

CSC384: Intro to Artificial Intelligence



UTM Fall 2005

Instructor: Steve Engels
sengels@cs.utoronto.ca

The Robot Parallel

- Robots are the ultimate physical tool
 - instead of allowing humans to perform a task more effectively, robots replace humans entirely by taking over the control aspect of the task.
- Artificial intelligence (AI) is the robot's equivalent for *mental* tasks
 - computers are mental tools, allowing humans to perform mental tasks like calculation and recall more effectively
 - artificial intelligence replaces the human element entirely, performing cognitive tasks like comprehension, reasoning and decision-making.



CSC384 Lecture Slides © Steve Engels, 2005

Slide 2 of 7

The Computer Science View

- If all areas of computer science are tools for various mental tasks...
 - Databases:** information storage
 - Graphics:** visualization
 - Theory:** ????
- ...AI is the "smarter" version of these tasks

CS Task	AI Task
Databases	Data Mining
Graphics	Computer Vision
Theory	Theorem Proving

CSC384 Lecture Slides © Steve Engels, 2005

Slide 3 of 7

Defining AI

- "Artificial intelligence is about automating intelligent capabilities"
 - my graduate studies supervisor, Dale Schuurmans
- The Turing Test: The ability to achieve human-level performance on cognitive tasks, sufficient to fool an interrogator.
 - Requirements:
 - natural language processing
 - knowledge representation
 - automated reasoning
 - machine learning
 - (computer vision)
 - (robotics)
 - The last two requirements are for the **total Turing Test**, which does not allow physical separation between the interrogator and the subject



CSC384 Lecture Slides © Steve Engels, 2005

Slide 4 of 7

Defining AI (cont'd)

- But what qualifies a system as being "intelligent"?
- One division of AI definitions is into **weak AI** or **strong AI** categories:
 - weak AI** = systems that behave intelligently
 - strong AI** = system that actually think, and are intelligent
- AI definitions can also fit into the **human** or **rational** categories:
 - human-centered** = intelligent systems try to achieve human performance at various intelligent tasks
 - rationality-centered** = intelligent systems try to perform human tasks as intelligently as possible
 - Also called **classical** versus **stochastic** AI
- See Figure 1.1 in Russell & Norvig

CSC384 Lecture Slides © Steve Engels, 2005

Slide 5 of 7

Practical Applications of AI

- Robots
 - automated cars, volleyball-playing robots, Sony AIBO
- Logistics
 - transport of goods, timetable scheduling
- Game playing
 - Deep Blue (chess), Chinook (checkers), real-time AI
- Speech recognition
 - Ticketmaster, Bell, Microsoft's Dr. Who project
- Language understanding
 - ELIZA, Ask Jeeves, spelling & grammar checkers, translation software, Google
- Expert systems
 - animal classification, medical diagnosis, computer configuration
- Theorem proving
 - Fermat's last theorem, 4-colour theorem
- Artificial life
 - Furbies, personal avatars
- Computer vision
 - handwriting recognition, face recognition



CSC384 Lecture Slides © Steve Engels, 2005

Slide 6 of 7

What this course is about

- Artificial intelligence problems and approaches
- The underlying mathematics and algorithms present in artificial intelligence systems
 - practical applications will be explored in the assignments and the project
- AI as a research area
 - there is no single answer to the problem of creating intelligence. Anybody who says otherwise is trying to sell you something
- Debunking AI myths
- Illustrating the limitations of AI techniques