

AI23 Coursework 2 Deadline 9am April 28 2006

The aim of this coursework is for you to increase your understanding of neural networks and evolutionary algorithms, and to gain experience in reading and appraising a paper from an academic conference.

In 1994, Karl Sims published a remarkable paper (Sims, 1994) in which he described a system for evolving the morphologies (bodies) and neural systems of virtual creatures. You can download this paper and movies of the evolved creatures from his website at <http://www.genarts.com/karl>

Write an essay of between 3500-4500 words entitled “*The biological plausibility of Sims’ system for evolving virtual creatures*”.

Your essay should include:

1. An overview of how the system works (30 marks)
2. An examination of the biological plausibility for the different parts of the model (e.g. the evolutionary algorithm, the neural network) (55 marks)
3. A reasoned conclusion on overall biological plausibility (15 marks)

There are many comments on biological plausibility within the module slides for the relevant topics and within the suggested reading. You will also need to explore the literature for yourself to find relevant information – much of this can be found on-line. Be sure to cite the work of others within the body of your essay and give a list of references at the end (see <http://www.comp.leeds.ac.uk/tsinfo/projects/citing-sources.html> for guidance on how to cite material).

Don’t worry if you don’t understand every line of Sims’ paper – the important thing is to understand the essential parts of the system. For example, there are references in sections 1 and 4 to techniques you are unlikely to have come across before.

There will be a discussion on the topic of the essay in the laboratory time-slot 1-2pm 24th April in LT03. You should come to this having already read the paper and made substantial progress in planning and writing the essay.

Reference

Sims, K., *Evolving Virtual Creatures*, Computer Graphics (Siggraph '94 Proceedings), July 1994, pp.15-22,