6COM1035 - answers to CW2 queries & clinics session tomorrow 21/12/2017

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l.canamero Dec 20, 3:23 pm

To: l.canamero, m.lewis4, You (oscardarpla96@gmail.com)

Dear all,

A very long email but read it all if you have questions about CW2.

A reminder that I will be available for questions about CW2 tomorrow, 21/12/2017, during my office hours. For people who are no longer on campus I could try to answer questions via skype. Please send me an email beforehand if you need to do so.

I have had some queries asking to clarify elements of CW2 and was asked to post the answers to everyone, as others might have similar questions.

First, I would like to remind everyone that the CW2 is not just about programing robots that do fun things but about applying the principles, models and notions seen in class to the design and implementation of autonomous CAI systems (robots, in this case). These elements are also assessed as part of this coursework. You need to apply your understanding of the material and use your imagination too. Therefore, before you start to write code, go over the relevant module materials (slides AND papers related to the lectures, and files and code used in the practicals).

All the material you need to complete this coursework has been explained in the lectures and worked on during the practical sessions. To facilitate finding the relevant material and to make more clear the links between lectures and practical sessions I have made some changes to the titles of the practical sessions and added further explanations about their aim and content. I have also updated the labels of practicals in the Module Guide to reflect this.

The queries were about the sensors to be used for the garbage collection and motivated (2RP) controllers, as well as about templates of code. My explanations below will refer to the e-puck robot model, the one you need to use.

The choice and use of sensors is part of the design, so this is one of the elements that are assessed. It is up to you, given the constraints of the robot and the task. However, I am happy to give additional guidelines:

- The sensors you use and how you use them needs to be related to the elements you add to the environment in addition to the task of the robot. Remember the Three Constituents Design Principle.

- Remember the e-puck has ground sensors that can be used to detect elements on the ground (e.g. a line or resources of different colors, e.g. black and white on a gray background). It also has IR (infrared) proximity and distance sensors that can be used to detect objects in the proximity of the robot. These objects can be of different sizes, and you need to use your imagination and apply the material seen in class to decide how you discriminate different objects. For example, a small object could be used as garbage, and the robot might be able to detect it with only 1 sensor, whereas a larger object such as the wall will be detected by more than one IR sensor simultaneously. Or for the 2RP, you could put the two resources on the floor and use the ground sensors for both, or use different objects and detect them with the proximity/distance sensors, or a combination of both options. Remember also the lectures and practicals on active perception, some students might want to use some of that.

- Regarding the sample templates for the controllers, think of the similarities and differences between exercises implemented in class (such as line following, object avoidance, motivated homeostatic architecture) and the behaviors involved in the controllers you need to program for the CW, and how you could adapt or take inspiration from the former to implement the latter.

CONCRETE MATERIALS available on Studynet that you might find particularly useful for this coursework (but you might want/need to check other things as well):

a) Lectures:

- Lecture 4: basic notions and design principles. In addition to the slides, papers 2004_ALife_Pfeifer_design_principles.pdf and / or pfeifer96_fungus_eaters_design_principles.pdf

- Lecture 5: Constructing reactive CAI for decision making. In addition to the slides, the paper by Ibbotson & Prescott

- Lecture 7: Constructing Autonomous Systems for decision making: actively exploring the environment. In addition to the slides, the paper avila-garcia_sab04.pdf

- Lecture 8: Comparing decision making strategies and architectures. In addition to the slides, the paper iberamia02_lnai2527.pdf

b) Practical sessions:

See practical 7, the line following and object avoidance example. The folder contains contains:

- PDF documents explaining the exercises (one in Python, file Constructive_AI_Practical_Session_7_Python.pdf, one in C, file Constructive_AI_Practical_Session_7_C.pdf),:

- code: there is a worked-out exercise to implement a line following controller, showing the use of ground (infrared) sensors; these can be used to detect resources on the floor; the solution code is available for python (PyController_lf.py) and C (C_Controller_lf.c)

- exercise to practice object avoidance, which includes use of proximity/distance IR sensors ; the solution code is available in Python (PyController_avoid.py) and C m(C_Controller_avoid.c)

Information about changing the floor is available in Practical 6

I hope all this information helps. Best wishes,

Lola

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