Introduction to Artificial Intelligence

ARTIFICIAL INTELLIGENCE TECHNIQUES

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

- Evolutionary algorithm
- Neural networks
- Fuzzy Logic
- Expert Systems and Knowledge Processing
- Searching
- Internet and AI

Examples

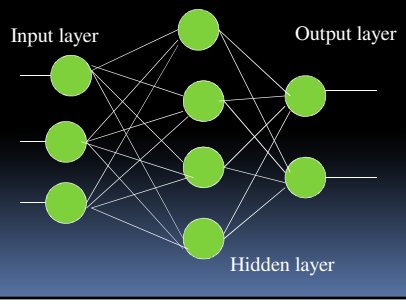
- Focus of the applications is the early part of the module is on:
  - Games
  - Robotics
  - Engineering and medicine

Assessment

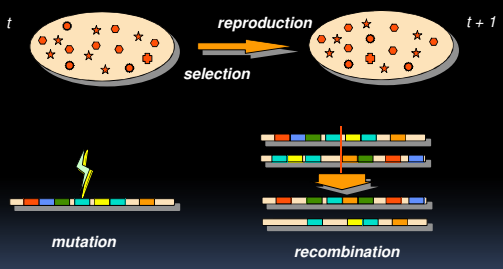
- Two assignments
  - mini-projects
  - Applying AI to tasks
  - Early part in Java

Example Areas

Multi-layered perceptron (Taken from Picton 2004)

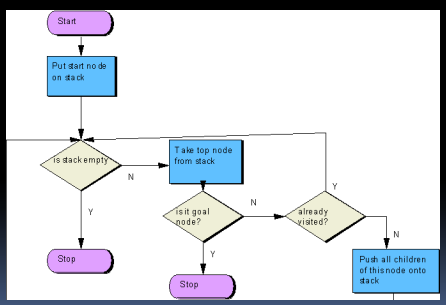


The Ingredients(Taken from: EvoNet Flying Circus www2.cs.uh.edu/~ceick/ai/EC1.ppt)



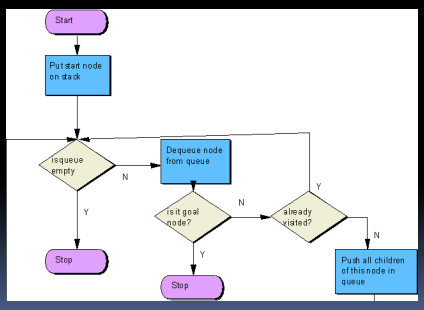
Depth-First Search

Taken from Jones (2005)



Breadth-First Search

Taken from Jones (2005)

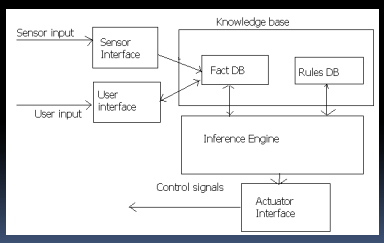


Knowledge Processing

- Introduce types of reasoning
- Deterministic
  - Propositional logic
  - Predicate logic
- Dynamic-non-monotonic
- Non-deterministic

Using an Expert System

- Taken from Johnson and Picton (1995)

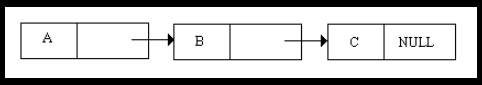


Internet and 'AI'

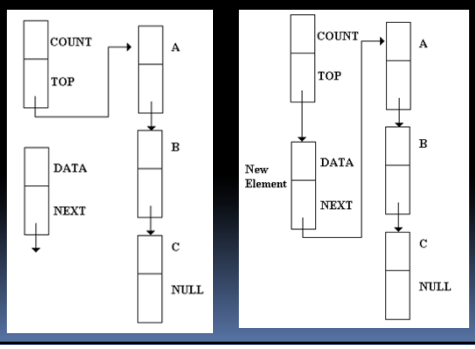
- Week A – AI on internet, basic introduction to semantic web, agents.
- Week B – Microformats
- Week C – Collective Intelligence and searching 1
- Week D – Collective Intelligence and searching 2

Basic structures

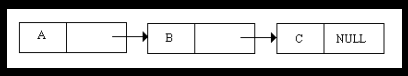
Data Structures-Linked List



Data Structures - Stack



Data Structures - Queue



Summary

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

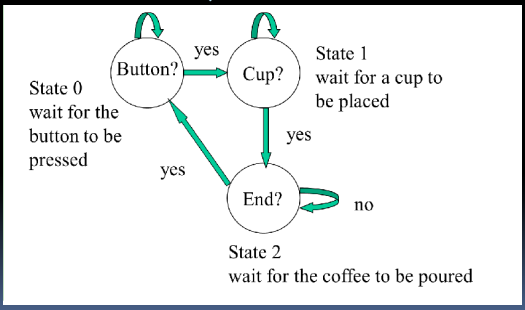
TASK 1: FINITE-STATE MACHINES

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)



Next-state table (Taken from Picton 2004)

	next state					
	button?		cup?		finished?	
present state	no	yes	no	yes	no	yes
0	0	1				
1			1	2		
2					2	0

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

- http://en.wikipedia.org/wiki/Finite_state_machine
- Picton PD (2004) CSY3011 Artificial Neural Networks, University College Northampton