The Effectiveness of Zombies

New Mexico
Supercomputing Challenge
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The Effectiveness of Zombies

The purpose of our project is to determine the extent of contamination certain areas with high or low levels of population density would receive. Our example areas for population density were from New Mexico towns and cities, to examine how the state would handle a zombie scenario, which is very similar to a disease spread and control study. We looked at population density in surrounding areas, and if towns were close to each other (10miles in distance) we included their population sizes together. After researching and collecting data on towns and disease spreading variables, such as physical contact, incubation period, initial population size, and the initial percentage of that population that is infected.

The project and study is intended to determine probabilities of spreading through individual variables and then, allowing them to interact and gathering data on the results we receive. We used the Net Logo program, a java script model simulator to assist us with watching variables interact and collect data after a set amount of “cycles” or “turns” that the model does.

Introduction

Purpose:

The purpose of our project is to determine the extent of contamination certain areas with high or low levels of population density would receive by examining our set variables and using the information we gathered through research to create a model to allow variable interaction.

Question:

Based on variables that we determine from research, how realistic would a zombie apocalyptic situation be? How rapidly would it spread? How effective could we be at containing the spread through controlling population sizes?

Hypothesis:

Our main hypothesis is that due to large populations in small areas, the spread of zombie infection will be incredibly rapid. There will be a direct connection based on a very small range in percentage of people able to defend the normal population from zombies, and how rapidly it spreads.

Method:

1. Undertake some preliminary research on the variables you choose to study, we decided to research population size and how viruses interact through physical contact in human beings.
2. Investigate the type of model you would like to create that would accurately assist with displaying your variables and allow them to interact with each other and be

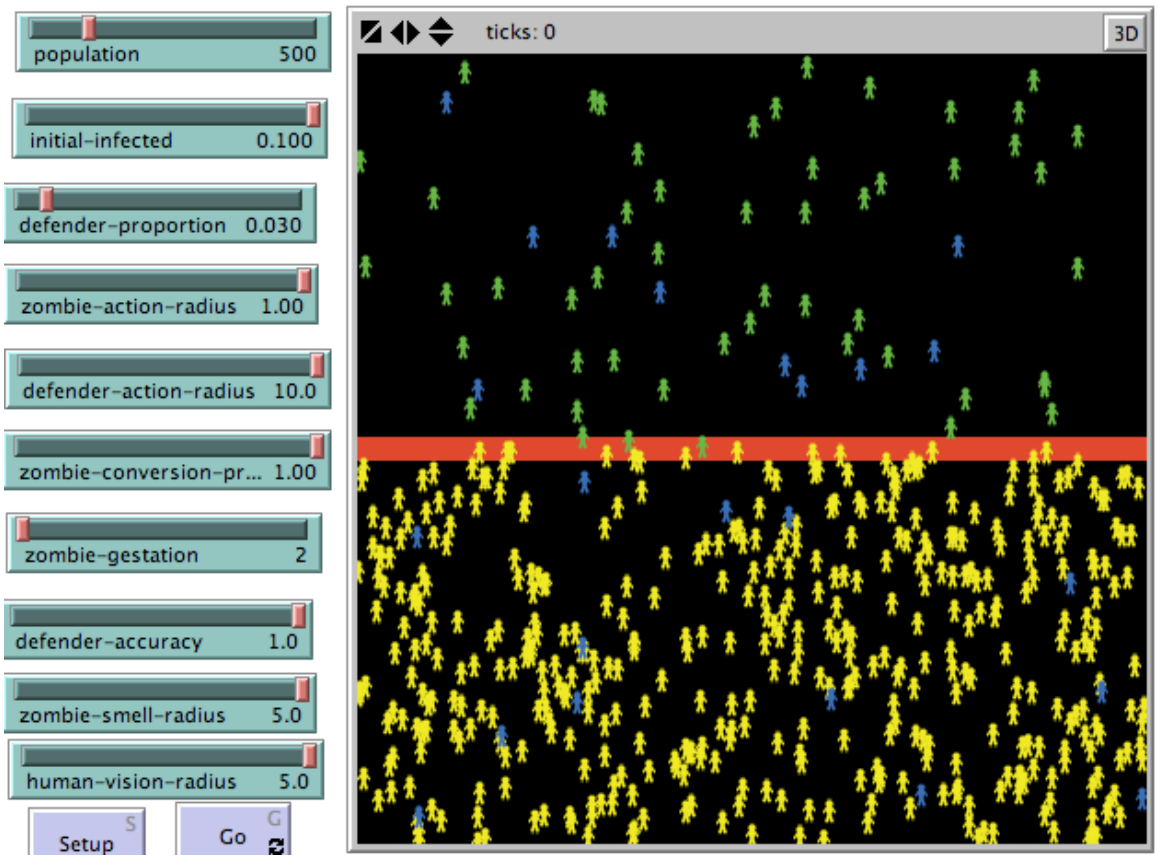
easily changed. We created many models some were designed around a single variable while others were made to display a real world scenario.

