

**Artificial Intelligence**  
**(COMP338)**

# Introduction

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[www.jarrar.info](http://www.jarrar.info)



# Watch this lecture and download the slides



Course Page: <http://www.jarrar.info/courses/AI/>

More Online Courses at: <http://www.jarrar.info>



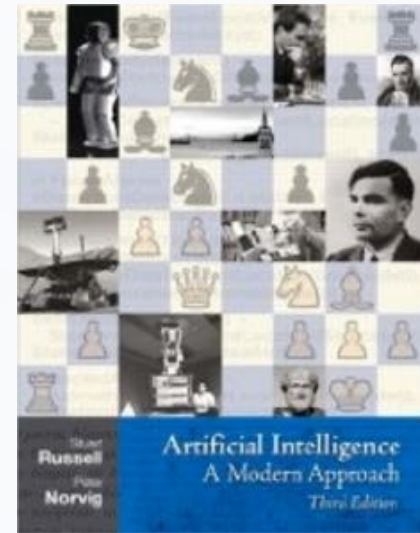
**I** 

**ARTIFICIAL  
INTELLIGENCE**

# Teaching Material:

## Textbook:

S. Russell and P. Norvig: *Artificial Intelligence: A Modern Approach*. Pearson, 2010, 3<sup>rd</sup> Edition




## Lecture Notes:

All lecture notes will be published on Ritaj before or directly after each lecture.

All lectures will be **video recorded**, and published online at:

<http://jarrar-courses.blogspot.com/2011/11/artificial-intelligence-fall-2011.html>

# More Resources




## Artificial Intelligence: A Modern Approach

(Third edition) by [Stuart Russell](#) and [Peter Norvig](#)

The [leading textbook](#) in Artificial Intelligence.  
Used in over **1300** universities in over **110** countries.  
The [22nd most cited](#) computer science publication on CiteSeer (and 4th most cited publication of this century).

- [AIMA Home](#)
- [Code](#)
- [Contents](#)
- [Courses](#)
- [Errata](#)
- [Instructors](#)

Search AIMA



### What's New

- [Free Online AI course](#), Berkeley's CS 188, offered [through edX](#).

### Comments and Discussion

- [Comments from readers](#)
- [Errata list](#) (errors in the book)
- [AIMA-talk](#) discussion list, open to all

### AI Resources on the Web

- [AI Resources](#) in many categories
- [AI courses that are using AIMA](#) (1300 schools)

### Online Code Repository

- Pseudo-code algorithms from the book in [pdf](#).
- [Online code](#) at [aimacode](#) project on Github.
- [Online demos](#) (Java applets and Javascript)
- [The OpenNERO 3D multiagent simulator](#)

### For the Instructor

- [AI Instructor's Resource Page](#)
- Lecture slides coming soon.

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<http://aima.cs.berkeley.edu/>

# Course Content

## Problem-solving by Search

Uninformed Search

Informed Search

Constraints Satisfaction

Games and Adversarial Search

**Project:** Routing system using Greedy/A\*

## Machine Learning

Introduction to Machine Learning

Linear Regression Learning

Decision Tree Learning

K-Means Clustering

**Project:** classification problems using R

## Knowledge and Reasoning

Logical Agents

First-Order-Logic

Inference in First Order Logic

Description Logic, Ontologies, OWL

**Project:** Prolog / Ontology using OWL

## Natural Language Processing

Introduction to NLP

Text Parsing (English and Arabic)

Probabilistic language modeling

Information Retrieval

Lexical Semantics & Lexical Resources

**Project:** search engine with autocomplete

# Grading

Med Exams (25%)

Final exam (35%)

Projects (35%)

Participation (5%)



# Rules



**Smile and be cool:** help be to make the course full of fun!!!!

**Attendance.** Attendance is mandatory. University regulations are strictly enforced.

**Academic Honesty:** Individual work must be each student's own work. Plagiarism or cheating will result in official University disciplinary review.

**Missed Exams:** There are no makeup exams, and project deadlines are very hard.

**Etiquette:** Cell phones must be turned off. Don't come late. If you must go out during the lecture go but don't let me notice.

**Ritaj:** Official communicate through Ritaj. I assume you check it several times a day (other channels of communication are informal).

