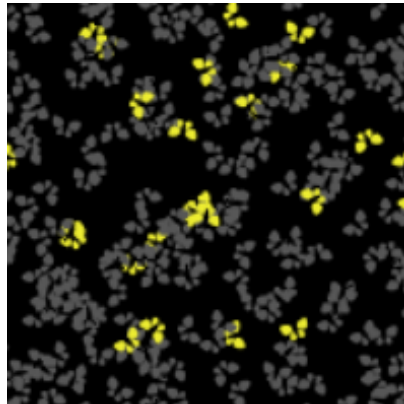


In-Class Assignment

Quantifying Visual Patterns in the Fireflies ABM



Written by

Prof. Erin N. Bodine

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During class today you will work with your group on the following assignment.

Assignment

You will start with the Fireflies model found in the NetLogo Models Library. Read through the info tab in the model to get an idea of how the model works.

Complete the following within your assigned group:

1. Set the global parameters to the following values:

- `number` = 1500
- `strategy` = `delay`
- `flash-length` = 1
- `flashes-to-reset` = 1
- `cycle-length` = 30
- `show-dark-fireflies?` = `On`

Run the model for > 3000 time steps. Do the fireflies synchronize? Describe the flashing pattern.

2. Set the global parameters to the following values:

- `number` = 1500
- `strategy` = `delay`
- `flash-length` = 10
- `flashes-to-reset` = 1
- `cycle-length` = 30
- `show-dark-fireflies?` = `On`

Run the model for > 3000 time steps. Do the fireflies synchronize? Describe the flashing pattern.

3. We can easily observe with our eyes when the fireflies have synchronized and we can visually distinguish between different types of synchrony. Can we construct code in NetLogo to "be our eyes"?

- (a) Brainstorm in your group to construct a measure of "synchronicity" which could be used to distinguish between different types of flashing patterns and could be used to indicate no flashing pattern (i.e. no synchronized flashing). This is a little trickier than you might first think. For example, given second set of global parameter above, change `flash-length` to a value of 5, and `cycle-length` to a value of 5. Are the fireflies synchronized? All the fireflies are "on" all the time, meaning that there is no flashing pattern. One would not classify this as the fireflies being synchronized. Thus, we cannot just use the proportion of fireflies that are "on" at a given time step as our measure of synchronicity. Somehow we additionally need information which lets us know if the fireflies are synchronized between when they are "on" and when they are "off". How can we measure if there is a dark period followed by a light period?

You can get as creative and crazy as you would like, but you must have something by the end of this class period. You should look at the code (which is fairly simple and straight-forward) to see what variables the fireflies are updating each time step and under what conditions.

- (b) Save the NetLogo files as `Fireflies-Group#.nlogo`.
- (c) Clear out what is currently in the info tab and replace it with a paragraph describing in detail how your group would measure synchronicity. This is all you have to have done by the end of this class period. At this point you can submit this file to Box. However, your group will be asked to implement its measure of synchronicity and determine if it works, so if you have time remaining, please use it to start your implementation.

4. Submit via Box:

- Your NetLogo file (`Fireflies-Group#.nlogo`)