Group Assignment 2

Tuning Deep Neural Networks
on real-life Business Data

Background and Goal:

The industry is online retail (e.g., Amazon).

Goal:

The goal is to predict quantity sold of a given product as accurately as possible by tuning the learning procedure.

Data:

All data is contained in *pricing.csv*. The data is copyrighted and confidential.

One line in the data represents a product selling on the company's e-commerce website. If a product goes out-of-stock and then becomes in-stock again a new line is created in the data for that product

- sku: stock keeping unit
- price: the price of the product on the website
- quantity: total quantity sold
- order: identifies the n^{th} time the product was in-stock and selling on the website
- duration: how long the product appeared on the site before going out-of-stock
- category: product category

Note 1: All categorical variables are integer encoded (not necessarily consecutively). All numeric variables are divided by a constant.

Variables

Input variables

- sku
- price
- order
- duration
- category

Response variable:

- quantity

Tuning parameters

The goal of this assignment is to gather experience on the sensitivity of the algorithm to different kinds of tuning parameters: batch size, number of hidden layers, number hidden neurons, hidden activation functions (sigmoid, tanh, relu, leaky relu, prelu, elu), optimizers (plain SGD, momentum, nesterov, adagrad, rmsprop, adam, learning rate scheduling), …

The first step in this exercise is to make a grid of all possible combinations of parameter values.

Deliverables:

Code (.py file)
-A deep neural network implemented in TensorFlow and a function to tune parameters
-All Python code to prepare the presentation

Presentation (pdf or PowerPoint)
-Useful insights on the sensitivity to tuning parameters
-Details on training