COM1005/COM2007
Machines and Intelligence
Module Introduction

Rob Gaizauskas (semester 1)

and

Phil Green (semester 2)

Module Aims

- to provide students with the historical and cultural context of modern day research into artificial intelligence
- to introduce students to some of the main problem areas of AI and make them aware of the state-of-the-art and open questions in these areas
- to introduce students to the AI research carried out in the Department
- to introduce a number of classic AI problem-solving algorithms and data structures
- to develop an ability to select appropriate techniques to address particular problems.
- to develop the technical knowledge necessary to implement AI problem solving
- to provide experience of scientific programming as opposed to software engineering

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Sem2
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- to develop the technical knowledge necessary to implement AI problem solving
- to provide experience of scientific programming as opposed to software engineering

Objectives

- be aware of the main issues involved in defining intelligence, and of the changing views of intelligence
- appreciate key representative programs developed during the course of AI research
- be aware of the major subareas of AI and of the problems addressed in these subareas
- be able to write simple programs to control the Nao humanoid robots.
- understand a number of different algorithms and data structures for AI problem solving
- understand the role of knowledge as information to guide heuristic search
- be able to select appropriate techniques to address particular problems.
- be able to program search, inference and planning algorithms
- be able assess the problem-solving performance of such algorithms experimentally
- appreciate a number of AI applications that use the techniques described.

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Module Outline: Semester 1

Week	Lectures	Lab	Assessment
1	Module Introduction; What is AI?	Imitation Game	*
2	Brief History of AI (I)	Chatbots	*
*	Brief History of AI (II)	Intro to the Nao	
4	Intelligent Agents as a Framework for AI	Nao: Simple Reflex Agent:	*
5	READING WEEK		
6	Perception: Computer Vision	Nao: face recognition	
7	Knowledge Representation & Reasoning	Nao: face recognition (cont)	*
8	Learning	Using Python with the Nao	
9	Communicating: Human Language Processing	Nao: Reinforcement Learning	
10	Experimental Methods in AI	Nao: Reinforcement Learning (cont)	*
11	Ethics and AI	None	
12	Catchup if necessary	None	

Assessment

- Semester 1:
  - Labs: 5 x assessed labs; mix of group + individual work: 12%
  - Quiz week 13 (January): 13%
    (1 hour; covering material from lectures)
- Semester 2
  - coursework (programming assignments): : 25%
- Final exam in June: 50%
 (covering material from both semesters)

Lab Groups
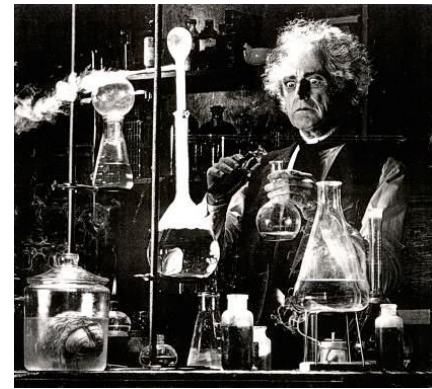
- There are 12 Nao robots
- There are approx. 120 students registered for COM1005/2007
- Therefore you each been assigned to one of 12 labs groups, named, imaginatively, A, B, C … J
- You will be invited (by email) to share a page that indicates which group you are in
  - Same info is linked to from module homepage
- You will be in the same lab group for the entire semester

Reading/Text Book

- No single text

- Some mandatory readings will be assigned

- References will be given at the end of most lectures

- Most comprehensive text from which much material for the module has been drawn is:

   Artificial Intelligence: A Modern Approach (3rd edition), Stuart Russell and Peter Norvig, Pearson, 2010.
   The library has hard copies and an e-copy license.
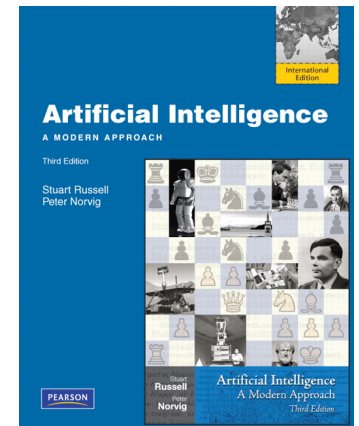
Module Homepage

- MOLE will be used
  - to submit assignments
  - to administer the quiz
- But the module homepage (for this semester) will be:

  https://staffwww.dcs.shef.ac.uk/people/R.Gaizauskas/campus_only/com1005/

Lecturers

- Semester 1
  - Rob Gaizauskas
  - Office: Room G28b
  - Email: R.Gaizauskas@sheffield.ac.uk
  - Appointments by email only
- Semester 2
  - Phil Green
  - Office: Room 145
  - Email: P.Green@sheffield.ac.uk

# Models of Learning: The Bucket Model

- Student's head is an bucket into which lecturer pours knowledge
- Student passively sits through lectures
- Head fills up
- Tada!! Learning has occurred ….

Models of Learning: The Bucket Model

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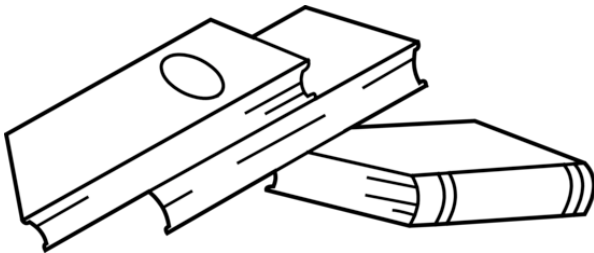# The Active Student Model

The Active Student Model
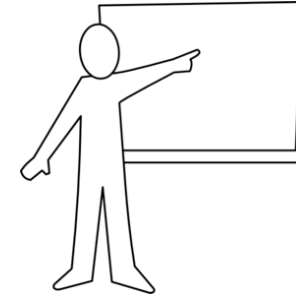
Lab Classes

Lectures

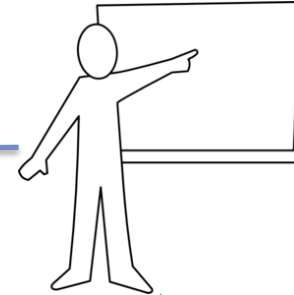Books, Papers, Web Resources

Classmates

The Active Student Model

Lab Classes

Do/create/question

Attend/Listen

Lectures

Reflect/relate

Question

Books, Papers, Web Resources

Read/Question

Discuss/compare

Classmates

Reflect/relate

Reflect/relate

COM1005/2007 2015-16

The Role of Lectures

- Lectures are only one part of your learning experience
  - BUT an important one
- Introduce content you are expected to know
  - Intelligibly
  - Entertainingly/motivationally
- Set the pace for getting through the material
- In a social setting
  - Motivational (they are keeping up why not me?)
  - Reassuring (we are all in this together)
- Provide a human (?) face to the content
  - Can be questioned
  - Provides existence proof that the material can be learned