Home Assignment №1

LIGHT

Variant 1

Rewrite the *handwritten digit recognition* section of the notebook, include the following operations:

1. Libraries import.
2. Download the mnist database.
3. Standardization and normalization of x_train and y_train.
4. Creation of a neural network.
5. Neural network training.

You can consult the notebook of the lesson, but you are required to write the code by yourself.

Variant 2

Hold a series of experiments to search for the best hyperparameters of the neural network created in the lesson.

1. Change the number of neurons in the network applying the following parameters:
    - one layer of 10 neurons
    - one layer of 100 neurons
    - one layer of 5000 neurons
2. Change the activation function in the hidden layer from ReLu to linear (None).
3. Change the batch size (batch_size):
    - 1
    - 10
    - 100
    - All data set (60000)
4. Create a table containing the obtained values.
5. Write a conclusion based on the results of the performed tests.

PRO

Recognize a handwritten digit that you created using a graphics editor (ie. MS Paint).

1. Draw a random digit in a graphics editor.
2. Save the file and upload it to the Colaboratory.
3. Use the function image.load_img(path, target_size=(28, 28), color_mode = ‘grayscale’) to upload the image and write it to a variable.
4. Use the function image.img_to_array(img) to transform the image into a numpy array.
5. Perform color inversion and reshape the array.
6. Use the network to recognize your own handwritten digit.

Use the same algorithm to write a handwritten digit on a sheet of paper (you should pre-process the image first).