A Proper Interpretation of Panic

New Mexico

Supercomputing Challenge

Final Report

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Team 50

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Executive Summary:

In today's society we have developed many common misconceptions about panic. Mainly because of the media influence, such as movies and news cast trying to dramatize the facts. But the fact is that human beings do not act hysterically the way they are depicted. Which is exactly why we have developed a "proper" interpretation of how people will act in disasters. Models out there today configure the worst outcome with large percentages of humans, effected by the disaster, consumed in panic. Our project is to demonstrate the spectrum of emotion a person will undergo, from normal, to shock, to panic when in a life threading situation or disaster. This could help disaster planners prepare for what people will actually go through and what they might do at a certain time of the event. Our hypothesis of people panicking in certain situations in a disaster, although blunt, is very real based on our research. Our program models this interpretation.

Our research has showed us that, although panic occurs, it is not the way we think it is. Through the information of Erik Heide our team had acquired this common misconceptions theory. What we have found is that people will first tend to go into shock. After this initial shock they will either panic or have a rational sense to RUN and get their family. People will panic if there is a dominant person panicking in the area, and they influence the group. They might also panic from what they see on the news or from the information they do not see on the news.

The model we built is a representation of how these people will begin to panic and the percentage of people that actually panic. There is three modes of emotion our agents, acting as people undergoing a disaster, will possess. The first is, named balance, signifying a normal or sensible state. The second wave will hit shock leading into a randomized percentage of people panicking. We hope this will help disaster planners get a better picture of what's going on.

Our team has learned many interesting things about human perception this year, and we hope or model is of some use. We believe that this subject should be studied to it's full extent, because the human mind is still not fully understood, there is a lot we do not understand. But with the knowledge of how we will actually act in a disaster and the model representing this, we can get closer to understanding how to treat the problem.

Statement of the Problem:

Through out this year our team has been learning about the very interesting facts of panic. We have learned that it is not so much panic that the majority falls under, but shock, when undergoing a disaster. Today's models represent the dramatized panic that media plays into. This representation is not accurate, which is why a better model is called for. We have put together a model of what we believe is a better interpretation of how people will act in a disastrous situation.

Description of the method used:

By the works of Erik Heide our team has learned what is more likely for a person to do in a disaster. The first initial response is shock, people will literally freeze. In the disasters we are trying to create, shock is a bad thing. People who stop to think and forget to start again, could end up loosing their life. Now some people with strong characters will have a initial feeling to get their loved ones and go. Some will panic if they have weak characters, and some will panic because a dominant person is panicking and will influence the others. But panic is not what the large percentage of people do. Sometimes it is found that people will panic from lack of information. And the lack of information is so the people won't panic. Kind of ironic.

Our program has used this new evidence of panic and integrated it into our own model based off of the zombie infection model created by Alex Fink. The model we created has two rooms. The first room is the basic Hollywood panic scenario, for comparison. The second is the model with the information we have learned. This second scene shows people in shock, people panicking, and zombies acting as the disaster. When people begin to panic this leaves time for the zombies to catch them. In result they die. In the first room, or original room, we show how many people died compared to how may people die from shock in the second room. This gives us a ratio to work off of. Our model also has a randomized number of people in panic and a randomized number of people acting rationally. This random set is based of a character set of strong or weak. Strongly or weakly influence, that is also randomly set.

Result and conclusion:

In result, we have found not only that people go into shock more than they panic, but that the shock also causes more deaths- in a crowed room disaster that is. Our conclusion is that this model may be correct in the retrospect of how humans will behave opposed to what disaster planners use today.

Our program and a screen shot of it can be seen here.

