University of Antwerp

Artificial Neural Networks

[2500WETANN]

José Oramas

Course Overview

[Some organization aspects and policies]

José Oramas

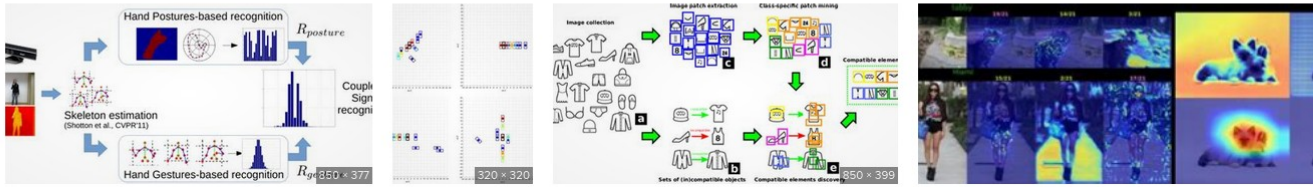
Course Overview

[… or what we will be talking about during the coming weeks]

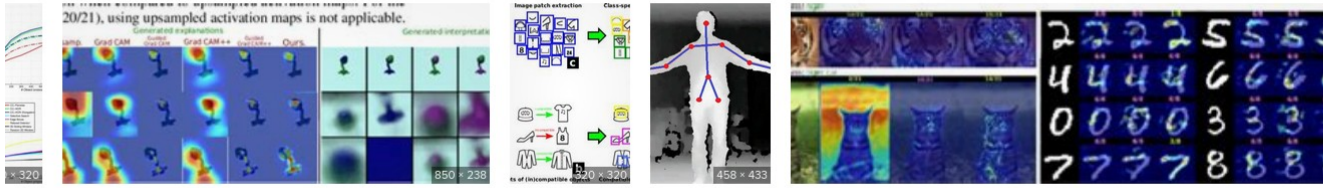
Overview of the course

- **Theory Lectures**
  - Wednesdays 10h45 – 12h45, Room G 005, CMI.
  - **Prof. José Oramas** (Jose.Oramas@UAntwerpen.be)

- **Who Am I?**
  - **Artificial Intelligence research at the Internet Data Lab (IDLab)**
  - **Also teaching:**
    - Operating Systems (1500WETOPS),
    - Distributed Systems (1500WETDIS),



Algorithm pipeline. Skeleton joints are estimated using a ... researchgate.net | Qualitative examples ... researchgate.net | The proposed method consists of three steps. Given a se... researchgate.net | Left: Visual explanations generated by our method ... researchgate.net



Left: Examples and GT-masks from the proposed an8FLower ... researchgate.net | (PDF) Modeling Vi... researchgate.net | Skeleton joints of t... researchgate.net | Average Images from the identified relevant filters for ... researchgate.net

Why follow this course?

Your Thoughts

Why follow this course?

My Thoughts

The Two Popular Roles of A.I.

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Course Goals & Context

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Understand [Deep] Neural Networks and relevant architectures

- Principles & nomenclature (what?)
- Challenges and desirable properties (why difficult?)
- Algorithms, important assumptions and design approaches (how?)

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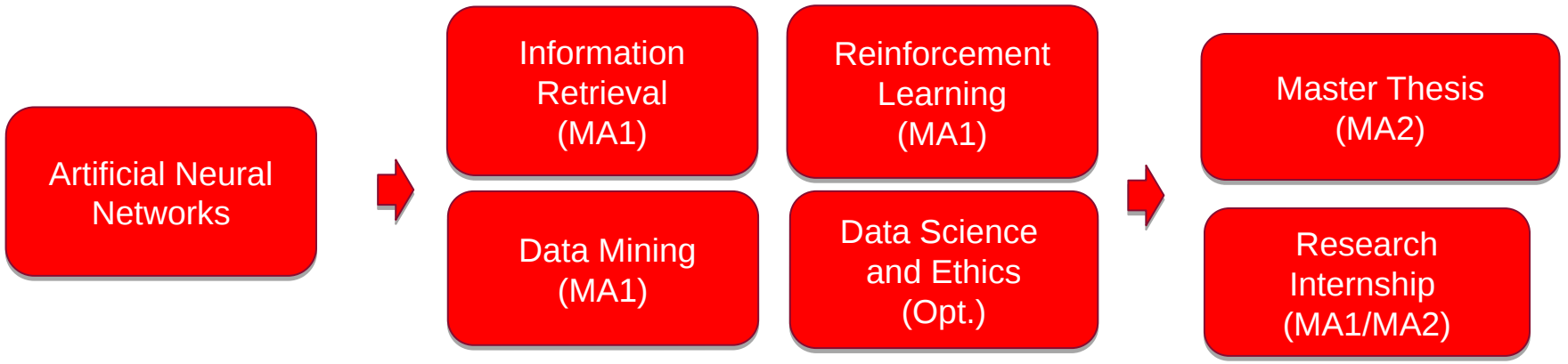
Course context



