Artificial Intelligence 2: Introduction

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Outline of Topics

Lectures times/venues

- Lecturers
  - Shan He: Week 1, Weeks 7-11 (Email: s.he@cs.bham.ac.uk, Office hour: Thursday 15:00 - 17:00)
  - Miqing Li: Weeks 2-4
  - Hyung Jin Chang Week 5-6
  - Fawad Hussain: Dubai
- Lecture structure
  - Two lectures per week: Thursday morning 9-11
  - Two tutorials (TAs): Wednesday afternoon from week 2
    - Math help-desk: exercise questions
    - Programming tutorial: AI programming tutorial

What is AI?

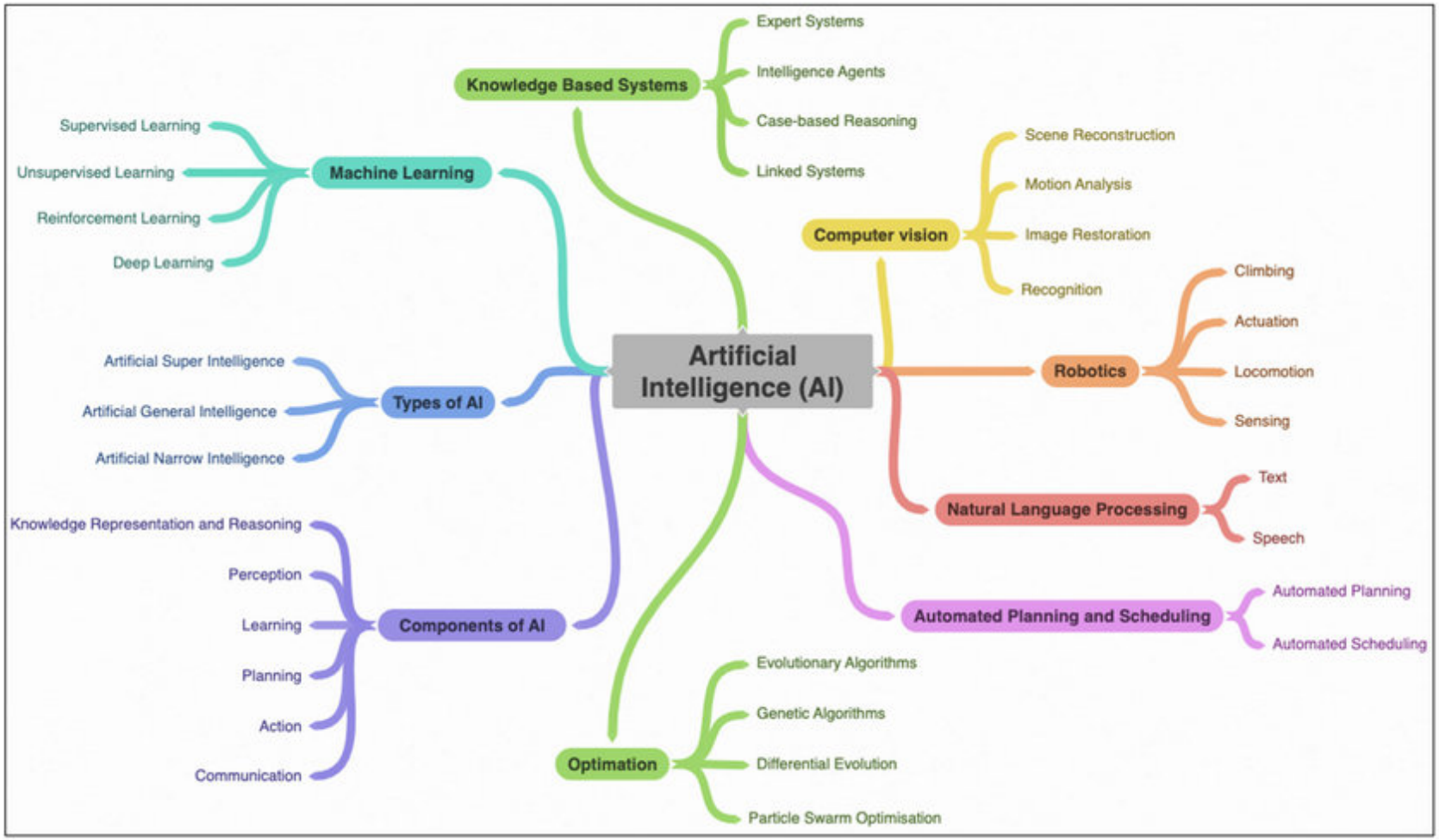

Figure 1: M. Regona et.al, Opportunities and Adoption Challenges of AI in the Construction Industry: A PRISMA Review , JOITMC. 8(1):45, 2022

Aims of the module

We will learn:

- Automated planning and scheduling (Weeks 2-4): Advanced search algorithms and Constraint Satisfaction Problems
- Computer Vision (Weeks 5-6)
- Interpretable machine learning (Weeks 7-11):
  - Maximum likelihood – Logistic Regression and Classification
  - Information theory: entropy, cross entropy, mutual information, information and decision tree learning and feature selection.
  - Probabilistic Graphical Models:
    - Bayesian networks
    - Hidden Markov Chain

Learning outcomes

- Demonstrate a sound understanding of logic and probability and their role in artificial intelligence.
- Formulate decision making problems using probabilistic and logic-based methods
- Apply randomized methods for decision making
- Model and analyse complex data using probabilistic graphical models

Exam and Continuous Assessment

Main Assessments: 1.5 hour examination (80%) and continuous assessment (20%)

Continuous assessment: two online quizzes, 10% each.

- Advanced Search and CSP and (Week 4)
- Interpretable Machine Learning (Week 7)

Supplementary Assessments: 1.5 hour examination

Text books

Probability and statistics

- Probability and Statistics
- Probability Theory: The Logic of Science

