

Artificial Intelligence

Contest 3

Part 1: Network design

You need to build Bayesian networks that can identify and predict the movement for six types of ghosts. These will be six separate networks.

1. Ghost making random movements.
2. Ghost that makes random turns at intersections but continues down a corridor without turning around.
3. Ghost that always moves away from Pacman.
4. Ghost that moves clockwise around the board staying along the exterior walls. (It does not take the tunnel to the other side of the board.)
5. Same as ghost 2, but when Pacman gets too close it move away from it.
6. Same as ghost 4, but when Pacman gets too close it move away from it.

The network has the following states:

- Wall_N, Wall_E, Wall_S, Wall_W: is there wall north of the ghost, ...
- PacmanFarther_N, PacmanFarther_E, PacmanFarther_S, PacmanFarther_W: will ghost get farther away from Pacman if they move that direction.
- DistanceToPacman: how far away Pacman is from the ghost (32 possibilities).
- Ghost_X, Ghost_Y: x and y coordinates of the ghost (19 possibilities each).

The network will have a single output with 5 states (don't move, north, south, east, west). You are allowed to add hidden states to the network. (They will be both inputs and outputs to the network.)

For each ghost you need to do the following:

- Draw the network structure.
- For each node of the network, indicate the number of output states.
- Determine the degrees of freedom in the network. (Try to make this as small as possible.)
- Explain why you think the network can learn to predict the moves of the ghost