Code: (as modified from Zombie Infection, By: Alex Fink)

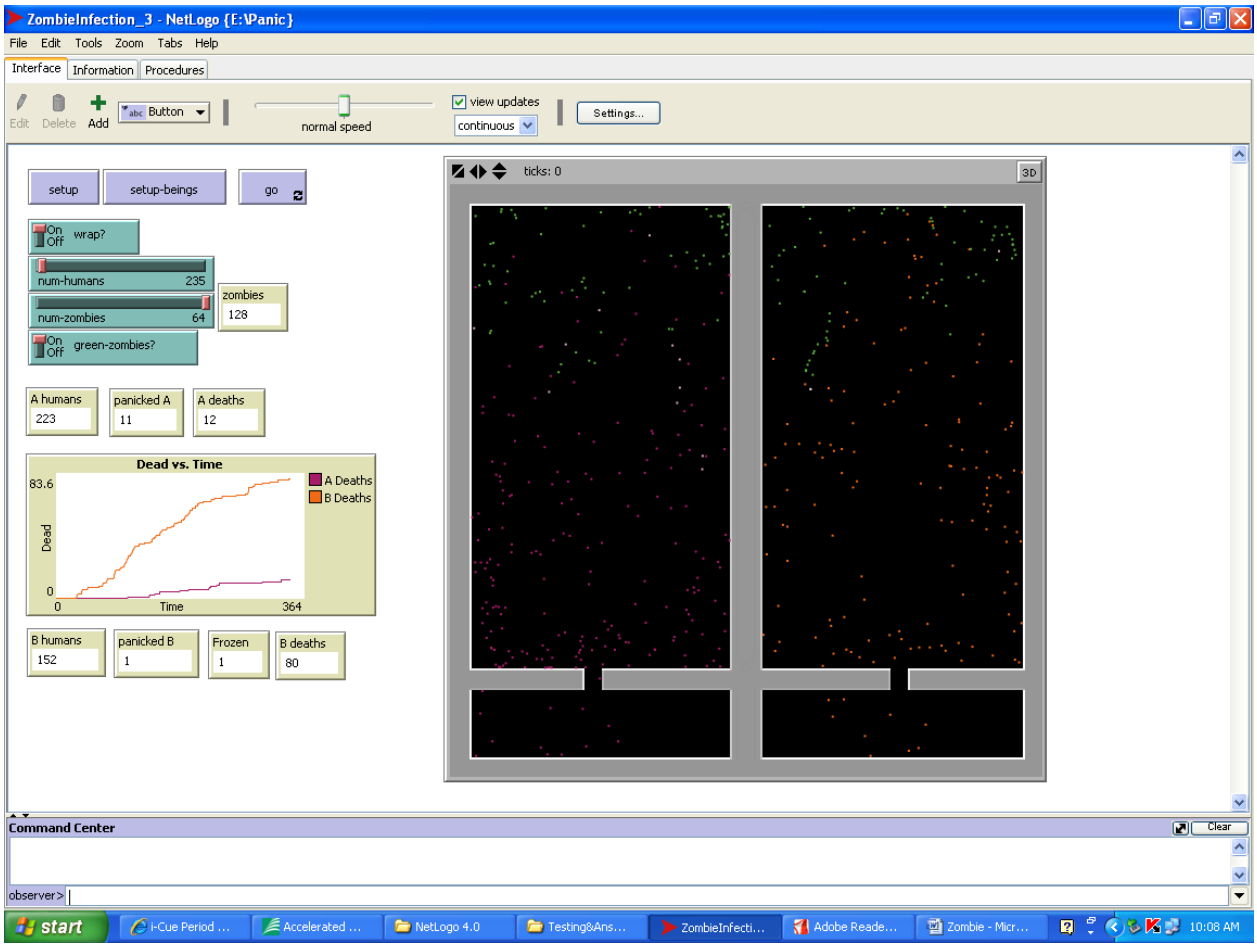
```
globals [countin dead_a dead_b]

breed [ humans_a ]
breed [ humans_b ]
breed [ zombies ]

humans_a-own [panic-time]
humans_b-own [character panic-time freeze brave]
zombies-own [chasing-time]

to go
  set-current-plot "Dead vs. Time"
  set-current-plot-pen "A Deaths"
  plot dead_a
  set-current-plot-pen "B Deaths"
  plot dead_b

  ask zombies [
    set color ifelse-value green-zombies? [green] [gray]

    ifelse chasing-time > 0 [
      set chasing-time chasing-time - 1
    ] [
      if random 4 = 0 [set heading random 360]
    ]

    if (who - countin) mod 5 = 0 [
      let beings-seen turtles in-cone 10 45 with [self != myself]
      if any? beings-seen [
        let target one-of beings-seen
        face target
```

```
      set chasing-time 20
    ]
  ]

  step 0.3
  if count humans_a-here > 0 [ set dead_a dead_a + 1 ask humans_a-here [ die ]]

  if count humans_b-here > 0 [ set dead_b dead_b + 1 ask humans_b-here [ die ]]
 ]

 ask humans_a [
  step 1
  if panic-time > 0 [
    set panic-time panic-time - 1
    if panic-time = 0 [set color magenta]
    step 1
  ]

  if (who - countin) mod 5 = 0 [
   let beings-seen turtles in-cone 10 45 with [self != myself and (breed = zombies or (breed =
humans_a and panic-time > 0))]
    if any? beings-seen [
     lt 157.5 + random-float 45
     set color magenta + 3
     set panic-time 10
    ]
  ]
 ]

 ask humans_b [
  if freeze = 0 [ step 1 ]
  if panic-time > 0 [
    set panic-time panic-time - 1
    if panic-time = 0 [set color orange]
    step 1
  ]
  if freeze > 0 [
   set freeze freeze - 1
   if freeze = 0 [set color magenta + 3 set panic-time 10 ]
  ]

  if (who - countin) mod 5 = 0 [
   let beings-seen turtles in-cone 10 45 with [self != myself and (breed = zombies or (breed =
humans_b and panic-time > 0))]
    if any? beings-seen [ set brave random character
     ifelse brave > 8 [ set freeze 5  set color white ]
```

```
      [lt 157.5 + random-float 45
      set color magenta + 3
      set panic-time 10]
      if brave <= 8 [ facexy 68 -138 set color orange set panic-time 0 step 1]