3. While examining our models and collecting data about variables we conducted more research into the possibility of tangents that our infection process could have taken, which include it being spread by water contamination, animals, and even an airborne version of the virus.

Conclusion

My partner and I reached the conclusion that more densely populated cities, such as Albuquerque (3010p/m) would be easily contaminated if the "defender" population size were not above 3% of the total. In order for cities to be successful with eliminating infected units, they must maintain a force that is 3% of the entire population that can eliminate targets such as military personnel or Police Officers.

For our model examples we used a uniform number of cycles, the max being 20 and looking at how things stood after 20 rotations of the model. Or allowing every unit to act in 20units of time. Within 20 rotations of the model, any population size that had less that 3% of their force being able to "destroy" zombies the entire population would become infected within 20 rotations, and for smaller populations some would extend to around 27, or 30 rotations.



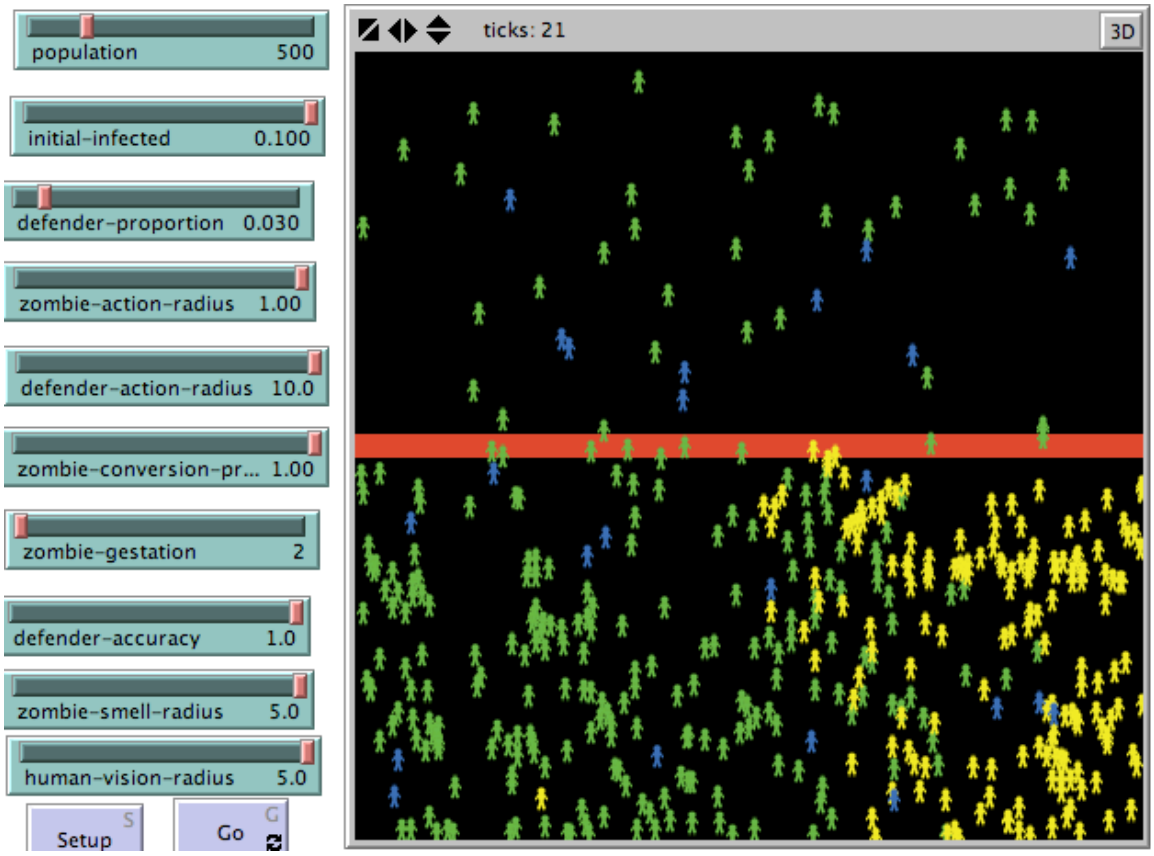
Here is the beginning of a model, with a small population size of 500 units on the screen.

