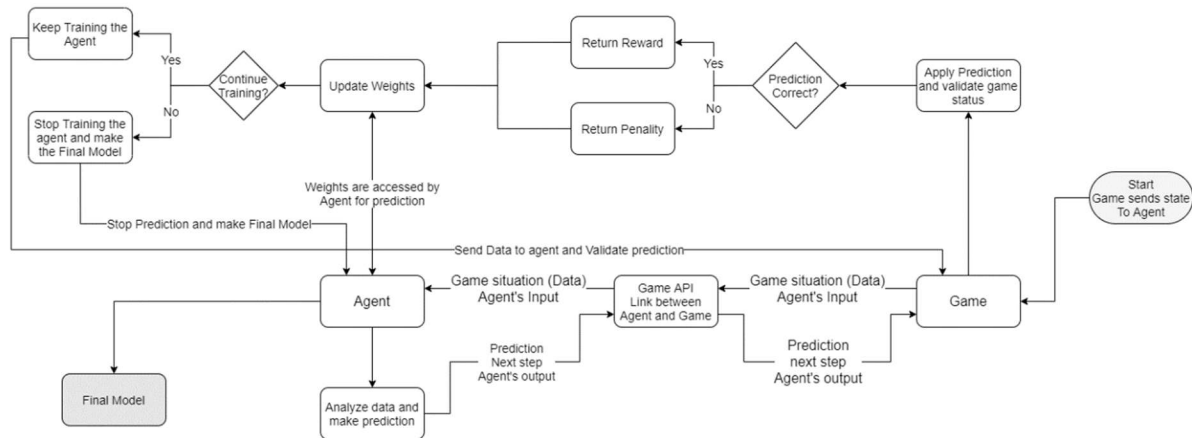
Feasibility Study:

Games provide a safe place to train and evolve. Artificial intelligence helps us in recreating and solving problems in the “way of the man”. Games provide a safe means for AI to overcome such problems. Using AI to play games captures interest and imagination of users, setting benchmarks and establishing different perspectives towards the game. This also helps researchers estimate the improvement of AI over time, considering the AI uses reinforcement learning wherein time plays a key role.

Design Approach/ Methodology/ Planning of work (should not exceed 1 page)

Design approach for the project is as follows:

- Establish game states and goal state(s)
- Create agent and reward function
- Run the agent through the game states over a certain period and update weights through the process
- Obtain goal state and compare with previous iterations to determine improvement in the model



References:

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- II. C. Politowski, F. Petrillo and Y. -G. Guéhéneuc, "A Survey of Video Game Testing," 2021 IEEE/ACM International Conference on Automation of Software Test (AST), 2021, pp. 90-99, doi: 10.1109/AST52587.2021.00018.
- III. C. Gordillo, J. Bergdahl, K. Tollmar and L. Gisslén, "Improving Playtesting Coverage via Curiosity Driven Reinforcement Learning Agents," 2021 IEEE Conference on Games (CoG), 2021, pp. 1-8, doi: 10.1109/CoG52621.2021.9619048.
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- VI. V. H. S. Durelli et al., "Machine Learning Applied to Software Testing: A Systematic Mapping Study," in *IEEE Transactions on Reliability*, vol. 68, no. 3, pp. 1189-1212, Sept. 2019, doi: 10.1109/TR.2019.2892517.