    ]
   ]
  ]
  set countin countin + 1
end



;; Step without running into things
to step [dist]
  if [pcolor] of patch-ahead dist != black [
    ;; Turn so that we're facing parallel to the wall, ie. find the black neighbouring
    ;; patch closest to where we would have gone (at distance 1), and turn to face it.
    let x dx + xcor
    let y dy + ycor
    face min-one-of neighbors4 with [pcolor = black] [distancexy x y]
  ]
  fd dist
end


to setup
  setup-town
  setup-beings
end



to setup-beings
  ct
  ;; this stuff is in this function just so it always happens
  set-current-plot "Dead vs. Time"
  clear-plot

  set countin 0

  ;; Zombies get the earliest who numbers; we use this elsewhere.
  ;; Make sure the beings are on non-built squares.
  create-zombies num-zombies [
    set color ifelse-value green-zombies? [green] [gray]
    setxy -68 120
```

```
    set heading random-float 360
  ]

   create-zombies num-zombies [
    set color ifelse-value green-zombies? [green] [gray]
    setxy 68 120
    set heading random-float 360
  ]

  create-humans_a num-humans [
    set color magenta
    setxy ((random-float -100 ) - 20) random-float 100
    set heading random-float 360
  ]

  create-humans_b num-humans [
    set color orange
    setxy ((random-float 100 ) + 20) random-float 100
    set heading random-float 360
    set character ( exp random-float 3 )
  ]
end

to setup-town
 ca
 import-pcolors "PanicRoom.jpg"
 ask patches [if pcolor = white [set pcolor black]]
end
```

Screen Shot



Achievement and Acknowledgments:

The biggest achievement on this project was being able to properly show and determine the actual panic perception of a group in a disaster. There is a lot we do not understand on the whole perception of panic. And this project could be investigated so much further, as it is highly interesting and unknown. We are proud of how far we have come however, and would like to express our deep appreciation to our mentor Joe Vertrees. For with out him, we would be no where.

References:

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5. *Kevin Kelly*:

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