

Deep Learning

"Métodos Avanzados de IA 2"

How it works before why it works

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Objetivo General

Introducir al participante en el conocimiento de las redes neuronales, brindando un conocimiento de las herramientas de última generación para la clasificación, la detección, la segmentación y la generación sintética de imágenes.

Objetivos específicos

- Conocer las generalidades, tipos de redes neuronales y sus aplicaciones.
- Utilizar transfer learning y aprender las bases de la anotación de imágenes como base para el entrenamiento de **DNN**.
- Desarrollar algoritmos usando redes neuronales para llevar a cabo clasificación, detección y segmentación de imágenes.
- Manejar algunas librerías para imágenes, procesamiento y visualización de datos.

- Aprender el manejo básico de frameworks de ai en PYTHON.

El método

title <https://www.gse.harvard.edu/faculty/david-perkins>

Content

1. Jupyter Notebook Tutorial: The new research writtin' platform
2. Image Processing Using PIL
3. Course Introduction
4. Image Classification: a study case 3.1 Follow up 1: Image processing 3.2 worshop 1: Image classification
1. Lecture 1: About Neural Networks, history, perceptron and multi layer deep learning, applications
2. Lecture 2. Image Labellin' Common datasets and labelling platforms
3. Image Multi-Classification: a study case 6.1 worshop 2: Image multi-classification

Follow up 2

1. Lecture 3 CNN
2. worshop 3: Image segmentation: camvid study case. Image segmentation (Autoencoders: UNET) 8.1 Lecture 3. Second Part. Metrics

Expo-poster Follow up 3

1. Worshop 4. Image Generation (GANs), Super resolution, Google satellite to maps
2. Lecture 4: Image generation and image translation using gans Follow up 4
1. Collaborative Filtering: neural networks for tabular data (optional) 11.1 worshop 5: Recomendations systems
2. RNN: Recurrent Neural Networks and NLP: Natural Language Processing 12.1 worshop 6: Neural Translation english to spanish
3. GNN: Graph Neural Networks
4. Adversarial Attacks and Data Ethics, Follow up 5

Framework & Technology

- Jupyter Notebook
- Google Drive and Google Collaboratory = Collab

- Fastai Library V1
- Keras for TF

Grading

- 40% workshops
- 20% follow-ups & 10% test
- 30% expo & poster (interesting topic: technical and business diligence)

References

- Fastai Course V1, V2
- Andrew NG Deep Learning Course
- Zeiler-Fergus, 2014. Visualizing And Understanding Convolutional Neural Networks



Supuestos del Deep Learning

- DL is a black box: not really, visualize gradients and activations
- It needs huge ammount of data: Use data augmentation and transfer learning
- It's only for PhDs: It's based on sums and multiplications, try Fastai and Keras
- DL is images: Not longer true!, collaborative filtering, sentiment analysis, and NLP are in its core nowadays.
- Needs a huge GPU: Only in specific research projects.
- It's not really AI: who cares! Do you really want to build a brain?

What can I do after this course?

Create a world class model to:

- Classify species, beisball vs cricket pictures
- Identify movie reviews and recomend some, create an app to follow a company goodwill
- Build a chatbot to sort user requirements in a company or predict stores sales
- Make a facial recognition system
- Create an app to segment objects in satellite images
- Create a visual inspection software for quality assurance
- And many more...