

CS 107 Fall 2006

Lecture 12: Artificial Intelligence

1 Kinds of Computer Programs.

1. Most of the job is user interaction, possibly with a simple business transaction. Example: a point-of-sale system. In these applications, the human interface is often more complex than any computation that takes place.
2. We know a good algorithm. These programs use a formula to compute an answer or an algorithm to solve a well-understood problem. Examples: the position of a rocket in space, given the launch time and speed; a management report with sorted data.
3. Some problems can only be solved by generating all possible solutions and searching through them for the best. We have no complete and efficient way to arrive at an answer. Problems that call for finding a maximum or a minimum are often like this. Examples: what is the most efficient way for a traveling salesman to visit all ten of the cities he covers?
4. Problems for which we don't know all the data or where we can't evaluate the importance of some of the data. These problems are addressed by the techniques of ARTIFICIAL INTELLIGENCE. We make guesses and use strategies (use heuristics) to do the best we can to find an acceptable solution. Example: Big Blue, a computer that plays world-class chess.

2 Traditional Areas of Artificial Intelligence

1. Game playing (where the computer is a player, not just the referee).
2. Medical diagnosis: at best, the computer is an aide to a trained person. An issue:
 - When the doctor and the computer do not agree, who should we trust?
 - Does it matter whether the doctor disagrees often or seldom with the computer?
 - Our local hospital monitors this issue and investigates doctors who often disagree. Is this a good way to control costs? to identify incompetent doctors?
3. Pattern recognition, including
 - OCR: optical character recognition (see OCR sample)
 - Image recognition, recognition of an intruder, face recognition, etc.
 - Robot navigation (see ASIMO sample)
 - Speech recognition
4. Language processing, including
 - Natural language understanding (see transcript of eliza demo).
 - Natural language translation (see Mary had a little lamb demo).