



A NEAT ALGORITHM

WADE MARTIN

7TH GRADE

LAFAYETTE TECUMSEH JR. HIGH
ROBOTICS & INTELLIGENT MACHINES

PROBLEM QUESTION AMR1

When an AI using the NEAT algorithm is put into a simple platformer game where the goal is to get as high as possible and given a varying vision input, which vision method will perform the best?

Slide 2

AMR1 Anna M. Rose, 3/18/2026

HYPOTHESIS

If an AI created by the NEAT algorithm is put into a game where the goal is to get as high as possible and given basic inputs about its position and velocity, it will achieve the highest height of three vision techniques given as inputs using the grid vision technique, because the grid vision technique gives the AI the ability to 'see' a wide range of platforms around itself.

VARIABLES

- Independent Variable: The type of 'vision' input the NEAT AI agent gets.
- Dependent Variable: The height the AI achieves (in units).
- Control: An agent not given a 'vision' input.
- Controlled Variables: program, AI algorithm, game engine (Unity), # of generations, basic inputs (xVelocity, yVelocity, isGrounded, xPosition), starting neural network

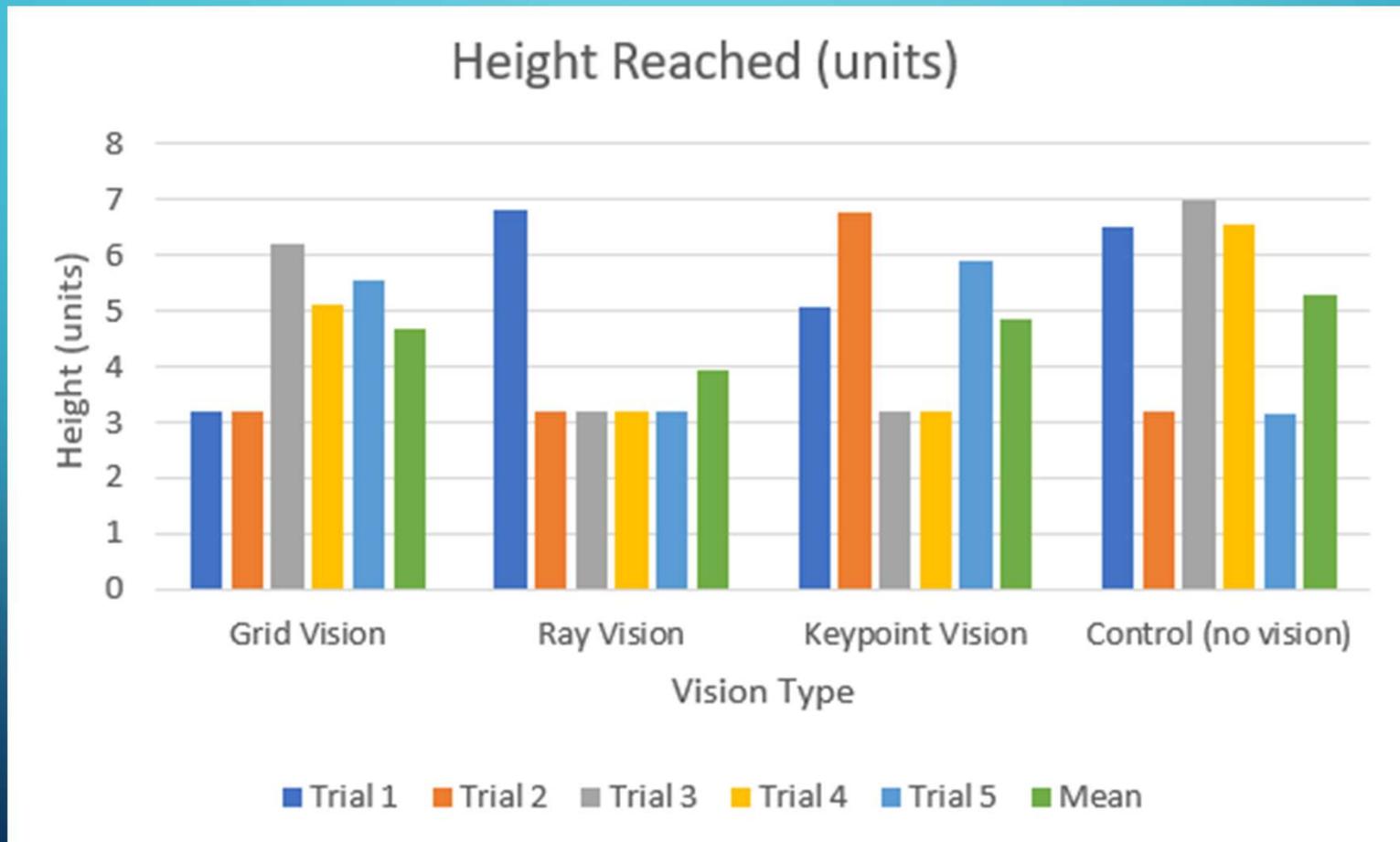
PROCEDURE

1. Gather materials.
2. Turn on the computer and log in.
3. Open Unity Hub.
4. Open my program.
5. Set the vision method to grid and the generations to 100.
6. Run the simulation, then check the console.
7. Record the number it says for highest height reached and switch to the next trial/method.
8. Repeat until the data table is full.

DATA TABLE

	Grid Vision	Ray Vision	Keypoint Vision	Control
Trial 1	3.20	6.79	5.06	6.48
Trial 2	3.18	3.20	6.76	3.20
Trial 3	6.18	3.20	3.20	6.96
Trial 4	5.12	3.17	3.20	6.54
Trial 5	5.55	3.18	5.88	3.14
Mean	4.646	3.908	4.82	5.264

Graph



DISCUSSION

The control (no vision) achieved the highest average height after 100 generations, with an average height of 5.264 units. In order from second to last, keypoint vision after 100 generations (4.82 units), grid vision after 100 generations (4.646 units), and ray vision after 100 generations (3.908 units). Many of the scores from all vision variants were around 3.2 units, including 2 scores from grid vision, 4 from ray vision, 2 from keypoint vision, and 2 from the control. The rest of the scores were around 5-7 units. The highest score was 6.96 units, and the lowest was 3.14 units.

CONCLUSION

If an AI using the NEAT algorithm is put into a platformer game where the goal is to achieve the highest height possible, the AI using keypoint vision will perform the best. My data did not support my hypothesis because my control (no vision) did the best. The results turned out like this because I may have implemented NEAT incorrectly, or I did not run the simulation for enough generations (I ran it for 100). I was a little rushed, so I might have gotten some things wrong in my implementation. There were also just the normal errors in code that I had to bugfix, but those did not affect the results. I learned in this experiment that NEAT is a delicate program, and I (or anyone) need to implement it completely correctly if I want to get reliable results.

IMPROVEMENTS

I could have done this experiment better by adding more testing features and generally implemented the AI better. I also should have run the simulation for longer than I did (100 generations), probably 1,000 or 10,000.