

Artificial Intelligence
(AI)

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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

Systems that think like humans	Systems that think rationally
Systems that act like humans	Systems that act rationally

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
`http://java.sun.com/docs/books/jls/html/index.htm`
- ▶ Java FAQ
`http://java.sun.com/people/linden/intro.html`
- ▶ Java White Paper
`http://java.sun.com/docs/white/langenv/`

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
```

```
>
```

Applet

```
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 (cont)

```
<HTML>
```

```
<HEAD>
```

```
<TITLE>Course Materials for CS 520</TITLE>
```

```
</HEAD>
```

```
<BODY BGCOLOR="#7aaad0" text="#000000">
```

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

```
<APPLET code = "FirstApplet.class"  
        width=150 height=100>
```

```
</Applet>
```


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);
        while (hi < 50) {
            System.out.println(hi);
            hi = lo + hi;
            lo = hi - lo;
        }
    }
}
```