**Facebook Group:** students are encourage join this group (<https://www.facebook.com/groups/747055358836932>) to discuss and share related material among each other. (This is an informal communication channel, and does not replace Ritaj)

# Definition of AI

Based on [1]

“Intelligence: The ability to learn and solve problems”

Webster’s Dictionary

“Artificial intelligence (AI) is the intelligence exhibited by machines or software”

Wikipedia

“The science and engineering of making intelligent machines”

McCarthy

“The study and design of intelligent agents, where an intelligent agent is a system that perceives its environment and takes actions that maximize its chances of success.”

Russel and Norvig AI book

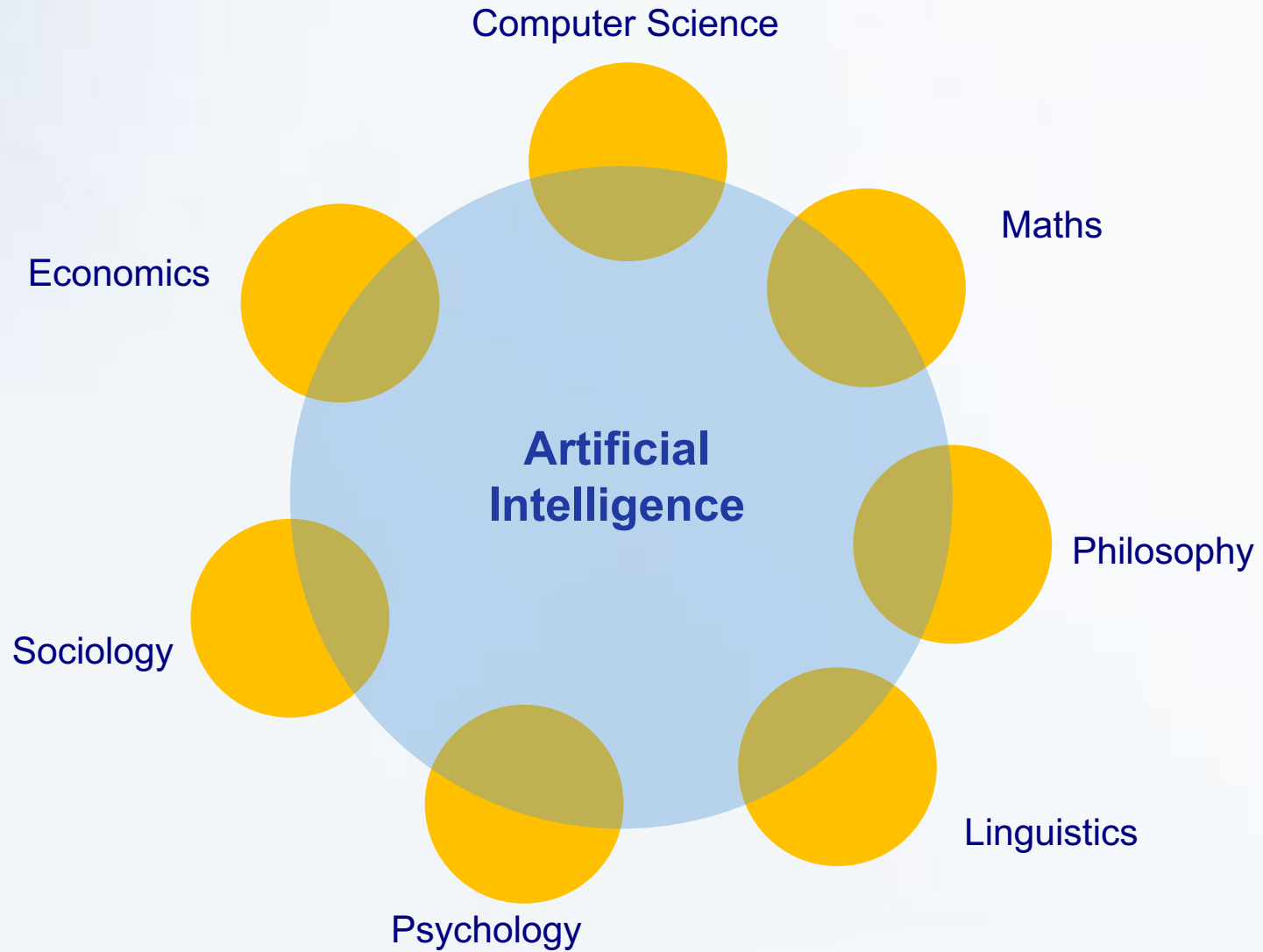
# What is AI?

