COPTER BOT BASED ON DEEP Q-LEARNING

Harivignesh Rajaram

Pranav Kumar Sivakumar

Saikrishna Jaliparthy

PROJECT DESCRIPTION AND MOTIVATION

Project Description:

- Our objective is to develop a Deep Neural network model to automate the gameplay in Copter game. The Copter is a classic side-scrolling game where the agent must successfully navigate through a cavern.

Motivation:

- Copter is an interesting classic game to work on with RL since it doesn't have a final goal state to achieve rather just the high score from staying alive for a longer time.

- It also provides us with the opportunity to upskill our Machine Learning knowledge and experience in the area of Reinforcement Learning(RL)

PROPOSED WORK

- A reinforcement learning algorithm called Q-Learning is utilized as it has been proven that for any finite Markov Decision Process, at a given state Q-learning can find an optimal policy such that the reward is maximum by taking into account the successive states.
- Our goal is to progress from a simple Multi-layered perceptron (MLP) to experimenting with a convolutional neural network with a couple of fully connected layers and more complex additions.
- We also plan to implement Experience Replay which will allow our network to train itself using stored memories from it's experience.

DATA DESCRIPTION AND EVALUATION

Data Description:

- As we will be implementing reinforcement learning technique to train a bot, we will not be using any external datasets.

- Instead, training data were collected by interacting with the OpenAI Gym Interface / PyGame Learning environment.

Evaluation:

- Analyze how the bot learns to play when it approaches to caverns

- Analyze how the bot plays against humans

- Analyze how one bot over-performs the other bot eg., genetic algorithm