Deep Learning (614544013)

Master in Artificial Intelligence

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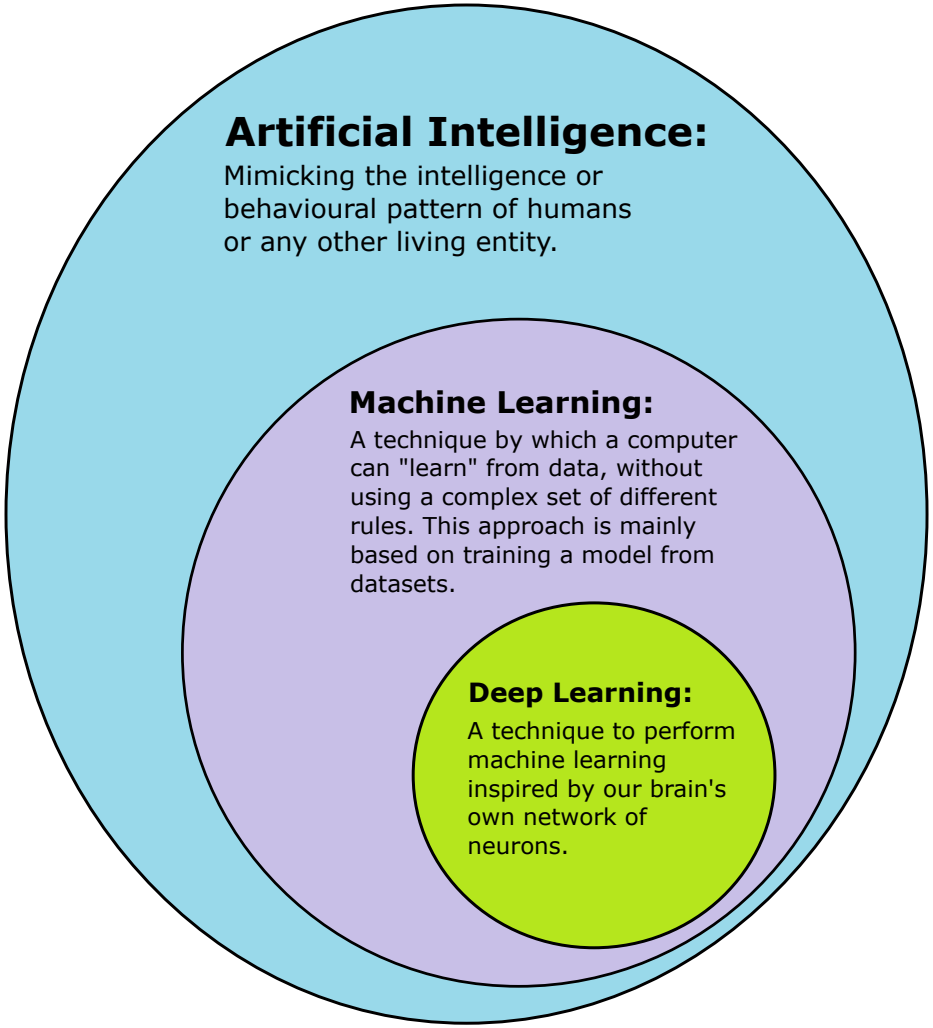
Context


Artificial Intelligence:
Mimicking the intelligence or behavioural pattern of humans or any other living entity.
Machine Learning:
A technique by which a computer can "learn" from data, without using a complex set of different rules. This approach is mainly based on training a model from datasets.
Deep Learning:
A technique to perform machine learning inspired by our brain's own network of neurons.

Contents

Organization

- Theoretical classes are divided in half between UDC (first half) and UVIGO (second half).
- The practical classes are local at each university, although their contents are the same.

Week	Date	Unit	Theory	Professor	Date	Laboratory
1	23-Jan-23	U1	Presentation Introduction to deep learning	UDC	26-Jan-23	Setting up the environment Introduction to DL frameworks
2	30-Jan-23	U2	Regularization and optimization	UDC	02-Feb-23	Exercises on regularization & optimization
3	06-Feb-23	U3	Convolutional Neural Networks (CNNs)	UDC	09-Feb-23	P1: CNN
4	13-Feb-23	U3	CNNs architectures	UDC	16-Feb-23	P1: CNN
5	20-Feb-23		Carnival		23-Feb-23	P1: CNN
6	27-Feb-23	U3-4	CNN examples Introduction to recurrent networks	UDC	02-Mar-23	P1: CNN
7	06-Mar-23	U4	LSTM networks GRU networks	UDC	09-Mar-23	P2: RNN
8	13-Mar-23	U4	Bidirectional networks	UDC	16-Mar-23	Father's day (moved)
9	20-Mar-23	U5	Autoencoders: anomaly detection / denoising	UVIGO	23-Mar-23	P2: RNN
10	27-Mar-23	U5	Autoencoders: variational	UVIGO	30-Mar-23	P2: RNN
11	03-Apr-23		Easter		06-Apr-23	Easter
12	10-Apr-23		Easter		13-Apr-23	P2: RNN
13	17-Apr-23	U6	GANs networks	UVIGO	20-Apr-23	P3: GAN
14	24-Apr-23	U6	GANs: convolutional	UVIGO	27-Apr-23	P3: GAN
15	01-May-23		Labor day		04-May-23	P3: GAN
16	08-May-23	U7	Transfer learning	UVIGO	11-May-23	P3: GAN
17	15-May-23	U8	Other DL techniques: Multitask learning	UVIGO		
	16-May-23	U8	Other DL techniques: Transformers	UVIGO		

Assessment

- **Objective test (50%)**:
  - Test conducted at the end of the semester with theoretical and practical content.
- **Laboratory practice (50%)**:
  - Practice exercises based on the knowledge acquired in the theoretical classes and represent the continuous evaluation of the course.
- **Minimum grade**:
  - In order to pass the course it is essential to obtain a minimum grade of 4 in both parts separately.
  - If the minimum grade has not been reached in any of the two parts, the final grade cannot be higher than 4.

Assessment

- **Non-attending students**:
  - The submission of any of the activities or tests of continuous evaluation by a student will indicate the student has chosen to attend the course.
- **Second opportunity**:
  - The grades of the continuous evaluation and/or the final exam obtained during the four-month period will be kept, as long as the grade in that part is 4 or more points.
  - You can retake any part (test or practice) in the second opportunity, but you will eliminate the grade obtained in the first one.

Basic

- François Chollet (2021). Deep Learning with Python, 2nd Ed. Manning
- Aurélien Géron (2019). Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow, 2nd Ed. O'Reilly
- Mohamed Elgendy (2020). Deep Learning for Vision Systems. Manning
- David Foster (2019). Generative Deep Learning. O'Reilly
- Ian Goodfellow, Yoshua Bengio, Aaron Courville (2016). Deep Learning. MIT Press

Complementary

- Jakub Langr, Vladimir Bok (2019). GANs in Action. Manning
- Andrew Ferlitsch (2021). Deep Learning Patterns and Practices. Manning
- Andrew W. Trask (2019). Grokking Deep Learning. Manning

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