INF436 Machine Learning: Lab 4
Solving a classification problem with Artificial Neural Networks

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Due: For next lecture/lab session,

Evaluation: code (in group) + (theoretical, practical) questions (individual).

Suppose that you are working on a project that consists of designing a mobile robot that can autonomously navigate over a 2D map avoiding obstacles. In this lab session, we are particularly interested in constructing a classifier that can separate a passable region from a forbidden region by learning its parameters from a given dataset.

1 Exercises

1. Download the data set *data1_lab4.txt* for this lab that are available on campus.ece.fr. Both data sets consist of three columns: $x1$ [m], $x2$ [m] and y [-], where $(x1, x2)$ are 2D cartesian coordinates, and y indicates whether a data point is of passable region (y=1) or of forbidden region (y=0).

2. Implement the aforementioned classifier using the artificial neural network approach by learning its parameter values using the provided dataset. This ANN should consist of 3 layers (input, hidden and output). Choose the number of neurons that suits the most for each training data set.

3. What are the optimal parameter values for the hidden layer (v) and for the output layer (ω) for each data set?

4. Test your classifier by introducing some new input data (at your will).

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