Title: Introduction to Artificial Intelligence

Id: CSCE 476-876, Spring 2000

URL: `www.cse.unl.edu/~choueiry/CSCE476-876`

Berthe Y. Choueiry (Shu-we-ri)

`choueiry@cse.unl.edu`

`Tel: (402)476-5444`

Outline

- Overview and administrative trivia
- What is AI?

If time allows, demo ACL

Administrivia

Meetings: M/W/F from 12:30 to 1:20 p.m.

Office hours: M/F from 1:20 to 2:20 p.m., or by appointment.

TA: To be announced.

Class home page: `www.cse.unl.edu/~choueiry/CSCE476-876`
for syllabus, schedule, lecture notes, assignments, reading material, announcements. **Please check often.**

Books:
Textbook: Artificial Intelligence: A Modern Approach (AIMA)
Reference book: LISP, 3rd Edition, Winston & Horn (LWH)
Books on reserve at the Love Library (LL)

Interactions administrated by `handin`
Broadcast: `cse476-ml@cse.unl.edu`
To instructor & TA: `cse476@cse.unl.edu`

Workload

Reading material: AIMA, LWH, and the web.
Regularly check the schedule page.

Glossary: of important terms
(1) in margins in AIMA
(2) highlighted during lectures, and
(3) sent by email

Assignments: programming, theoretical, and library-search
Programming: Allegro Common Lisp

Surprise quizzes on material covered during the lectures and/or by the required reading.

Tests: a pre-test, a mid-term and a final.

Grading policy

Pre-test: 5%

Glossary: 10%

Quizzes: 20%

Homework: 25%

Programming: 50% correctness, 25% programming style, and 25% documentation

Tests: 40% (20% each)

$\longrightarrow$ Bonus awarded for 100% attendance (sign up!)

$\longrightarrow$ Exceptional performance yields <u>**may**</u> exemption from final exam

Pretest

Scheduled for Friday, Jan 14, 2000

One part to be completed in the class

One part to be completed at home

Basic knowledge of mathematics, logic, algorithm, data structure, complexity

Topics

- Intelligent agents
- Search
- Logical systems
- Planning systems
- Uncertainty: probability and decision theory
- Learning

If time allows: perception, robotics, NLP, philosophical issues

Goal of AI

- Understand intelligent entities (reasoning mechanisms)
- Build intelligent entities (systems)
  contrast with cognitive science and philosophy

→ Build computers with human-level intelligence.. or better
(human reasoning exhibits systematic errors)

Using: slow, tiny brain, biological or electronic

In order to: perceive, understand, predict and manipulate a far more complex world

Proof of feasibility: human beings
just look in the mirror :-)

New discipline, old topic

AI is a new discipline (vs. physics):
- term coined in 1956 by John McCarthy
- task is enormous, opportunities are wide, easy to make a difference
- Einstein is (probably) yet to come

Study of Intelligence is an old topic. Philosophy: learned but speculative

Advent of computers introduced a new experimental and theoretical discipline: theories can now be tested
$\longrightarrow$ out of the armchair, into the fire

Early Systems were naive (rule-based, etc.)
Paradigms are getting more difficult, elaborate, richer, more subtle

Focus and fields

General:

- perception
- logical reasoning

Specific: (task oriented)

- chess
- proving mathematical theorems
- pun writing
- diagnosing diseases
- planning/scheduling tasks of building construction

A truly universal field

Often scientists/engineers become AI researchers:
want to formalize, systematize, automate the intellectual tasks they are trained to carry out (electrical engineers, civil engineers, medical doctors)

Sometimes, AI researchers delve into specific fields to apply their methods (biology, power systems)

Include 8 definitions in Fig. 1.1

Views of AI fall into four categories:

Thinking humanly	Thinking rationally
Acting humanly	Acting rationally

Thinking humanly	Thinking rationally
Acting humanly	Acting rationally

Dimensions for classification:

Vertical: concern, focus of efforts
- $\rightarrow$ thought process and reasoning
- $\rightarrow$ behavior and action

Horizontal: evaluation of success
- $\rightarrow$ against human performance
- $\rightarrow$ against ideal concepts of intelligence

Rationality = do the right think

Thinking humanly	Thinking rationally
Acting humanly	Acting rationally

Classification contrast human & rationality:
- Human: empirical science, hypothesis and experimental
- Rationality: mathematics + engineering

No right/wrong, all four approaches are valuable

List of terms for glossary:

Due date: Jan 19, 2000

Cognitive science
Decision theory
Deduction
Expert Systems
Frames
Genetic Algorithms
Hidden Markov Models
Induction
Intractability
Lisp
Neural Networks
Machine Learning
Means-end analysis
Natural Language Processing
Prolog
Rationality
Reduction (problem reduction)