Plan for next four weeks

- 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

Aims of sessions

- Introduce applications of AI on internet
- Neural Networks
- Brief look at agents

Neural network applications

- Modelling system based on clicks (Segaran 2007)
  - On-line applications can produce large amounts of feedback on user behaviour.
  - So we can build a ‘model’ of what results a user is more likely to choose.
  - An ANN can be used to this.

- A MLP
  - Inputs search terms
  - Outputs gives URLs that were returned

- Training
  - The ANN gives ‘rankings’ for the URLs, predict the users choice.
  - The choice comes from the weights.

- Training (cont)
  - If a URL is selected the weights are strengthen for the URL
  - If a URL is not selected weaken the link.
Fraud Detection (Marmanis and Babenko, 2009)

- Load the data set of transactions
- Calculate useful statistical information for each user
- Create an instance of the NN FraudClassifier class and give it a name
- Specify what attributes should be used by the classifier
- Specify the number of iterations during training
- Train the classifier
- Save the serialized version of the classifier, so that we can use it later, if needed
- Demonstrate that we can create a clone of that classifier through the load method
- Classify a couple of transactions from the training set
- Load the testing data set
- Create an instance of the FraudErrorEstimator to find the accuracy of the classifier on the testing dataset

Agents

- This is has been argued is the real power of the power of semantic web to produce machine-readable Web-content.
- Programs collating information form diverse sources.

Overall definition (Wikipedia (NA))

- In computer science, a software agent is a piece of software that acts for a user or other program in a relationship of agency. Such “action on behalf of” implies the authority to decide when (and if) action is appropriate. The idea is that agents are not strictly invoked for a task, but activate themselves

Intelligent Agents 1

- Taken from Wikipedia (NA)
- Capabilities of include:
  - ability to adapt
    - Adaptation implies sensing the environment and reconfiguring in response. This can be achieved through the choice of alternative problem-solving rules or algorithms, or through the discovery of problem solving strategies. Adaptation may also include other aspects of an agent's internal construction, such as recruiting processor or storage resources.

Intelligent Agents 2

- ability to learn
  - Learning may proceed through trial-and-error, then it implies a capability of introspection and analysis of behaviour and success. Alternatively, learning may proceed by example and generalization, then it implies a capacity to abstract and generalize.
Autonomous Agents

- Modified from Wikipedia (NA)
- Software agents that claim to be self-contained and capable of making independent decisions, and taking actions to satisfy internal goals based upon their perceived environment. All software agents in important applications are closely supervised by people who start them up, monitor and continually modify their behaviour, and shut them down when necessary.

Distributed and Multi-agents

- Modified from Wikipedia (NA)
- Agents are well suited to include their required resources in their description, can be designed to be very loosely coupled and therefore executed as independent threads and on distributed processors. When several agents interact they may form a multi-agent system. Such agents will not have all data or all methods available to achieve an objective and thus will have to collaborate with other agents. Also, there may be little or no global control and thus such systems are sometimes referred to as swarm systems. As with distributed agents, data is decentralized and execution is asynchronous.

Mobile agents

- Taken from Wikipedia (NA): Agent code that moves itself, including its execution state, on to another processor, to continue execution there. This is also referred to as mobile code.

Agents Attributes 1

- Based on Jones (2005) should have one or more of these:
  - Autonomous – user can let it get on with it without too much interaction.
  - Adaptive - it learns as it goes!
    - Ideally behaviour should change based on experience.
    - Very difficult to do for a general case.
    - A little easier to when the environment/domain is very closely specified.

Agent attributes

- Communicative – Got get the info!
  - Communicate with user;
  - Communication with other agents;
  - Communication technology has be incorporated.
- Collaborative – works with other agents to get to the goal.
  - Multi-agent systems.
- Personal
  - Certain agents need to have personality especially in entertainment computing.
- Mobile

What attributes to the following have?

- Spend 45 minutes in groups on what attributes each of these have in your opinion:
  - Lego-based robotics;
  - Sociable robots such as Kismet from last week;
  - Search Agent on the internet;
  - An agent involved in on-line auctions;
  - Viruses.
References and Bibliography