

Artificial Intelligence

Introduction

Lecture 1

Outline: Introduction to AI



- ✓ N-ways Introduction
 - Personal Information and Background
 - ✓ Course Outline:
 - Requirements and Expectation
 - Module Assessment
 - Recommended Books
 - Layout of Course (14 lessons)
 - Office Hours
 - ✓ Course Delivery Methods
 - ✓ General Reference for the Course
 - ✓ Goals and Objectives of module
- ✓ Introduction to AI
 - What is Intelligence?
 - An Intelligent Entity
 - The Age of Intelligent Machines
 - Definitions of AI
 - Behaviourist's View on Intelligent Machines
 - Turing's Test - Part 1 & 2
 - History of AI
 - Examples of AI systems

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Course Outline: Recommended Books



- ✓ **Artificial Intelligence** by Patrick Henry Winston
- ✓ **Logical Foundations of Artificial Intelligence** by Michael R. Genesereth, Nils J. Nilsson, Nils J. Nilsson
- ✓ **Artificial Intelligence, Luger, Stubblefield**
- ✓ **Artificial Intelligence : A Modern Approach** by Stuart J. Russell, Peter Norvig
- ✓ **Artificial Intelligence** by Elaine Rich, Kevin Knight (good for logic, knowledge representation, and search only)

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General Reference for the Course



- ✓ AI related information.
- ✓ General computer-related news sources.
- ✓ General Information Technology issues.
- ✓ All web links in my AI website.
- ✓ Whatis.com (Computer Science Dictionary)
<http://whatis.com/search/whatisquery.html>
- ✓ Technology Encyclopedia
<http://www.techweb.com/encyclopedia/>
- ✓ Computing Dictionary
<http://wombat.doc.ic.ac.uk/>
- ✓ Webster Dictionary
http://work.ucsd.edu:5141/cgi-bin/http_webster

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Goals and Objectives of module



- ✓ Understand motivation, mechanisms, and potential of Artificial Intelligence techniques.
- ✓ Balance of breadth of techniques with depth of understanding.
- ✓ Conversant with the applicational scope and solution methodologies of AI.
- ✓ Knowledge in LISP.
- ✓ Ready to apply AI techniques to the practice.

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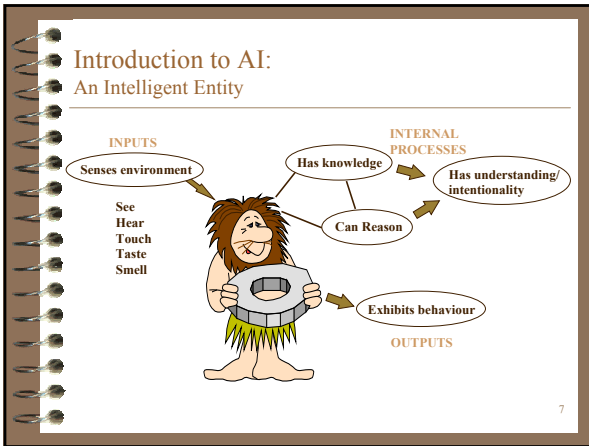
Introduction to AI: What is Intelligence?



Intelligence, taken as a whole, consists of the following skills:-

1. the ability to **reason**
2. the ability to **acquire and apply** knowledge
3. the ability to **manipulate** and communicate ideas

