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Artificial Intelligence

Bust The Ghost Project

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In this project, my teammate Aicha Belghiti and I were asked to implement Bust the Ghost game using Unity. Along our implementation, we used probabilistic inferencing where we used probabilistic models to describe this game in terms of probability distributions.

Probabilistic inferencing:

As shown in the figure bellow, we used $1/(8*20) = 0.006$ as prior distribution to start with.
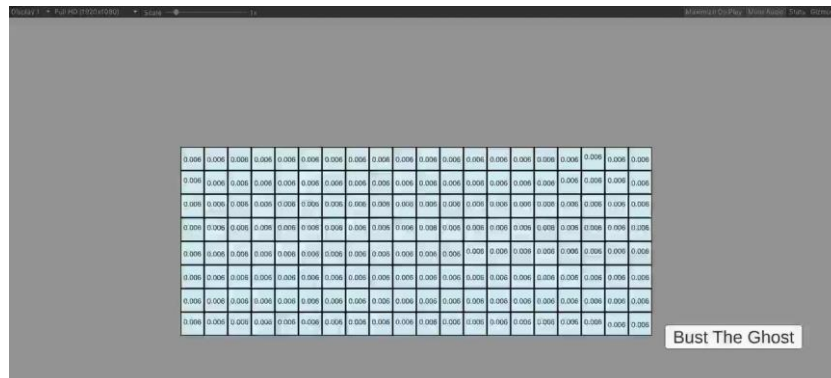
Then we used the followingconditional probability distribution P (Color | Distance from Ghost) to decide on the color to display when clicking on a cell:

When Distance from Ghost=0:

P(yellow |0)	P(orange |0)	P(red |0)	P(green |0)
0.10	0.200	0.6500	0.050

When Distance from Ghost=1:

P(yellow |1)	P(orange |1)	P(red |1)	P(green |1)
0.150	0.500	0.3	0.050

When Distance from Ghost=2:

P(yellow |2)	P(orange |2)	P(red |2)	P(green |2)
0.150	0.500	0.3	0.050

When Distance from Ghost=3:

P(yellow |3)	P(orange |3)	P(red |3)	P(green |3)
0.5	0.150	0.050	0.300

When Distance from Ghost=4:

P(yellow |4)	P(orange |4)	P(red |4)	P(green |4)
0.5	0.15	0.050	0.300

When Distance from Ghost>=5:

P(yellow |n)	P(orange |n)	P(red |n)	P(green |n)

The Joint probability tables:

Table 1:

Color	Distance from ghost	P(Color,Distance from Ghost)
yellow	3	0.5
yellow	4	0.5
red	3	0.05
red	4	0.05
green	3	0.3
green	4	0.3
orange	3	0.15
orange	4	0.15

Table 2:

Color	Distance from ghost	P(Color,Distance from Ghost)
yellow	1	0.15
yellow	2	0.15
red	1	0.3
red	2	0.3
green	1	0.05
green	2	0.05
orange	1	0.5
orange	2	0.5

Table 3:

Color	P(Color, 0)
yellow	0.10
red	0.650
green	0.05
orange	0.2

Table 4:

Color	P(Color,n)
yellow	0.250
red	0.05
green	0.6
orange	0.1

When the user/player clicks a cell, a color is displayed based on the distance between the ghost position and the clicked cell. Then, after each click, the posterior probability P(Ghost|Color) gets calculated using the following formulas:$P(Ghost\_t)=P(Ghost \mid Color\_t)=P(Ghost\_t-1)*P(Color \mid Distance from Ghost)$, and gets displayed on the tile.
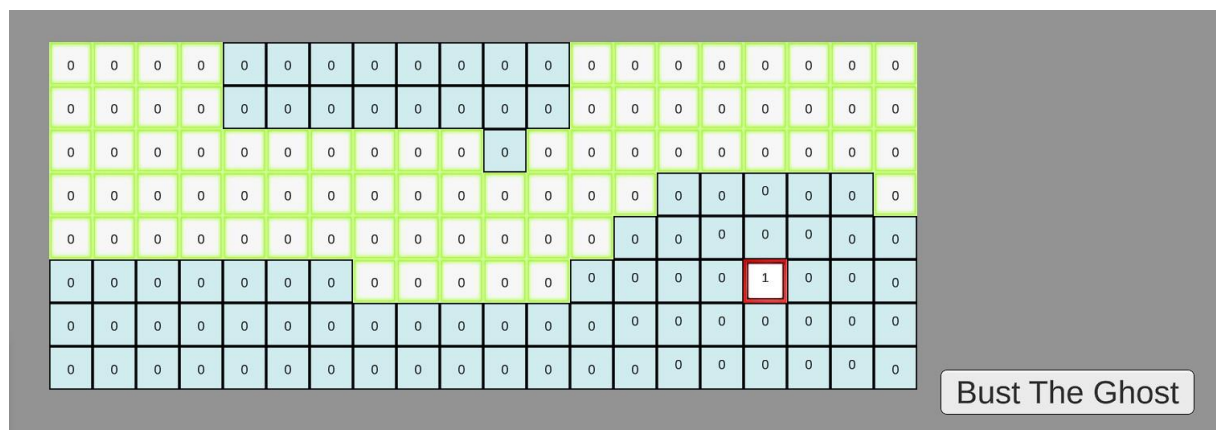
Using the color indication, we can know in what cells the ghost might be and the more a probability increases in one of the cells the more we make sure that the ghost is in that cell.

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bust The Ghost

Congratulations!! You Busted the ghost !