CS 6660
Intelligent Agents
Fall 2000

Take-Home Mid-Term Examination
Assigned: Tuesday, October 10, 2000
Due (in class): Thursday, October 19, 2000

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Question#1 (100 points):

Briefly explain each of the following terms:

(i) Intelligent Agent
(ii) Autonomy
(iii) Rationality
(iv) Bounded Rationality
(v) Agent Architecture
(vi) Reactive Control
(vii) Gradient Descent
(viii) Backpropagation
(ix) Fitness Function
(x) Blame Assignment
(xi) Primal Sketch
(xii) Visual Grammar
(xiii) Working Memory
(xiv) Productions
(xv) Frame
(xvi) Script
(xvii) Expectation Generation
(xviii) Case Grammar
(xix) Spreading Activation
(xx) Ontology

Question#2 (50 points):

2a: What is the method of gradient descent? What (if any) is the relation between gradient descent and the delta rule for learning in perceptrons? What does this relationship tell us about the delta rule for learning?

2b: What is a linearly separable problem? Give an example of a problem that is not linearly separable. What (if any) is the relation between linearly separable problems and the delta rule of learning? What does this relationship tell us about the perceptron method of learning?

Question 3 (50 points):

Consider the following sentence, where the verb "kick" maps into the primitive action "PROPEL" in Conceptual Analysis:

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John kicked the ball.
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3(a): Construct a general schema for "PROPEL" for analyzing sentences with this structure.
3(b): Construct a lexicon for the specific words in the above sentence for use by Conceptual Analysis.
3(c): Show how Conceptual Analysis processing the above sentence and derives its meaning.

Question 4 (50 points):

The meaning of "meaning" is an important issue both in vision (e.g,, image interpretation) and in language (e.g., text understanding). Why is "meaning" important? Briefly explain the various meanings of "meaning" in AI.

Question 5 (50 points):

A central dilemma in AI is that while most interesting problems are computationally intractable, intelligent agents have only limited computational resources. Briefly explain AI concepts and methods for addressing the issue of computational complexity.

Question 6 (50 points):

Genetic Algorithms and Multi-Layer Neural Networks are two examples of AI methods. How may an agent decide which of these two methods to use in what situation? How might an agent more generally decide to select among AI methods available to it?