



UC Berkeley
EECS Lecturer SOE
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CS10 The Beauty and Joy of Computing

Lecture #15 Artificial Intelligence

2011-10-24

ROBOT RIDES BIKE!

The PRIMER-V2 robot is capable of starting from a stopped position, start riding, follows a path specified by a controller, and can stop without falling!



<http://robosavvy.com/forum/viewtopic.php?p=32542>

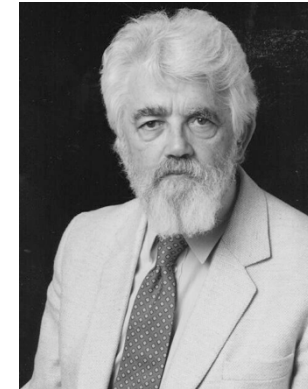


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AI Definition by John McCarthy

- "Getting a computer to do things which, when done by people, are said to involve intelligence"
- Finesses the idea of whether a computer has consciousness, whether they have rights, etc



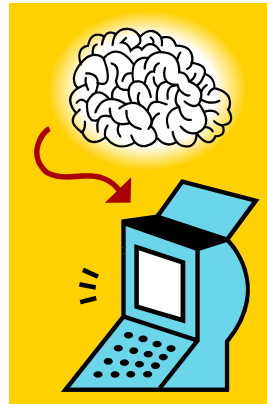
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en.wikipedia.org/wiki/Artificial_intelligence

What intelligent things do people do?

- Planning
- (Machine) Learning
- Natural Language Processing
- Motion and manipulation
- Perception
- Creativity
- General Intelligence

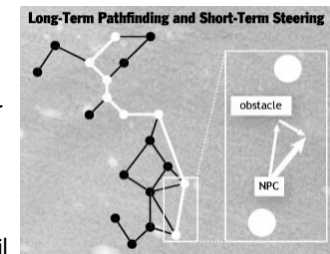


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Planning (from Video Games lecture)

- Range of intelligence
 - Low: simple heuristics
 - Medium: pathfinding
 - High: Learns from player
- Dynamic difficulty
 - Must hold interest
 - "Simple to learn, difficult to master is the holy grail of game design."
 - Cheating AI (e.g., racing)



www.businessweek.com/innovate/content/aug2008/id20080820_123140.htm
en.wikipedia.org/wiki/Dynamic_game_difficulty_balancing
en.wikipedia.org/wiki/Game_artificial_intelligence
queue.acm.org/detail.cfm?id=971593



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Machine Learning

- **"A program learns if, after an experience, it performs better"**
- **Algorithm Types**
 - Supervised learning
 - Give a system input & output training data, and it produces a classifier
 - Unsupervised learning
 - Goal: determine how data is organized, or clustered
 - Reinforcement learning
 - No training data, real-time corrections adjust behavior

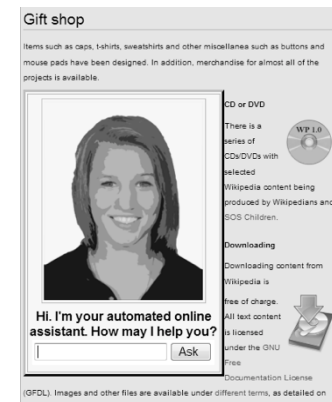


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Natural Language Processing

- **Form of HCI**
- **Known as "AI-complete" problem**
 - Requires extensive knowledge of world
- **Statistical NLP**
 - Imagine a supervised learning system trained on all text of Web
 - It could easily correct your text (and guess what you'd say) by seeing what's common



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Robotics

- **For many, the coolest and scariest part of AI**
- **Also involves HCI**
- **Combines fields of AI**
 - Speech recognition
 - Synthetic voice
 - Machine vision
 - Planning
- **IPRE believes every one should have their own personal robot!**



TOPIO, the ping-pong playing robot



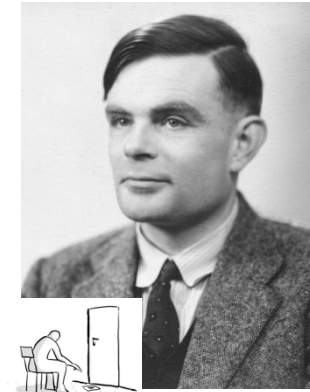
ASIMO Humanoid robot from Honda
UC Berkeley's towel-folder

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Turing Test for Intelligence

- In 1950, Turing defined a test of whether a machine could "think"
- "A human judge engages in a natural language conversation with one human and one machine, each of which tries to appear human. If judge can't tell, machine passes the Turing test"
- John Searle argued against the test via the Chinese room experiment, in which someone carries on a conversation by looking up phrases in a book. Does that person understand Chinese?



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