Artificial Intelligence Application Development

Introduction

Today's Outline

Course Overview

Administration

Objectives

Ability to build simple versions of a few AI applications

Familiarity with full-scale versions of the same applications

Application building using paradigms of AI Programming

Mastery of Python, a popular programming language useful for AI applications and rapid prototyping

Major Topics of this Course

Advanced AI Topics

- natural language processing
- machine learning
- others tailored to class interests

Methodologies, Tools and Languages

- knowledge-based and statistical
- regular expressions, rule systems, grammars, probability, automata, and more
- Python

Applications

- from tokenizers to intelligent email agents

Artificial Intelligence

The field of *Artificial Intelligence (AI)* is primarily concerned with understanding and building intelligent entities.

AI is one of the newest (since 1956) and oldest (since 4000 BC) disciplines.

Studying AI involves studying formal representations, and algorithms for their manipulation.

Python

Shallow learning curve

- designed to be easily learned

Support for rapid prototyping

- interpreted, with no compilation step

Self-documenting code

- "executable pseudocode"

Support for good programming style

- object-oriented

NLTK: Python-based Courseware

A software package for manipulating text and performing AI/NLP tasks

- advanced tasks are possible from an early stage
- permits student projects at various levels (tweaking modules, writing modules, building systems)
- standard and consistent interfaces precisely define tasks and allow tasks to be easily combined

NLTK Contents

Python Modules define standard interfaces and sample implementations for many tasks common to NLP and AI

- data types (tokens, trees, ...)
- processing techniques (tokenizing, parsing, ...)
- probability modeling
- tagging
- parsing
- classifying
- visualization

Tutorials provide gentle introductions

Reference documents give precise explanations

Sample Pitt Applications

Tutor students in areas such as physics

Access the web over the telephone

Recognize opinions in the world press

Detect disease outbreaks

Demos

Dialogue Systems

- ELIZA (www-ai.ijs.si/eliza/eliza.html)

Question Answering

- AnswerBus (misshoover.si.umich.edu/~zzheng/qa-new)
- Ask Jeeves (www.ask.com)

Machine Translation

- Babelfish (babelfish.altavista.com)

Games

- Tic Tac Toe (http://www.geocities.com/chen_levkovich/tictactoegame.htm)

Administration

Professor

Textbook

Web page

Requirements

Who should be here

Dr. Diane Litman

Affiliations

- Associate Professor, Computer Science Department
- Research Scientist, LRDC
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- Member, CIRCLE

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Office Hours TBA

Litman, cont.

Background

- 2001-present: University of Pittsburgh
- 1985-2001: Technical Staff, AI Principles Research Department, AT&T Labs - Research (formerly AT&T Bell Laboratories)
- 1990-1992: Assistant Professor, Computer Science, Columbia University
- 1986: PhD, Computer Science, University of Rochester (*Plan Recognition and Discourse Analysis: An Integrated Approach for Understanding Dialogues*)

Homepage

- http://www.cs.pitt.edu/∼litman

Litman, cont.

Research

- Speech and Natural Language Processing
  - http://www.cs.pitt.edu/∼litman/nlplab.html
- Other Artificial Intelligence
  - machine learning applications
  - user modeling and personalization
  - knowledge representation
  - plan recognition

Teaching Assistant

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Office Hours

- TBA

Class

Who are you?

Texts

Learning Python (Help for Programmers) by Mark Lutz and David Ascher

Selections from other textbooks

Course Web Page

URL

- www.cs.pitt.edu/~litman/courses/cs1573/1573.html

Syllabus

- topics
- readings
- assignments
- lecture notes
- announcements
- NOTE: involves viewing/printing postscript, pdf, ppt, etc.

Requirements

Readings (before class!)

Homeworks (problem sets, writing and using programs)

Email Filtering Project (programming, paper, and presentation)

Class Participation

Prerequisites

An interest in Artificial Intelligence, and ...

- ability to write and use programs
- background in computer science
- prior knowledge of Python not assumed
- 1571 a plus

For Next Time

(Re)Read Chapter 1 from Artificial Intelligence: A Modern Approach

- available online

Begin Self-Study Python Module

- get a CSSD account
- read Lutz and Ascher 1-2
- simple Python exercises due in one week

Send me email for a class mailing list

Assignment

- find an interesting AI application or demo, and be prepared to report back on your findings

Survey

Name:

Email:

Department:

Year:

Major:

Relevant Courses:

Programming Languages:

Operating Systems:

Goals: