NOVA IMS Information Management School

AI

Artificial Intelligence

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Approach

- Simple reasoning
- Receptivity
- Structured classes
- Documentation (presentations, books, Internet)
- Tools: Visual Studio Code + Azure
- Participation is encouraged but is not obliged
- No surprises …

The Theachers

- Vitor Santos, is an Assistant Professor at NOVA Information Management School (NOVA IMS) of Universidade Nova de Lisboa and at European University, teaching "Information Systems", "Artificial Intelligence" and ”Digital Systems” courses in Computer Science and Informatics Engineering Degrees. Before that, he was an invited Professor Trás os Montes e Alto Douro University (UTAD) and Minho University (UM).
- He integrates several national and international conferences scientific committees and has authored several academic publications (>120).
- He was the Microsoft Portugal Academic Computer Science Program Manager for 8,5 years.
- Before that he occupied senior management positions at Santander bank companies and has developed Computer Engineering activities for about 15 years (>40 IS projects).
- Vitor Santos holds a PhD. in Science and information and Technology Systems from University of Minho, a B.Sc. in Informatics Engineering from Cocite, a Postgraduate course in Computer Science from Science Faculty of Lisbon University, a M.Sc. in information Systems Science from University of Minho, a D.E.A. from University of Minho and a Computer Specialist title from polytechnic institutes Guarda, Castelo Branco and Viseu.
- He is working in a second PhD in Culture Studies at FLUL.

Research interests

General: Information systems & AI

Today themes (2023) :

- Artificial Intelligence & Information systems (Explainable AI, Machine Learning, Process Mining, Augmented Intelligence, Artificial Life, Intelligence Process Management
- Enterprise DNA, ..)
- Technologies and Democracy
- AI & Philosophy
- Information systems architectures, planning, management and alignment with business
- Creativity and innovation in Information Systems
- Positive Engineering (Technologies in Education, Health, Environment, Smart cities …)
- Software Engineering
- …

The Theachers

- Marco Silva, has been part of the Microsoft Portugal team since 2015. He started as a consultant, moving to architect and digital advisor, and then to cloud solutions architect and National Innovation Officer, working mainly in the telecom and retail industries.
- An engineer specialized in Artificial Intelligence and Computer Graphics, he technologically leverages his clients' businesses through various skills such as Data Mining and Machine Learning, Cognitive Intelligence, and Mixed, Augmented and Virtual Reality.
- Professor of Data Mining and Machine Learning, Advanced Data Mining and AI, and Data Science Project at ISEG's Data Science Degree and Business Analytics Postgraduate Course.
- Professional speaker with over 10 years of experience and active contributor to the Building the Future and DICE podcasts. Participates in the AI, Communication & Democracy Lab

Building the Future - AI Portugal Podcast

https://open.spotify.com/show/5m1aEHtGsJIHjMwHMmf51T

Syllabus

- Two type of classes
  - Theoretical -Practical

Complementary (for AI lovers <3 !! - These matters will not be part of the theoretical exams and practical work on these topics will not be proposed)

The complementary classes topics can be proposed by the teachers or by students

Syllabus

1 – Overview and brief history of AI

- AI and Philosophy
- Historical Overview of AI and applications
- Paradigms and approaches

2 - Knowledge Representation and Reasoning

- Software Agents (Cognitive Agents v. Reactive Agents, BDI model,…)
- Logic Programming fundamentals
- An Introduction to Prolog

Syllabus

3 - Problem Solving

- Agents and search problems
- Blind search
- Heuristic search (informed)
- Local search and optimization problems (*(hill climbing, simulated annealing)*
- Search with opponents (Games)

4 - Machine Learning

- Apprentice agents. Approaches to the problem of learning

Syllabus

- Artificial Neural Networks
  - Neurobiology fundamentals
  - McCulloch & Pitts' Neuron
  - Hebb's Law
  - Simple Pattern Recognition Networks: Perceptron, Adaline
  - Unsupervised Competition-based networks (Maxnet, Mexican Hat, Hamming Net, SOM)
  - Multilayered artificial neural network (Backpropagation, Neocognitron)
  - Deep Learning Introduction (CNN, GAN, …)

Fundamental Bibliography

5 - Evolutionary computing

- An introduction to Genetic Algorithms
- Artificial Life

6 - Future of Artificial Intelligence and social/philosophical impacts

Assessment

The theoretical evaluation will have a final written exam **(1st phase Exam)** and will valorize attend to classes.

The grades of the practical and the theoretical assessments must be **greater than eight**.

1st phase *Evaluation*: *Theoretical exam (50%) + Practice(50%)*

2nd phase *Evaluation:* *Theoretical exam (*100%) or *Theoretical exam (70%) + Practice(30%)*

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Assessment

Practice Evaluation:

-Prolog´s Project (30%) – **Individual assignment**

-You will love it ☺ !!

+

- Azure AI Project (30%) - **Individual assignment**

+

- Azure GenAI Project (30%) - **Individual assignment**

+

- Class Attendency (10%) - **(#Classes Attended * 10% / #Total Classes)**

Fundamental Bibliography

- **Russell, Stuart, and Norvig, Peter. Artificial Intelligence: a Modern Approach, 4th. Edition, Prentice Hall, 2020**.

- Elaine Rich, Kevin Knight; Artificial intelligence. ISBN: 0-07-100894-2

- Ernesto Costa e Anabela Simões; Inteligência artificial. ISBN: 972-722-269-2 (PT)

https://www.marktechpost.com/2021/06/11/top-artificial-intelligence-books-to-read-in-2021/