MIW (eng) - mini-project 5 (29.04.20)

Neural Networks with Keras

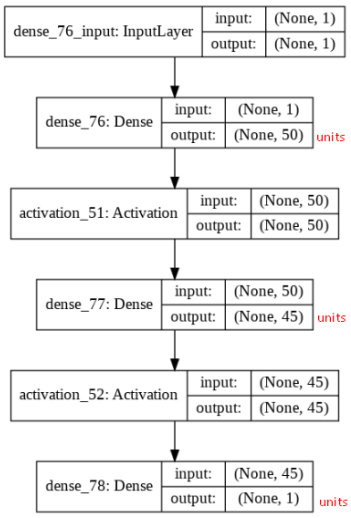
0. **(optional) Setup**
    a. You can use 5_NN_template.py to fill out necessary sections. It is up to you.
    b. Google Colab notebooks have Keras installed.
    c. If you are coding locally on your computer, install Keras with *pip install keras*
    d. But remember, the code should be submitted as a Google Colab notebook.

1. **Get and prepare data**
    a. Read in the data from a file *daneXX.txt* that's been assigned to you via the link, where XX is the number of a dataset:

    https://docs.google.com/spreadsheets/d/1eyqkibVdV5LXjAoKUhVNvWHixhPk2iw3zyYUi_2LPUM/edit#gid=1925742827

    b. Shuffle the dataset.
    c. Split the dataset into test/train datasets. Suggest your ratio.

2. **Build, train and test:**
    a. Build a model according to this structure with RELU activation functions:



    b. Fit the training data in the model. Suggest a number of epochs.

c. Evaluate the model on the test dataset.
d. Make predictions on the test dataset.
e. Plot the results (red) and actual points (blue) in one scatter plot.

3. **Save the results and submit**
   a. Compile the model and save it as a picture miw5_sXXXXX_model.**png**, where XXXXX is your student number.
   b. Compile the model and save it as a model file miw5_sXXXXX_model.**h5**, where XXXXX is your student number.
   c. Plot the results (red) and actual points (blue) in one scatter plot and save it to a file as miw_sXXXXX_result.**png**, where XXXXX is your student number.

4. **Are results not fitting the actual test data? Try:**
   a. Changing an optimizer.
   b. Setting a different number of input neurons.

Submission:

1. Send a link to your notebook on https://colab.research.google.com/, an image of your model, your model file and the image of your plotted results to my email ihalych@pja.edu.pl.

Deadline rules:

1. By midnight 29.04.20 - max amount of points is 10
2. By midnight 6.05.20 - max amount of points is 10
3. By midnight 13.05.20 - max amount of points is 5
4. Later - 0 points

Resources:

0. Installing Keras
   https://keras.io/#installation
1. Sequential model
   https://keras.io/getting-started/sequential-model-guide/
2. Dense layer
   https://keras.io/layers/core/#dense
3. Activation
   https://keras.io/layers/core/#activation

4. Loses
   https://keras.io/losses/
5. Optimizers
   https://keras.io/optimizers/
6. Fitting data
   https://keras.io/models/model/#fit
7. Compiling a model
   https://keras.io/models/model/#compile
8. Visualizing a model
   https://keras.io/visualization/
9. Saving a model
   https://keras.io/getting-started/faq/#how-can-i-save-a-keras-model