

## LAB

### Task

Our task was to work a little with CNN and MNIST dataset. We had to define the structure and train the network. After that, we had to study the influence of learning rate and a number of filters on network performance. That led to the conclusion that properly chosen parameters are really important. As result, we introduced random search and studied the best performing configuration.

### Architecture of the network

Layer	# of Units	Activation function	Size
Convolutional layer	16	ReLu	3
Pooling layer	-	-	2
Convolutional layer	16	ReLu	3
Pooling layer	-	-	2
Dense layer	1024	ReLu	-
Logits layer	10	Sigmoid	-

Table 1: Parameters for each layer

### Default values

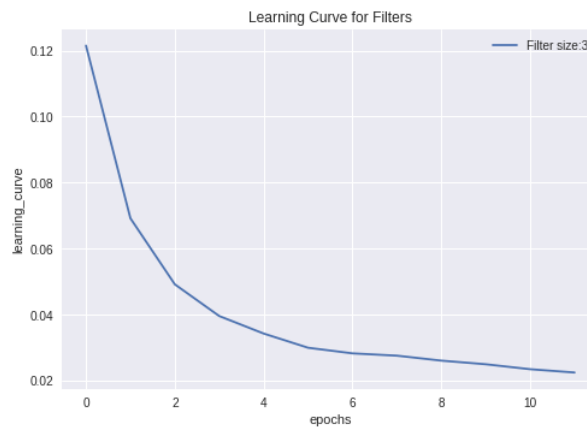


Figure 1: Learning curve

## Learning rate importance

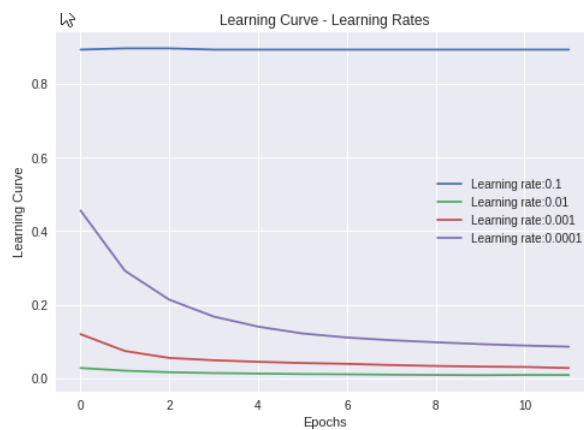


Figure 2: Learning curve

## Number of filters importance

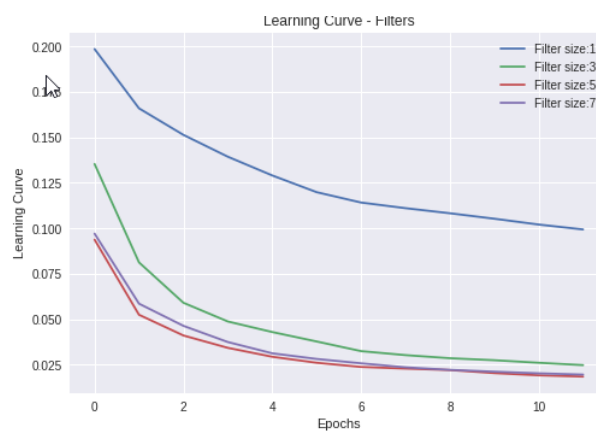


Figure 3: Learning curve

## Random search

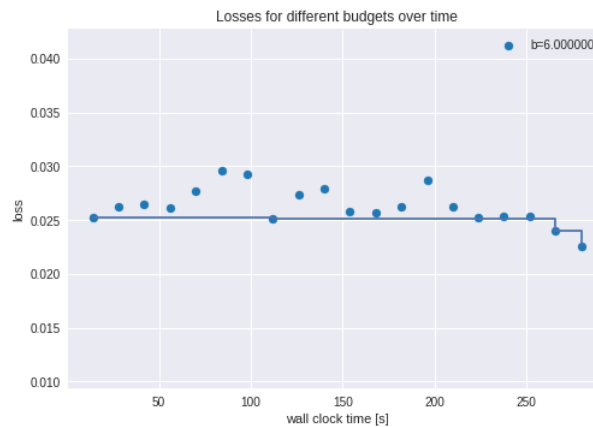


Figure 4: Loss

## Best performing configuration

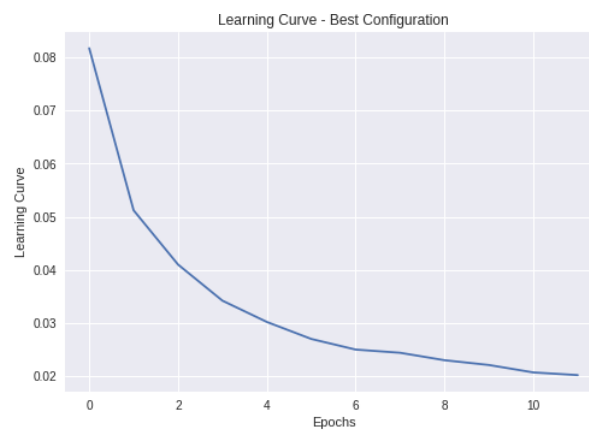


Figure 5: Learning curve

## Comments

- I got some problems running the code on my Windows-based machine, after a long fight I switched to Google Colab. I hope it is not a big inconvenience.
- I will provide the Google Colab notebook with the results saved in the output, I will also try to create .py files, but I cannot check if they are running properly