Mix of theoretical and practical knowledge on deep neural networks

Theory Lectures

- Session 1 Introduction & Perceptron Learning
- Session 2 Shallow-Deep Neural Networks
- Session 3 Convolutional Neural Networks – Foundations
- Session 4 ConvNets – Advanced Architectures
- Session 5 Learning & Optimization
- Session 6 Modeling Sequences with Neural Networks
- Session 7 Transfer Learning
- Session 8 Deep Generative Models
- Session 9 Interpretation & Explanation Algorithms
- Session 10 Guest Lecture

Supporting Content

- **Reference Textbooks**
  - ***Dive into Deep Learning***, Zhang, Zachary, Li & Smola, 2020.
  - ***Deep Learning***, Goodfellow, Bengio & Courville. An MIT Press book. 2016

- **Scientific Articles (Journals/Conferences)**
  - IEEE Transactions on Pattern Recognition and Machine Intelligence (TPAMI)
  - Journal of Machine Learning Research (JMLR)
  - IEEE Transactions on Neural Networks and Learning Systems (TNNLS)
  - International Conference on Learning Representations (ICLR)
  - Neural Information Processing Systems (NeurIPS)
  - International Conference on Machine Learning (ICML)
  - Computer Vision and Pattern Recognition (CVPR)
  - ***ArXiv is your friend but be critical***

Practical/Coding Sessions

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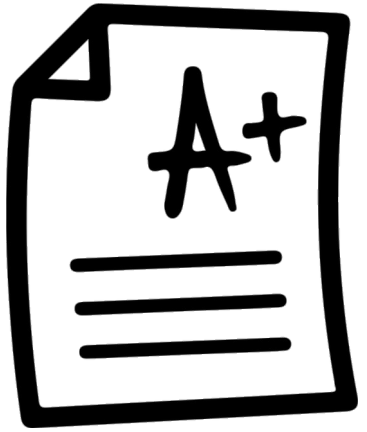
About:

- Mondays 10h45 – 12h45, Room G 025, CMI
- Practical implementation of theoretical concepts (Python + Pytorch)
- Introduction to complementary concepts

Evaluation

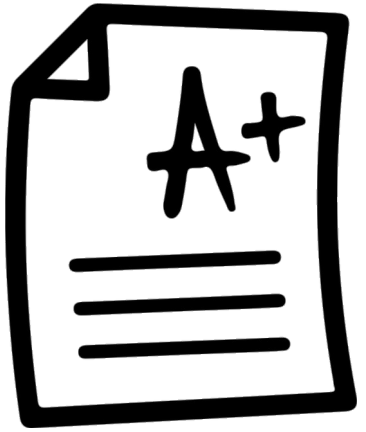
[The annoying part]

Evaluation



- **Theory Exam (60%)**
  - Content discussed in the lectures
  - Written – close book / No oral presentation
- **Practical Assignments (25%)** – individual
  - Two assignments on standard neural network architectures and algorithms.
- **Research Paper Assignment (15%)** – in groups
  - Presentation of a scientific paper.

Evaluation



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Important:
- To pass the course you **need a grade of at least 10/20** on each exam.
- You need to **succeed on all these parts** in order to pass the course.
- Partial exceptions are possible, but **only within the same academic year**.

Communication

- **Blackboard**
  - Announcements
  - Course material
  - Projects and other assignments
  - Questions via the Forums

What if I cannot come to the class?

Lecture recordings will be made available via Blackboard

- Default: Made available at random
- Possible release under request
  (exceptional circumstances)
- Recordings mostly from 2021-2023
- Material is not always perfect
- Note this is **mostly for backup purposes.**

Break

See you in few minutes

Course Overview

[Some organization aspects and policies]

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