The slide bars on the left are our variables and allow us to easily change settings to see manipulations in data.

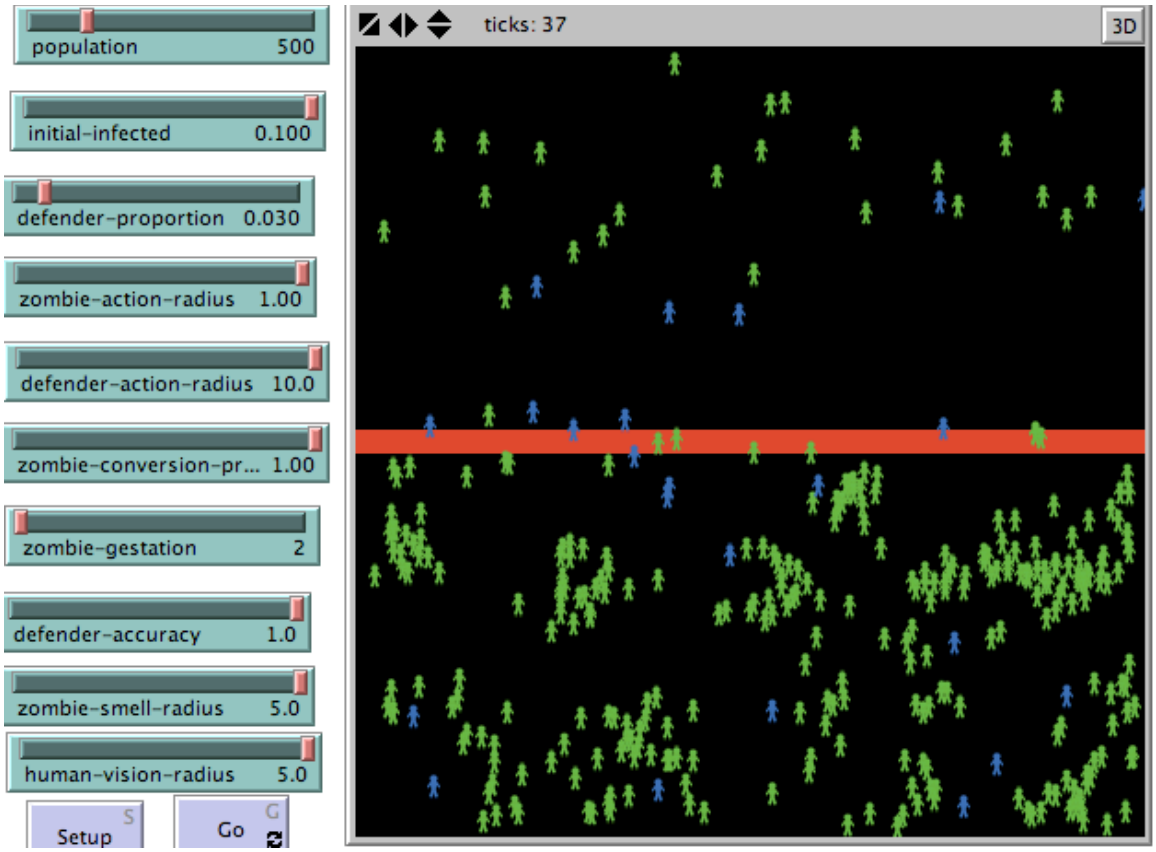
The yellow figures are normal human beings, who can become infected by zombies.

The blue are what we call defenders, who are able to kill zombies and are an example of military or police influence.

The green are our infected members of the population.



Here is the same model after 21 rotations, as you can see with the infected are easily spreading behind the “quarantine” zone which is the red line across the middle of the model.



Here is the same model after the entire general yellow population has been transformed into infected zombies.

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