Reminder: For this lesson you need to install **the Keras library**

Submission Format: Please Submit one **ZIP FILE** that contains:

* **\*.py** files with necessary code and
* **\*.docx** file with IDs and students names, results and explanations.

The name of the ZIP FILE should be: lab<#>\_<IDnumber1>\_<IDnumber2>, where # is the lab number.

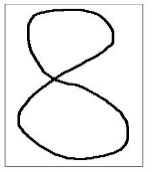
**Lab 9: Convolutional Neural Networks**

**Tasks to do**

1. Read the file CNN\_Lab\_9. Open the files lab\_9\_0.py and lab\_9\_1.py .
2. Load the MNIST Database of handwritten digits from Keras: *keras.datasets import mnist*
3. Choose a part of the images as a **Training Set** and rest of the images as a **Testing Set**.
4. Define a simple CNN model *def baseline\_model()*
5. Construct the model on the Training Set.
6. Predict the value of the digit on the Testing Set.

**Independent work**

1. Draw on a separate piece of paper (or in Paint) digit '8'. Use smartphone for scanning this picture and create the image file. You can use Paint to draw and create the image file.



1. Crop from the considered image up to the format of MNIST Database. Resize the image to size 28x28.
2. Use CNN algorithm to build a model – the trained network for the MNIST Database.
3. Predict the labels of your image using the trained network.
4. Show your image with it's prediction result.
5. Repeat the steps 7-8 for digit '7'.
6. Use CNN algorithm to build the trained network for a subset from MNIST Database (classes of digits '1' and '7').
7. Predict the labels of your '7' image using the trained network from step 13.
8. Show your image with it's prediction result.