
Heuristic-based Influence Maps for a Ms Pacman Controller

CEC 2007 Ms Pacman Competition Entry
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Overview

This Ms Pacman controller was developed using the web based implementation of the game at <http://www.webpacman.com/mspacman.htm> and the toolkit developed by Simon Lucas.

Running the Controller

To run the Ms Pacman controller, simply make sure that the following variables in the MsPacInterface class are set to the version of Ms Pacman being used. Once the variables have been set, simply run the MsPacInterface class.

Screen Position

Adjust left and top to give the position of the Ms Pacman application, this is measured from the top left of the screen.

Adjust the width and height to suit the Ms Pacman application being used.

Colours

Different versions of the game appear to use different colour settings for game objects. Currently the colours are defined to work with the web based version of the game.

If colour adjustment is required, change the following colours to suit the version of Ms Pacman being used.

- blinky
 - pinky
 - inky
 - sue
 - pacMan
 - edible (this is the colour when the ghost is edible)
 - changing (this is the colour when the ghost is changing from edible)
 - pill
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In order to use the correct integer value for the game, apply the following algorithm.

- Find the hex representation of the colour
- Negate this hex number
- Convert the last 6 hex digits to an integer
- Make this integer negative
- Add one or subtract one from this number to fine tune the adjustment

Theory behind the controller

The controller is based on an influence map, with each game object having an influence on Ms Pacman's movement at each step. The influence of an object decreases the further the object is away from Ms Pacman. The objects that have been identified in this game are as follows:

- Ghosts
- Edible Ghosts
- Changing Ghosts
- Pills
- Power Pills
- Clusters of pills (referred to as clusters)

The rules used in this game to determine influences are as follows:

- Ghosts have less affect the more pills that are eaten.
- Positions where pills were are seen as a bad area to visit.
- Clusters grow in influence as the amount of pills decrease.
- Power pills are seen as a bad area to visit when ghosts are not near.
- Once a power pill has been eaten, the desire to eat ghosts increases dramatically.
- Ms Pacman is twice as afraid of the closest ghost compared to others, and will try to stay away from the closest ghost as much as possible.
- Ms Pacman is vulnerable in the corners of the maze, so an artificial "Ghost" of half the normal strength of a ghost is placed in the corner to deter Ms Pacman from visiting this area unless absolutely necessary.

The amount of influence an object has is defined in the Attributes class and can easily be changed to notice the effect of differing influences from objects. For example, changing the scale factor of the ghosts to 0 will remove the detection of ghosts.

This controller is still a work in progress; the best effort seen so far was a total consumption of 376 pills. There are 220 pills per maze, excluding power pills.
