

**CSCI 5582**  
**Artificial Intelligence**

Lecture 1  
Jim Martin

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**Today: 8/29**

- What is AI?
- Administrative stuff
- Overview of course topics

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**A Mental Exercise:**  
**Why Artificial Intelligence**

First let's consider some alternative names for this field:

- Fake intelligence
- Imitation intelligence
- Synthetic intelligence
- Simulated intelligence

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## A Framework

"The automation of activities that we associate with human thinking..." Bellman 1978	"The study of mental faculties through the use of computational models" Charniak&McDermott
"The study of how to make computers do things at which at the moment people are better. Rich&Knight	"The branch of CS that is concerned with the automation of intelligent behavior." Lugar&Stubblefield

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## Our Framework

Getting computers to do the right thing based on their circumstances and what they know.

- No presuppositions about how they should be designed to do the right thing
  - I.e. not limited to how people do it
- Evaluation is based on performance, not on how the task is performed

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## Applied Areas of AI

- Game playing
- Speech and language processing
- Expert reasoning
- Planning and scheduling
- Vision
- Robotics

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## Some Examples

- Playing chess
- Driving on the highway
- Translating languages
- Recognizing speech
- Diagnosing diseases
- Mowing the lawn

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## Playing Chess

- Environment?
  - Board
- Actions?
  - Legal moves
- Doing the right thing?
  - Moves that lead to wins

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## Recognizing Speech

- Environment
  - Audio signal
  - Knowledge of user
- Actions
  - Choosing word sequences
- Doing the right thing
  - Recovering the users words

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## Diagnosing Diseases

- Environment
  - Patient information
  - Results of tests
- Actions
  - Choosing diseases
  - Choosing treatments
- Doing the right thing
  - Eliminating disease

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## Translation

- Environment
  - Source text to be translated
- Actions
  - Word sequences in target language
- Doing the right thing?
  - Words that achieve the same effect
  - Words that are faithful to the source

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## Google/Arabic



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## Google/Arabic Translation

**Killing Palestinians and wounding nine in the raids sector.**  
Nine Palestinians were wounded among civilians in an Israeli air raid in the neighborhood near the Gaza Strip. This comes immediately after the killing of two prominent Al-Aqsa Martyrs Brigades in the Israeli occupying forces carried out air and infantry forces in the Babine camp in the West Bank.

● **Bashir meets Fraser, the Security Council will not impose forces Darfur**  
It is scheduled to meet with Sudanese President Omar al-Bashir Jenday Fraser Assistant Minister for Foreign Affairs of the American attempt to persuade officials in Khartoum, Sudanese Darfur deployment of the nationalities. For his part, US Ambassador to the United Nations that it has no intention of the Security Council to impose its forces in the province.

**Rumsfeld and Cheney insist on keeping the American forces in Iraq**  
Called American Defense Minister Donald Rumsfeld Americans to show patience on Iraq. I take Vice President Dick Cheney calls Democrats withdrawal of American forces from Iraq link and the possibility of early withdrawal of attacks inside the United States.

● **Killing civilians and wounding officer suicide attack in Afghanistan**  
The international force to help establish security (ISAF) killed civilians and the wounding of an officer in an attack against Afghan forces convoy south Atlantic Afghanistan. In the capital Kabul, a hand grenade exploded at the passage of manufacture French patrol was not reported injuries or damage.

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## Driving

- **Environment**
  - Restricted access highway
- **Actions**
  - Accelerate, brake, turn, navigate, other controls
- **Doing the right thing**
  - Stay safe, get where you want to go, get there quickly, don't get a ticket

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## 2005 DARPA Challenge



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## 2007 Challenge

The DARPA Urban Challenge will feature autonomous ground vehicles executing simulated military supply missions safely and effectively in a mock urban area. Safe operation in traffic is essential to U.S. military plans to use autonomous ground vehicles to conduct important missions.

DARPA will award prizes for the top three autonomous ground vehicles that compete in a final event where they must safely complete a 60-mile urban area course in fewer than six hours. First prize is \$2 million, second prize is \$500,000 and third prize is \$250,000. To succeed, vehicles must autonomously obey traffic laws while merging into moving traffic, navigating traffic circles, negotiating busy intersections and avoiding obstacles.

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## The Architectural Components of AI Systems

- State-space search
- Knowledge representation
- Logical reasoning
- Reasoning under uncertainty
- Learning
- Sensing/Motion components
- Communication

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## Administrative Stuff

- CAETE
- Web page
- Reasonable preparation
- Requirements
- Programming

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## CAETE

A couple of things about this format

- Classes are recorded
- They are available for viewing on the Web
  - Not a substitute for coming to class
- Don't make a mess

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## Web Page

The course web page can be found at.  
[www.cs.colorado.edu/~martin/csci5582.html](http://www.cs.colorado.edu/~martin/csci5582.html)

It has (will have) the syllabus, lecture notes, assignments, announcements, etc.

You should check it daily for new stuff.

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## Preparation

- Basic algorithm and data structure analysis
- Ability to program
- Some exposure to logic
- Exposure to basic concepts in probability
- Familiarity with linguistics, psychology, and philosophy
- Ability to write well in English

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## Requirements

- READ the book!
  - Artificial Intelligence: A Modern Approach  
Russell and Norvig, Prentice-Hall 2002
- 4 or 5 assignments
- 3 quizzes and a final

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## Grading

- Assignments - 30%
- Quizzes - 30%
- Final - 30%
- Participation - 10%

Looks like the final is scheduled for 12/18 at 1:30. Don't schedule your holiday travel prior to that.

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## HW Late Policy

- Assignments are due in class, at the beginning of class, on the assigned due date.
- That is unless you've made some arrangement with me ahead of time.

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## Programming

The programming for this class will be done in Python.

- Python is a
  - High-level, interpreted, scripting language suitable for the homeworks in this class.
  - Free versions are available for UNIX, Windows and Macs

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## Main Course Topics

- Agents
- State space search
- Knowledge representation
- Uncertain reasoning
- Machine learning
- Speech and language processing

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## Assignment 1

- Two parts
  - Install and learn Python
  - A simple programming problem
  - A short writing assignment
- See the web page for more details (soon)
- Both are due in class at the start of class on 9/7

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## Next Time

- Read Chapters 1 and 2
- Get started on the first assignment

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