Hands on Intro to Deep Learning with Keras and Tensorflow

(Introducción práctica al aprendizaje profundo con Keras y Tensorflow)

Transversal Activities of Doctorate

Universidad Politécnica de Cartagena

1. General course information

Name	Hands on Intro to Deep Learning with Keras and Tensorflow
Level	Doctorate
Code	
University	Universidad Politécnica de Cartagena
Language	English/Spanish

ECTS	1	hours / ECTS	10	Total hours	30

2. Lecture data

Lecturer in charge	Javier Garrigós Guerrero, José Javier Martínez Álvarez
Department/Service	Electrónica, Tecnología de Computadoras y Proyectos
Knowledge area	Arquitectura y Tecnología de Computadores
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3. Course objectives

AI, ML and DL are complex disciplines that usually require a graduate or master specialization, or solid mathematical background to get a profound knowledge of them. However, the democratization of the toolsets is making DL accessible for researchers without a solid background in AI, C++ or CUDA programming. Nowadays, basic Python scripting skills suffice to apply DL to solve real world problems.

Therefore, this course is not (and could not be) focused in teaching ML algorithms (doctorate candidates interested in contributing to the AI field should take a full stack specialization), but on how to use ML (DL) algorithms and well stablished frameworks to solve ML tasks.

Students will learn the historical evolution of AI, ML and DL, the operating principles and steps of the DL algorithms (why it works) and the kinds of problems they can be applied to. Students will also get practice in configuring some of the most used cloud services for DL (Microsoft Azure, Google Colab, Floydhub). Finally, students will learn basic knowledge on one of the most used DL frameworks (keras+tensorflow) and use it to solve some real world classification tasks.

Python programming experience is advisable but not required.

4. Theory programme

1. A historical perspective on Artificial Intelligence, Machine Learning and Deep Learning. DL workflow.

2. Data preprocesing.

3. DL for image processing. CNNs.

4. DL best practices.

5. Practical programme

1. Framework setup: tool-set (python, tensorflow, keras) and computer (local workstation, cloud services: Microsoft Azure, Google Colab, Floydhub,..) setup.

2. Manipulating tensors with numpy and keras.

3. Multiclass classification example.

4. Image classification example.

6. Hours distribution

Activity	Location	Student work	Hours
Theory programme	Classroom (presential)	Attend class	4
		Homework: study of the theory contents	4
Practice	Classroom (presential)	Attend class	4
		Homework: Design of a sample application (60% grade)	15
Test	On-line	On-line test taking (40% grade)	0.5
Tutoring	On-line	On-line	1.5
			30