Universidad Politécnica de Cartagena | Campus de Excelencia Internacional

INTRODUCCION TO ARTIFICIAL NEURAL NETWORKS

Transversal Activities of Doctorate

Universidad Politécnica de Cartagena

Academic year: 2016-2017

1. General course information

Name	INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS				
Level	Doctorate				
Code	300001013				
University	Universidad Politécnica de Cartagena				
Language	English				
ECTS	1	**hours / ECTS**	10	**Total hours**	30

2. Lecture data

Lecturer in charge	Dr Javier Molina-Vilaplana		
Department	Systems Engineering and Automation		
Knowledge area	Systems Engineering and Automation		
Office location	1ª planta del Hospital de Marina. Sub-ala Nordoeste. Despacho: 2068.		
Telephone	00349685359	**Fax**	
email	javi.molina@upct.es		
URL / WEB			
Office hours	Mornings 10.00-14.00 Monday-Friday		

3. Course objectives

The course attempts to provide the engineering graduate student with a brief insight in artificial neural networks. The fundamental properties of neural networks are sketched and the most basic examples of training algorithms are discussed. The students are encouraged to implement some of these algorithms. Some advanced simulations tools will also be presented. The course may be useful for those interested in a subsequent one more focused in applications of neural networks.

4. Theory programme

1. FUNDAMENTALS

1.1 Artificial Neurons. Connectionist Models.

1.2 Networks of neurons. Topologies.

1.3 Training of Artificial Neural Networks.

2. NEURAL NETWORKS LEARNING ALGORITHMS.

2.1 Perceptron and ADALINE.

2.2 Exclusive OR problem

2.3 Multilayer Perceptrons.

3. BACKPROPAGATION ALGORITHM

3.1 Basic algorithm.

3.2 Advanced algorithms.

3.3 Deficiencies.

BASIC BIBLIOGRAPHY

An Introduction to Neural Networks. B. Krose and P Van der Smagt. (English)

http://www.infor.uva.es/~teodoro/neuro-intro.pdf

Redes Neuronales Artificiales. A.J. Serrano, E.Soria, J.D. Martin (Spanish)

http://ocw.uv.es/ingenieria-y-arquitectura/1-2/libro_ocw_libro_de_redes.pdf

5. Practical programme

1) ADALINE. Applications
2) BACKPROPAGATION. XOR Problem.
3) MATLAB NEURAL NETWORK TOOLBOX.

6. Hours distribution

Activity	Location	Student work	Hours
Theory programme	CONTROL LAB. DEPARTMENT OF SYSTEMS ENGINEERING AND AUTOMATION.	Attend class	**6**
		Homework: study of the theory contents	**10**
Practice	CONTROL LAB. DEPARTMENT OF SYSTEMS ENGINEERING AND AUTOMATION.	Attend class	**4**
		Homework:	**8**
Tutoring	Virtual	Virtual ….	**2**
			30