Machine learning generated AI for analyzing and playing Minecraft tag

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Level of Interest: 10/10

Description:

We would like to build a model that can, in real time, take in data regarding a confined minecraft tag game and output controls that will lead the model's in-game character to play the game with real strategy and intent. Through playing the game ourselves we have seen that there are specific outputs/controls that we do in response to various inputs, whether that be the position of the other players or the layout of the map around us. We believe that a machine learning model should be able to learn from our responses to those inputs and begin making predictions as to which outputs should be taken to win the game/tag the other player/avoid being tagged.

Data:

The train/validation/test datasets will consist of 58 inputs and 10 outputs. The first six inputs will be the x, y, z positions of the AI Agent and the Player. One input will be if you are "it" or not. To tell where the players are looking, we will need four inputs for the yaw and pitch of the AI and the Player. To give the AI a sense of urgency, there will be 5 distance inputs: distance between the AI and the Player, and four distances between the AI and each wall of the world border. We will also need six more inputs for the velocity of each player. Finally, 36 inputs are necessary to let the AI know if there are blocks within a 3x3x4 space. The outputs/target are the commands the AI makes in response to the inputs.

Input:

AI Position	**Player Position**	**Is It**	**AI Yaw and Pitch**	**Player Yaw and Pitch**	**Distance from Player**	**AI Velocity**	**Player Velocity**	**Blocks Nearby (3x3x4)**	**Distance From World Border Edges**
[10.32, 52, -12.0]	[15.31, 52, -19.1]	0	[90º, 45º]	[90º, 45º]	8.602	[1.2, 0.4, -1.2]	[1.2, 0.4, -1.2]	[0,0,1,0,... 0,1] (36 inputs)	[57, 68, 20, 45]
Continuous	Cont.	Nom.	Cont.	Cont.	Cont.	Cont.	Cont.	Nominal	Continuous

Output/target:

WASD	***Space Bar***	***Yaw***	***Pitch***	***Right Click***	***Left Click***	***Shift***
[1, 1, 0, 0]	0	-23.4	-0.01	1	0	0
Nominal	Nominal	Cont.	Cont.	Nominal	Nominal	Nominal

Acquiring the Data:

We will need to write a simple Minecraft Java Plugin for capturing the game state. Minecraft works by updating 20 times in one second, so we will generate one instance of data every 1/20th of a second. With the plugin, we will be able to play hours of minecraft tag, gathering gamestate and outputs. By the end of it all, we will have a very large dataset to train our model on.