Artificial Intelligence Techniques

Introduction to Artificial Intelligence

Artificial Intelligence

- AI is often divided into two basic ‘camps’
  - Rule-based systems (RBS)
  - Biological inspired, such as Artificial neural networks (ANN)
- There are also search methods which some people include.
- Increasingly hybridisation.

In the module

- Search methods
- Evolutionary algorithm
- Neural networks
- Rule-based systems

Examples

- Focus of the applications is the early part of the module is on:
  - Games
  - Robotics
  - Engineering and medicine

Assessment

- Two assignments
  - mini-projects
  - Applying AI to tasks
  - Early part in Java

Multi-layered perceptron (Taken from Picton 2004)
The Ingredients (Taken from: EvoNet Flying Circus www2.cs.uh.edu/~coick/ai/EC1.ppt)

Data Structures - Linked List

Data Structures - Stack

Data Structures - Queue

Summary
- Introduced the module
- Introduced different types of AI Structures

Task 1: Finite-state machines
Outcomes

- By the end of the session you should:
  - Understand what a state diagram is.
  - Understand the principles of a finite state machine.
  - Describe a simple system using a state diagram.
  - Applications using state diagrams.

What is a state?

State diagram (Taken from Picton 2004)

State 0
wait for the button to be pressed

State 1
wait for a cup to be placed

State 2
wait for the coffee to be poured

Next-state table (Taken from Picton 2004)

<table>
<thead>
<tr>
<th>present state</th>
<th>button?</th>
<th>cup?</th>
<th>finished?</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

Where are they used?

- Designing systems
- Games

- Your designing a character for a maze-based game.
- You must design a state diagram and table for the character.
Further reading and references

- Picton PD (2004) CSY3011 Artificial Neural Networks, University College Northampton