Introduction à l'Intelligence Artificielle

M1 Miage 2017–2018 *Intelligence Artificielle*

Stéphane Airiau

LAMSADE

DAUPHINE
UNIVERSITÉ PARIS

Pourquoi avoir un cours d'IA

- Qu'est-ce que l'IA ?
  question difficile, les contours de l'IA sont parfois assez flous
- Qu'est ce que l'IA fait pour vous ?
  - traduction automatique (par exemple Mandarin $\rightarrow$ Français)
    par exemple, essayez `deepl.com`.
  - identification d'objet dans des images (ex : chaises, visages, etc)
    essayez *Rasta* (stage réalisé au lamsade)
  - plier votre linge
  - démontrer ou aider à démontrer de nouveaux théorèmes
  - assistants (médical, légal, ex IBM Watson)
  - robots (aides aux personnes âgées, aides musées)
  - **voitures autonomes**
  - **jouer au jeu de Go**
  - **jouer au pocker** Brains Vs. AI

Intelligence Artificielle

Terme créé par John McCarthy (aussi développeur du langage LISP) autour de 1956

> *Construction de programmes informatiques qui s'adonnent à des tâches qui sont, pour l'instant, accomplies de façon plus satisfaisantes par des êtres humains car elles demandent des processus mentaux de haut niveau tels que l'apprentissage perceptuel, l'organisation de la mémoire et le raisonnement critique.*
>
> Marvin Minsky

Un enjeu politique

- France IA
- The Administration's Report on the Future of Artificial Intelligence

Le test de Turing

- Turing (1950) “Computing machinery and intelligence”
- Le test est créé pour donner une définition opérationnelle satisfaisante de l’intelligence
- Un ordinateur passe ce test si un homme, après avoir posé des questions écrites ne sait pas s’il s’adresse à un autre humain ou à une machine.

Tracks at IJCAI 2015

International Joint Conference on Artificial Intelligence

Agent and Multiagent Systems
Constraint Optimization
Ontologies
Game Theory
Heuristic Search
Graphical Models
Robotics and Vision
Natural Language Processing
Planning
Relational Learning
Satisfiability
Social Choice Theory
Vision and Perception
Web Mining

Artificial Intelligence and Social Sciences
Auctions and Market-Based Systems
Distributed Search/CSP/Optimization
Knowledge Representation, Reasoning, and Logic
Knowledge Acquisition
Machine Learning
Multidisciplinary Topics and Applications
Constraints, Satisfiability, and Search
Recommender Systems
Model Verification / Model Checking
Sequential Decision Making
Social Networks
Web and Knowledge-Based Information Systems
Special Track on Artificial Intelligence and the Arts

Special Track on Computational Sustainability
Special Track on Knowledge Representation and Reasoning
Special Track on Machine Learning

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Economie ?

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Logique ?

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Optimisation Combinatoire ?

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Tracks at IJCAI 2017

- **Machine Learning** (Classification, Feature Selection, Data Mining, Learing Graphical Model, Active Learning, Relational learning, Time series and Data Stream, Classification, Kernel Methods, Deep Learning, Data Mining and Personalisation, Semi supervised Learning, Reinforcement learning
- **Constraint Satisfaction** (Constraint Satisfaction 2, Solvers and tools,)
- **Uncertainty in AI** (Approximate Probabilistic inference 2, MDP)
- **Robotique** (Vision and Perception, motion and path planning, tobotics and vision)
- **Search** (Search in planning and scheduling, Heuristic search, planning algorithms, Satisfiability, Activity and plan recognition)
- **Systemes multiagents** (Agent theories, Cooperative Games, Noncooperative games, Economic Paradigms, Agent based simulations, etc)
- **Traitement automatique des langues** (Natural Language semantics, Natural Language processing, applications and tools, Discourse, Sentiment analysis and Text mining, Machine Translation)
- **Knowledge representation** (Common sense reasoning, automated reasoning and theorem proving, Description Logics and Ontologies, Geometric spatial and temporal reasoning,Computational Complexity of Reasoning, Belief change)

Plan du cours (pas complètement final)

- Algorithmes de recherche
- Algorithmes de recherche et heuristiques
- Problème de satisfaction de contraintes
- Jeux à deux joueurs

  minimax et élagage α-β

  un peu de théorie de jeux

} Good old fashion AI (GOFAI)

- Apprendre un arbre de décision
- Réseaux de neuronnes
- Apprentissage par renforcement

} Apprentissage automatique

- Intelligence Artificielle et Ethique

Contrôle des connaissances

- un examen (janvier) : 60%
- un projet : 40%
  - travail effectué
  - rapport
  - soutenance

Nouveauté cette année : des séances TD-TP
⇨ pour coder et exécuter les algorithmes.