Information theory

- Information Theory, Inference, and Learning Algorithms

AI and ML:

- Artificial Intelligence: Foundations of Computational Agents, second edition, Cambridge University Press 2017
- Mathematics for Machine Learning
- Bayesian Reasoning and Machine Learning

Let's chat about ChatGPT

- What is ChatGPT? Let's ask ChatGPT.
- Any news about ChatGPT? Let's ask ChatGPT.

Headlines about ChatGPT

Google is better:

- But: Google is freaking out about ChatGPT
- ChatGPT passes MBA exam given by a Wharton professor
- AI Bot ChatGPT Passes US Medical Licensing Exams Without Cramming – Unlike Students
- ChatGPT passes law school exams despite 'mediocre' performance
- BuzzFeed replaces 180 fired journalists with ChatGPT neural network

Let's chat about ChatGPT

Discussion: what is your impression about ChatGPT?

A simple question for you and ChatGPT

Question: when I was 4 my sister was half of my age. Now I am 45 how old is my sister?

Problems with ChatGPT

ChatGPT failure archive

ChatGPT: BS generator?

- Princeton computer science professor says don't panic over 'bullshit generator' ChatGPT
- ChatGPT's Fluent BS Is Compelling Because Everything Is Fluent BS
- If you want to know about BS, read Harry Frankfurt's On Bullshit:
  - "*One of the most salient features of our culture is that there is so much bullshit.*"
  - Bullshit = nonsense
  - Bullshitting: deliberately making false claims about what is true.
  - **Bullshitter**: "*does not reject the authority of the truth, as the liar does, and oppose himself to it. He pays no attention to it at all.*"
  - "*By virtue of this, bullshit is a greater enemy of the truth than lies are.*"

Discussion

What is the impact of ChatGPT on our culture and society? What shall we do with ChatGPT?

New trend: Trustworthy AI

Figure 2: European Commission Futurium, Requirements of Trustworthy AI, 2021

New trend: Trustworthy AI

Hoo to achieve trustworthy AI?

Trustworthy AI: explainability, safety and verifiability