Artificial Intelligence
Course Outline

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Watch this lecture and download the slides

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

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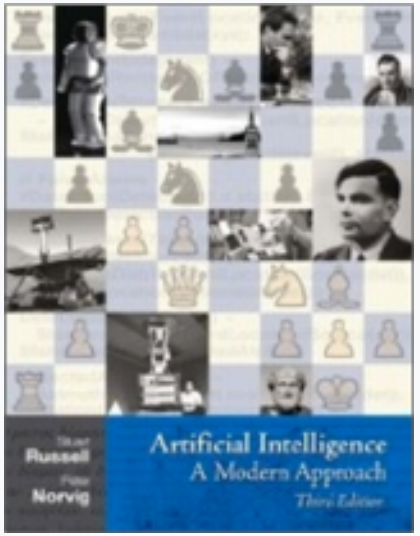
I
ARTIFICIAL
INTELLIGENCE

Teaching Material:

Textbook:
S. Russell and P. Norvig: *Artificial Intelligence: A Modern Approach.* Pearson, 2010, *3rd 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

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

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

Knowledge and Reasoning
Logical Agents
First-Order-Logic
Inference in First Order Logic
Description Logic, Ontologies, OWL

Project: Prolog / Ontology using OWL

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/257868544862798/) 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

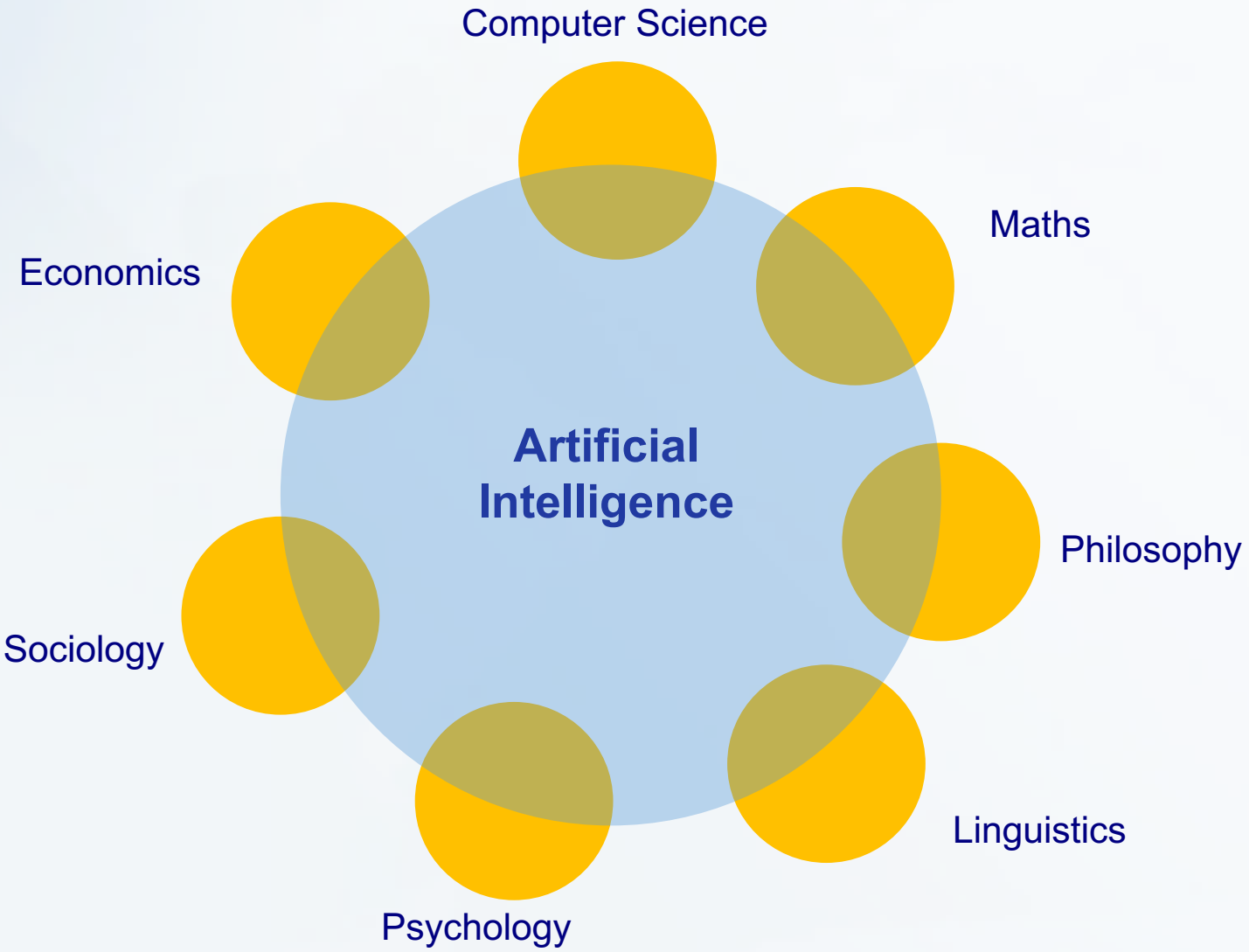
What is AI?

Based on [1]

Four schools of thoughts (Russel&Norvig)

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

Foundation of AI

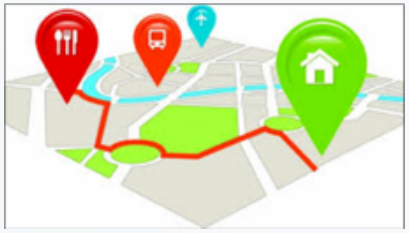


Applications of AI

Smart Search Algorithms

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

…. **Many more!**

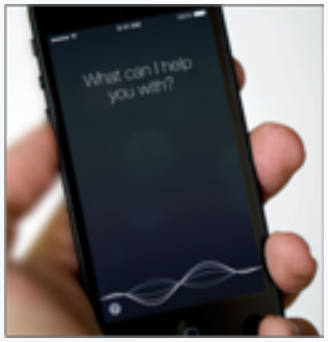


Applications of AI

NLP Applications

- Search engines
- OCR
- Speech recognition
- Machine translation
- Spam fighting
- Information extraction
- Summarization
- Spelling checkers
- Grammar Cheekers
- Sentiment analysis

…. **Many more!**

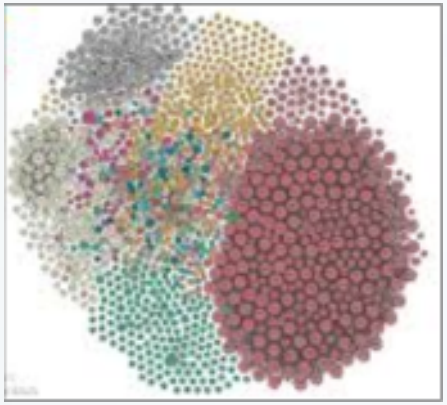


Applications of AI

Knowledge base Applications

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

…. **Many more!**

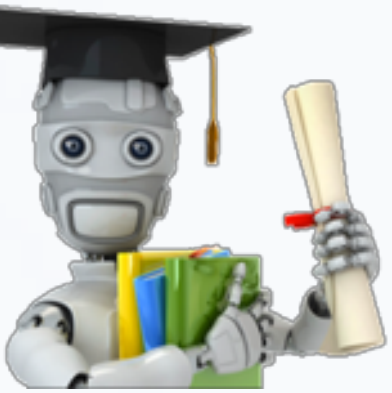


Applications of AI

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