Definition

Artificial Intelligence:

“The implementation and study of systems that exhibit an autonomous intelligence or behavior of their own” (Wikipedia.com)

Originally “the science and engineering of making intelligent machines”
Synonyms to AI:

- Computational intelligence
- Synthetic Intelligence

AI Research:

- Producing machines to computerize tasks that require intelligent behavior
HELLO, HELEN.

WHAT? SYLVIA!
THANK GOODNESS!
I DIDN'T KNOW IF YOU
ARTIFICIALLY INTELLIGENT
AGENTS COULD MAKE IT HERE!

WELL, IT WAS A BIT DIFFICULT
TO SQUEEZE THROUGH YOUR
BANDWIDTH. I GAINED A FEW
GIGABITS ON VACATION.

LISTEN, 10% OF MY NETWORK'S BEEN TAKEN OVER BY SOMETHING. CAN YOU SEE WHAT IT IS?

OF COURSE, DEAR. UM, DO YOU THINK IT'S INTELLIGENT?
LIKE ME?

IT'S POSSIBLE. WHY?

WELL, UM, HEH HEH... HOW DO I LOOK?
AI and Computer Science

- Artificial Life:
  - Study of digital organisms to learn about biological systems and evolution
AI and Computer Science

Automated Reasoning:

- Solving engines
AI and Computer Science

- Computer vision:
  - Algorithms for identifying 3D objects from 1 or more 2D pictures
AI and Computer Science

- Machine learning:
  - Automated creation of a set of rules and axioms based on input
AI and Computer Science

- Natural language processing/Computational linguistics
  - Automated understanding and generation of human language
AI and Computer Science

Robotics:

- Algorithms for controlling robot behavior
Examples of AI

- Control
- Planning and scheduling
- Answering diagnostic/consumer questions
- Handwriting
- Natural language
- Speech
- Facial Recognition
- Play games
- Mundane tasks
- Writing Java programs with a problem description
- Compose music
- Create new Math theorems
Goals of AI

- Focused on answering real life problems
- Critics say no actual comprehension by an AI machine has taken place
AI Timeline

- 1950- Alan Turing introduces the Turing test to test a machine’s capability
- 1951- The 1st AI programs were written on the Ferranti Mark I machine at the (U of Manchester)
  - Checkers and Chess playing program
- 1956- John Macarthy coined the term “Artificial Intelligence” as the topic of the Dartmouth Conference
  - This was considered to be the main event for Artificial Intelligence as a field
  - It introduced the term AI
The Turing Test

- It asked the question: Can a machine think?
- Turing said yes
- Test:
  - Humans hold teletype conversation on any topic with an unseen correspondent
  - If the human believes he/she is talking to another human when really talking to a computer the computer is intelligent
AI Timeline Continued

- **1958-** John McCarthy invented the Lisp programming language
  - A computer programming language with fully parenthesized syntax

- **1965-** Joseph Weizenbaum built ELIZA
  - Interactive program that carries on a dialogue in English language on any topic

- **1972-** The Prolog programming language was developed by Alain Colmerauer
  - Logic programming language

- **1973-** Edinburgh Freddy Assembly Robot
  - Computer controlled assembly system
AI Timeline Continued

- 1991- AI logistics systems were used in the 1st Gulf War to save US $

- 1994- Twin robot cars VaMP and VITA-2 drove more than 1000 kilometers on a Paris highway
  - Autonomous driving in free lanes, convoy driving, lane changing

- 1997- Chess Machine IBM beats the world chess champion

- 1999- Sony introduces AIBO—Artificially Intelligent pet

- 2004- DARPA Grand Challenge: autonomous vehicles in a competition for prize money

- 2005- Honda’s ASIMO robot walks like a human
Mechanisms and Classifiers

Mechanisms:

- AI systems built around automated inference engines
- If-then statements

Classifiers:

- Pattern recognition for condition making
- Neural network, support vector machine, k-nearest neighbor algorithm, Guassian mixture model, naïve Bayes classifier, decision tree
"He's crashed!"
AI

Movie trailer: http://youtube.com/watch?v=sqS83f-NUww&mode=related&search=

http://www.moviecritic.ca/reviews/2001/ai_artificial_intelligence/poster.jpg
Conventional AI

- Methods = machine learning
- Formalism
- Statistical analysis
- Symbolic AI, logical AI, neat AI, Good Old Fashioned Artificial Intelligence (GOFAI)
  - Expert Systems: reasoning capabilities

Case based reasoning: stores a set of problems/answers in an organized data structures = cases
AI programming languages/styles:

- Led to advances in programming languages
- Lisp dialects, Planner, Actors, the Scientific Community Metaphor, production systems, and rule-based languages
- **If-then statements (productions)**
  - Intrinsic variation, Variation produced in response to a dynamic environment
Strong vs. Weak AI

**Strong AI:**
- Forms of AI that can truly reason/solve problems
- Computers become self-aware but don’t exhibit human like thought process

**Weak AI**
- Denies the possibility of computers being self-aware
Ethical questions of AI

- What are the limitations? Can the computers become out of control?

- Will they eventually be able to correct themselves automatically (Matrix: exaggerated example)

- Will it replace humans in all jobs?

- How will society handle something that is so powerful?
Humans vs. Computers

Humans:
- Do evenly on all tasks

Computers:
- Great at simple tasks and have trouble with complex tasks