

Data Mining (Mineria de Dades)

Lluís A. Belanche
belanche@lsi.upc.edu

Soft Computing Research Group

Dept. de Llenguatges i Sistemes Informàtics (Software department)

Universitat Politècnica de Catalunya

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Data Mining (Part II)

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A worked example: Contradictory learning problem

Suppose we have a set of input examples $x_1, \dots, x_4$ which appear a number n_i of times in a data sample of size 52. Each $x_\mu \in \{0, 1\}^{10}$ and each target $t_\mu \in \{0, 1\}^7$

	INPUTS	n_i	OUTPUTS
x_1	1010011010	16	1,2,3,4,3,2,1
x_2	1101011101	17	2,4,2,1,2,4,2
x_3	0010100101	14	2,5,3,2,1,1,0
x_4	0101010101	5	2,5,3,2,1,1,0

- The OUTPUTS express the number of '1' in every position (from 1 to 7) of the corresponding n_i INPUTS
- For the input x_4 there can be more than one '1' in the output; for the other inputs there is just one '1' in the output (check the sums)

Artificial neural networks (V)

A worked example: Contradictory learning problem

- Because of the contradictions, the (training) error can never be zero.
- What should be expected? The network should learn the frequency distribution of the '1' in the outputs, for every input.
- We train a MLP of two hidden layers, 10 neurons each, and an output layer of 7 neurons, all of them using the logistic
- It can be shown that the minimum possible error is 43.42479
- After 600 epochs of the BP algorithm, the error reached is 43.42854