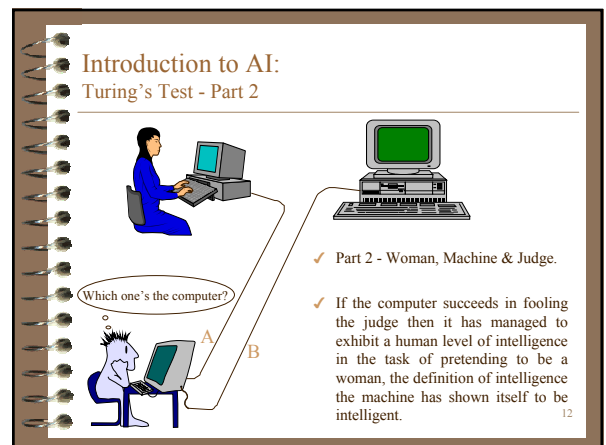
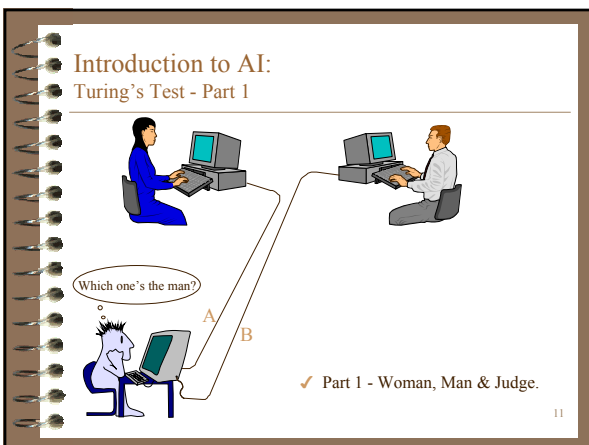
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- ### Introduction to AI: The Age of Intelligent Machines
- ✓ **1st Industrial Revolution:** the Age of Automation: Machines extend & multiply man's physical capabilities
 - ✓ **2nd Industrial Revolution:** the Age of Info Tech: Machines extend & multiply man's mental capabilities
 - ✓ **Information & Knowledge Revolution:** the Age of Knowledge Technology "...working smarter, not harder." How do we make our systems smarter? - by building in intelligence
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- ### Introduction to AI: Definitions of AI
- ✓ "... the science of making machines do things that would require intelligence if done by humans" - Marvin Minsky
 - ✓ AI is the part of computer science concerned with designing intelligent computer systems -E. Feigenbaum
 - ✓ Systems that can demonstrate human-like reasoning capability to enhance the quality of life and improve business competitiveness - Japan-S'pore AI Centre
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- ### Introduction to AI: Turing's Test
- ✓ In 1950 Alan Turing published his now famous paper "**Computing Machinery and Intelligence**." In that paper he describes a **method for humans to test AI programs**.
 - ✓ In its most basic form, a human judge sits at a computer terminal and interacts with the subject by written communication only. The judge must then decide if the subject on the other end of the computer link is a human or an AI program imitating a human.
 - ✓ <http://www.turing.org.uk/turing/>
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Introduction to AI: History of AI




Important research that laid the groundwork for AI:

- ✓ **1900-50s:** formal grammar & language theories
- ✓ **1920-30s:** formalisation of reasoning (predicate calculus and propositional logic)
- ✓ **1940-50s:** Cybernetics - communication in man and machine
- ✓ **1950s:** reality of digital computers (Mark I, ENIAC, EDVAC and UNIVAC)
- ✓ **Others: Information Theory, Neurological Theories, Boolean Algebra, etc.**

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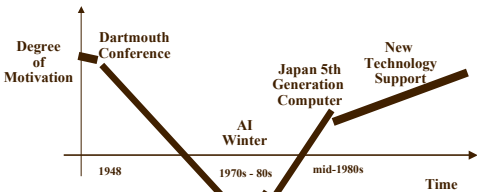
Introduction to AI: History of AI (cont'd)



- ✓ Basic philosophy is recorded since ancient Greece
- ✓ Early push after computer discovered (50's): Connectionist (neural net) vs. Symbolist/Logicist (AI)
- ✓ 1956 - recognised as the official beginning of AI - The Dartmouth Summer Workshop
- ✓ The 1950s was also noted for chess playing programs, machine translation, automatic theorem provers, Chomsky generative grammars and LISP
- ✓ CMU, Stanford, and IBM
- ✓ Early successes and enthusiasm - neural learning, theorem provers, problem solvers (GPS), game players, etc.

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Introduction to AI: History of AI (cont'd)

Adapted from:
Joe Carter (Andersen Consulting, 1988)
Oliver Tian (Andersen Consulting, 1989)

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Introduction to AI: Examples of AI systems



- ✓ Robots
- ✓ Chess-playing program
- ✓ Voice recognition system
- ✓ Speech recognition system
- ✓ Grammar checker
- ✓ Pattern recognition
- ✓ Medial diagnosis
- ✓ System malfunction rectifier
- ✓ Game Playing
- ✓ Machine Translation
- ✓ Resource Scheduling
- ✓ Expert systems (diagnosis, advisory, planning, etc)
- ✓ Machine learning
- ✓ Intelligent interfaces

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Class Activity: AI and Us



To discuss in groups on any AI-ish system(s) that the members are familiar with, some examples:

- ✓ Robots
- ✓ Chess-playing program
- ✓ Voice recognition system
- ✓ Speech recognition system
- ✓ Grammar checker
- ✓ Pattern recognition
- ✓ Medial diagnosis
- ✓ System malfunction rectifier
- ✓ Mars pathfinder
- ✓ Machine Translation
- ✓ Resource Scheduling
- ✓ Expert systems
- ✓ Machine learning
- ✓ Intelligent interfaces

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End of Lecture 1

Good Day.