MODELING OF EVACUATION CENTERS USING NETLOGO

www.tjhsst.edu/~kdesoto/

Introduction
an abstract

The actions of citizens during terror and evacuation events are oftentimes hard to predict. Using **NetLogo**, a 'cross-platform multi-agent programmable modeling environment' from The Center for Connected Learning and Computer-Based Modeling (CCL), the socio- and psychological factors affecting decision-making in these situations can be effectively simulated. Through appropriate research in categories of modeling and sociology, human behavior can be studied to help urban developers and social engineers protect the nation's interest: its citizens. Citizens that follow certain algorithms, or behave in certain ways, have a much greater chance of survival.

NetLogo is a cross platform multi-agent programmable modeling environment created by Northwestern University's Center for Connected Learning and Computer-Based Modeling (hereafter CCL). It was designed specifically for simulation of social and natural phenomenon. Originally StarLogoT, this language and graphical user interface hybrid offers a multitude of possibilities for researchers and students, allowing users to examine interactions and behaviors on both micro and macro scales. NetLogo is designed with accessibility in mind: the program allows for quick Java applet exportation and interactivity with CCL's HubNet interface, which lets the user run participatory simulations in which a class or group of testers takes part in enacting the behavior of a system as each user controls a part of the system by using an individual device (such as a TI-83+ calculator or a networked computer). NetLogo comes packaged with an expansive models library and an assortment of code samples for easy access.

NetLogo's versatility allows programs to be accessed and used in environments outside the computer laboratory setting. HubNet, one instance, allows a multitude of users to interact with a single model through the use of Texas Instruments TI-83+ calculators or networked computers. This is ideal for classroom settings because it allows each tester involved to affect the model in some way. Also, NetLogo offers easy exportation to Java Applet format, and with several keystrokes, an applet embedded in an HTML page can be created.

Modeling
a background

Modeling is a powerful tool that allows a programmer or social engineer to observe cause-and-effect relationships in occurences that

a) happen too slowly or quickly to see
b) involve danger or safety concerns
c) occur on a scale too large or too small for study
d) is not a common occurrence.

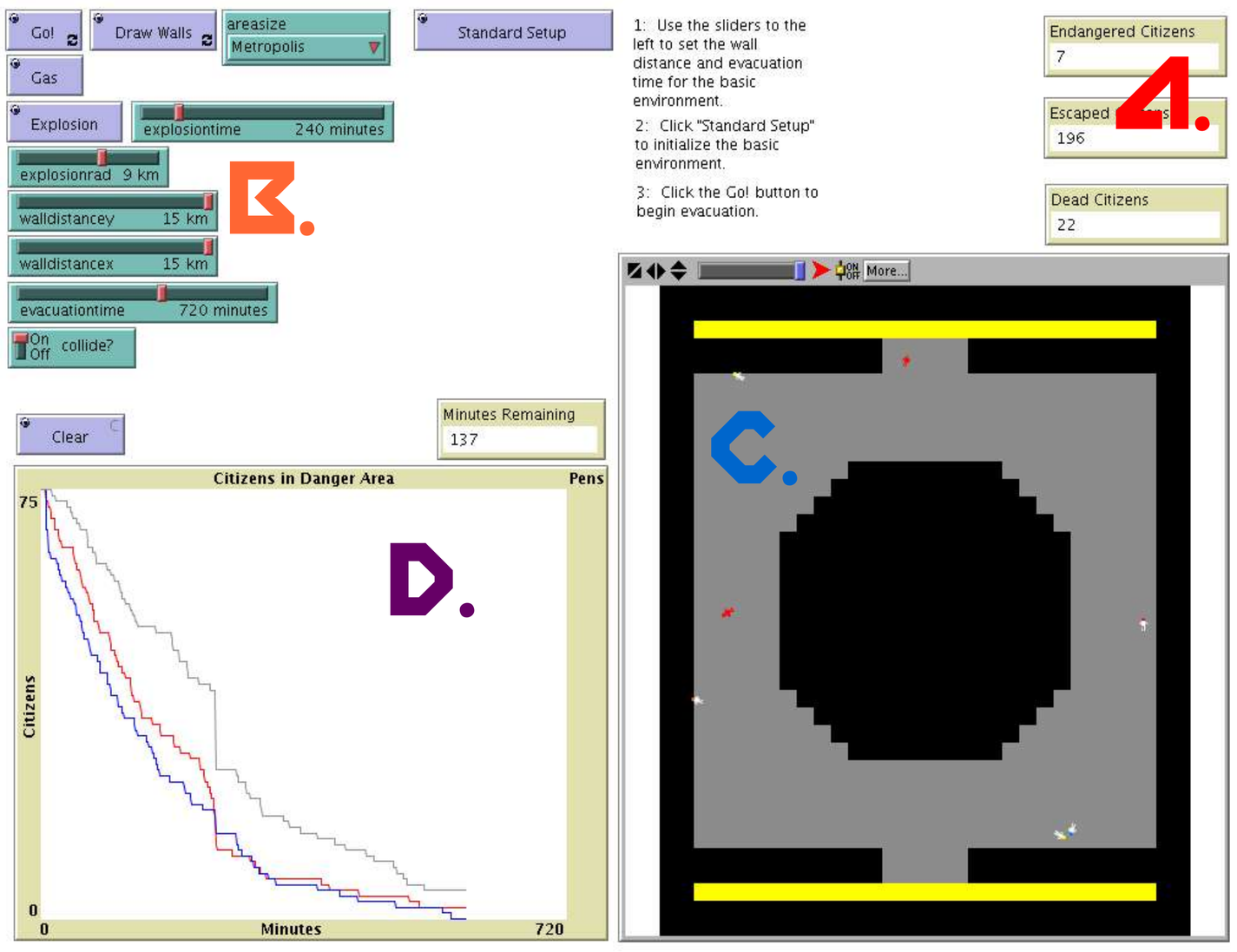
Armed with this knowledge, a scientist can use the material learned to help a community, understand a cause, or solve a problem. A perfect use for the modeling technology of today is a subject that meets all of these above criteria. The modeling of population centers during evacuation situations is perfect for such a study, because evacuation frequently occurs too quickly, is quite dangerous, happens rarely, and happens on such a wide scale that observing patterns is nearly impossible. In order to accurately code such an event, certain features must be researched.

I am implementing my project by coding iterations on a regular basis. These are available at my home page, www.tjhsst.edu/kdesoto, for other users to view, run, and comment on. The current goal is to accurately depict citizens' actions in a terror situation.

I am using the NetLogo code and the HubNet interface. This is all available off the NetLogo home page.

As explained above, I am testing this project by running it and evaluating the changes by comparing the previous version to the newly-coded iteration.

The GUI



Implementation

4. MONITORS allow the user to quickly examine a variable, even as the simulation runs.

B. ENVIRONMENT PARAMETER CONTROLS quickly adjust the settings of the initial environment, including size and more.

C. EVENT DISPLAY updates with each timestep, graphically outputting the events occurring in the model as they happen.

D. GRAPHICAL OUTPUT provides a quantitative way for the user to observe, record, and compara data.

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