Week 6 Demo 3

MKI59: Robotlab practical
December 5, 2018

You don't NEED to implement it in the interface, but if you can, then implement it such that the procedure starts with the click of a button.

The demo requires:

- 2 Nao robots with functioning cameras
- 2 laptops that run the code
- watch the linked scene from the movie

You will re-enact a small part of the Terminator 1 Tech Noir scene. The idea is that the Nao's have a dueling scene. You write 1 piece of code and deploy it on 2 Nao's, so each laptop controls 1 Nao. What emerges is interactive behavior between 2 Nao robots! The core part of the assignment is to create an algorithm such that the Nao can recognize another Nao using the camera.

start Both Nao's are in a sitting position opposite of each other.

> *Your team decides the exact distance. The only requirement is that the Nao's should be able to see each other fully when in the standing position.*

tech noir

1. Human says `ACTION!` and both Nao's go to the standing position and wait for 5 seconds. (**1 point**)
2. For Nao 1 the eye LEDs turn red and for Nao 2 the eye LEDs turn green. (**1 point**)
3. Each laptop is showing the terminator vision as was described in the previous demo's. NOTE: The terminator vision for the Nao with green eye LEDs has a green color overlay. (**1 point**)
   The difference being that the Nao is now searching for another *front facing* Nao. So once another Nao is found, there should be a bounding box around (a part) of the Nao. (**10 points**)

   You will decide with your team what is the most reliable way of detecting the other Nao. Things that might work: looking at colored part of body + color calibration, looking at the shape of the head or the body (edge/blob detection), look for the Nao eye LEDs, making the room a bit darker such that the Nao eye LEDs shine relatively brighter and are easier to find. If you want you can train a neural network to detect Nao's. Think outside of the box. You will ***only use Nao body(parts), that are originally attached to the Nao*** *in the detection algorithm. For example, sticking*

a ball on the Nao and then detecting balls is not allowed. Trying to detect Job's thumbs is also not allowed.

IFF you really really REALLY can't figure out a way, then tape a ball to the Nao and do ball detection or something else that is hacky. (**1 point**)

4. Both Nao's are standing and facing each other. When a Nao detects another Nao, it 1) raises its arm and points it at the other Nao and 2) says `PEW. PEW.`. 3) The arm goes back into "normal" position. (**1 point**)

   Pointing: The Nao has to move its arm up such that the arm at an angle of 90 degrees with its body and point in the direction of the other Nao

5. On the terminator vision, when another Nao is detected, there is a big clear text saying **TERMINATE**. (**1 point**)
6. After taking the first shot, 1) the Nao turns its head all the way to the left, 2) waits 3 seconds and 3) then turns its head back to a front facing position. 4) Finally the Nao goes into the squatting position. (**1 point**)
7. If your Nao detection algorithm is a little robust, the Nao should detect the other Nao and repeat step 4 and 5. (**squat shot: 2 points || standing shot: 1 point**) NOTE: this time the Nao says: `I win. You are terminated. PEW. PEW.` (**1 point**)
8. `[IFF step 7 does not happen, else skip this]` At the time of making this demo assignment, I am assuming that everyone can at least complete step 4, that is, detecting another front-facing standing Nao 2 when Nao 1 is standing. It could be that after going into the squatting position the Nao is unable to detect the standing Nao, or that the Nao's cannot detect each other when both are squatting. In the case the Nao is squatting AND it takes too long (30 seconds) before making a shot, the squatting Nao goes back into standing position and continues from step 7.
9. The Nao 1) goes back into sitting position, 2) the terminator vision turns off and 3) the eye LEDs turn white. (**1 point**)
10. If all goes well, there will be a losing Nao. After the winning Nao sits down, touch the head of the losing Nao. The losing Nao 1) says `Oh snap! I am terminated` and 2) goes into sitting position and 3) also performs step 9. (**2 points**)

`Demo 3 grade = ________ * 10 / 23 = ________`