Artificial Intelligence
(AI)

+  

Information Systems
(IS)
(Practical Applications of Computer Technology)

Artificial Intelligence with a focus on practical applications.
AI/Intelligent Systems

- Perception — vision, speech
- Natural Language Processing — understanding, generation, translation
- Commonsense Reasoning
- Robotics
- Game Playing
- Mathematics
- Expert Systems
- Learning
- Intelligent Network Agents (Softbots)
- Semantic Web
- Decision Support Systems
AI Languages

- **LISP**: Invented in 1956, by John McCarthy. designed primarily for symbolic processing.
- **Prolog**: Programming in logic
  logic programming language, early 1970’s, Kowalski, Colmerauer
- **CLIPS**: Expert System Tool/Environment
  NASA 1980’s
- **Java**
- **JESS**
Topics

Problem Solving Methods

1. Search
2. Logic, Deduction
3. Constraint Satisfaction

Also

1. Planning
2. Learning (symbolic, neural networks)
3. Natural Language Processing

Also

- How to implement these concepts
- Real-World Applications
What is AI?

Artificial intelligence (AI) is the design and study of computer programs that behave intelligently. These programs are constructed to perform as would a human or an animal whose behavior we consider intelligent.

Dean, Allen, and Aloimonos

Artificial Intelligence (AI) may be defined as the branch of computer science that is concerned with the automation of intelligent behavior.

Luger and Stubblefield
## Definitions of AI

<table>
<thead>
<tr>
<th>Systems that think like humans</th>
<th>Systems that think rationally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systems that act like humans</td>
<td>Systems that act rationally</td>
</tr>
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What is AI?

Acting rationally means acting in such a way as to achieve one's goals given one's beliefs. An agent is just something that perceives and acts. In this approach, AI is viewed as the study and construction of rational agents.

Russell and Norvig
Approaches to doing AI

▶ Symbolic
  ▶ neat
  ▶ scruffy

▶ Non-symbolic
  ▶ PDP, neural nets, connectionism
  ▶ Situated Action
My Interests

1. Automated Reasoning
   - modal logics
2. Knowledge Representation and Reasoning
   - actions and their effects on the world and on the knowledge of agents.
3. Computational Linguistics/Cognitive Science
4. Agents, Semantic Web
Deduction

1. All rich men are chauvanists.
2. Fred is a man.
3. Fred is rich

Is Fred a chauvanist?
Deduction

1. Janet likes anyone who is rich.
2. Programmers are rich if they use Prolog.
3. John is bald.
4. Janet uses COBOL.
5. John uses Prolog.
6. John is a programmer.

Does Janet like John?
Java

- Development began in 1991 within Sun Microsystems as a language to be used for small consumer devices.
- Project changed into a language for the internet.
- Java was first demonstrated in 1995 and then released in 1996.
- Java Language Specification
- Java FAQ
- Java White Paper
Java Characteristics

- Simple
- Object Oriented
- Distributed
- Robust
- Secure
- Portable
- Interpreted
- High Performance
- Multithreaded
- Dynamic
Java Example

class HelloWorld {
    public static void main(String[] args) {
        System.out.println("Hello, world");
    }
}

> javac HelloWorld.java

> java HelloWorld

Hello, world

>
import java.applet.*;
import java.awt.*;

/** This applet just says "Hello World! */
public class FirstApplet extends Applet {
    // This method displays the applet.
    // The Graphics class is how you do all
    // drawing in Java.
    public void paint(Graphics g) {
        g.drawString("Hello World", 25, 50);
    }
}

Applet
Applet (cont)

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</HEAD>

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<H2>CS520: Introduction to Intelligent Systems</H2>

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</Applet>

</BODY>
Another Example

class Fibonacci {
    /** Print out the Fibonacci sequence for */
    /** values < 50 */
    public static void main(String[] args) {
        int lo = 1;
        int hi = 1;
        System.out.println(lo);
        System.out.println(hi);
        while (hi < 50) {
            System.out.println(hi);
            hi = lo + hi;
            lo = hi - lo;
        }
    }
}