Based on [1]

## Four schools of thoughts (Russel&Norvig)

<b>Thinking humanly</b>	<b>Thinking rationally</b>
“The exciting new effort to make computers think... machines with minds, in the full and literal sense.” <i>(Haugeland, 1985)</i>	“The study of mental faculties through the use of computational models.” <i>(Charniak &amp; McDermott, 1985)</i>
<b>Acting humanly</b>	<b>Acting rationally</b>
“The study of how to make computers do things which, at the moment, people are better.” <i>(Rich &amp; Knight, 1991)</i>	“Computational Intelligence is the study of the design of intelligent agents.” <i>(Poole et al., 1998)</i>

# Foundation of AI



# Applications of AI

## Smart Search Algorithms

- Games
- Route finding
- Transportation/scheduling
- Traveling salesperson
- VLSI layout
- Automatic assembly

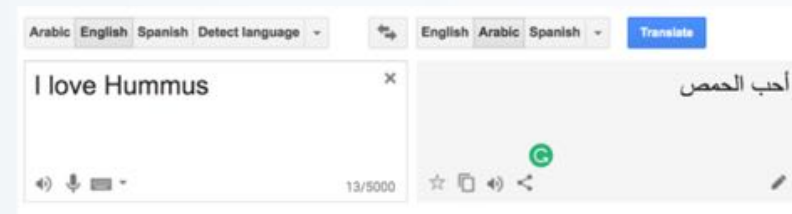
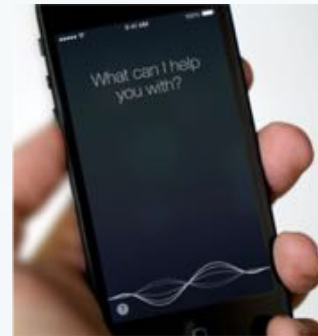
.... **Many more!**



# Applications of AI

## NLP Applications

- Search engines
  - OCR
  - Speech recognition
  - Machine translation
  - Spam fighting
  - Information extraction
  - Summarization
  - Spelling checkers
  - Grammar Checkers
  - Sentiment analysis
- .... **Many more!**

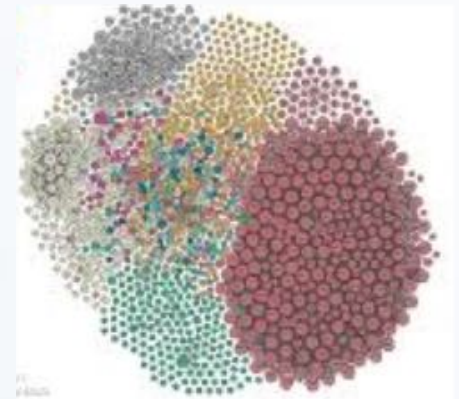


# Applications of AI

## Knowledge base Applications

- Semantic Web
- Expert Systems
- Reasoning
- Logic based games
- System interoperability
- Semantic search
- Medical diagnosis

.... **Many more!**

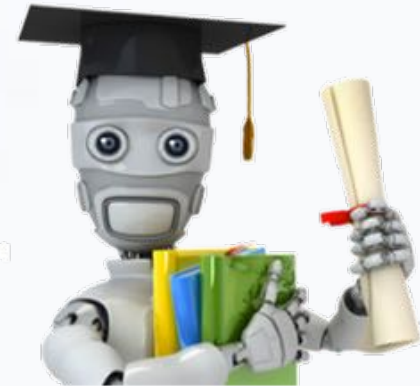


# Applications of AI

## Machine learning

- Face Recognition
- Autonomous cars
- Social network analysis
- Recommendation systems
- Fraud detection
- Financial forecasting

.... **Many more!**





# Discussion

- What is the common definition of “AI”? Do you agree?
- Do you know any AI application?
- Should artificial intelligence simulate natural intelligence?
- What are the criticisms on the AI research? Do you agree?
- What is the relation between AI and logic? AI and philosophy? Logic and philosophy?
- Explain the meaning of logic? reasoning? ontology?
- What is Natural Language Processing? And how it is related to AI?
- Why and how Probabilistic and statistical methods are used in AI ?
- What are the major research approaches/schools in AI? Which one you think is more productive?
- Which Arabic philosophers contributed to logic in the past?
- Why Arabs chose to study logic in the past?

# References

1. Artificial Intelligence Introduction

<http://studyres.com/doc/813688/artificial-intelligence-introduction>