EVALUATION OF CLIENTS FOR THE PROVISION OF LOANS VIA DEEP NEURAL NETWORK

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The article deals with possible methodology evaluation of clients for the provisions of loans via deep neural networks.

Evaluation of clients for the provisions of loans and mortgages is a very common process in banking. There are a great number of methods and procedures. The article presents the principle of using deep neural network. To explain this principle, let's use tab.1.

Order:	Income:	Property:	Loan:
1	0	0	0
2	0	1	0
3	1	0	0
4	1	1	1

Tab. 1 Input and output values

The table has an interpretation where input1 means the size of Income (1 - high and 0 - low), input2 means the size of Property (1 - high and 0 - low). The output is the provision of a Loan (0 - no and 1 - yes). In this example, I use deep learning, where I convert the problem into pictures. The colour green corresponds to the high Income, Property and the provision of the Loan. The colour red corresponds to low Income, Property and non-provision of the Loan. The above table is transformed into four images. See. fig.1.

Fig.1 Pictures for neural network

The table shows a conservative approach, where a loan is provided only if the Income is high and the Property is high. Deep Neural Network (DNN) is learned on two groups of images. The first image on the left, represents the provision of a loan. The second, third and fourth image represents no provision of a loan. The DNN uses pre-trained Google net with144 layers. The image size is set to be 224x224x3, where 3 is reserved for RGB colour. To train new images, it is necessary to replace the last two layers "loss3-classifier" and "output". It is suitable to set the learning parameter to fast - for new layers, slow - to middle layers and “freeze” old layers to speed up the calculation, prevent possible overfitting and remember the exact details. The neural network training is started on the CPU, or it could be speed up via GPU or GUDA GPU. Treining process is presented on Fig.2.

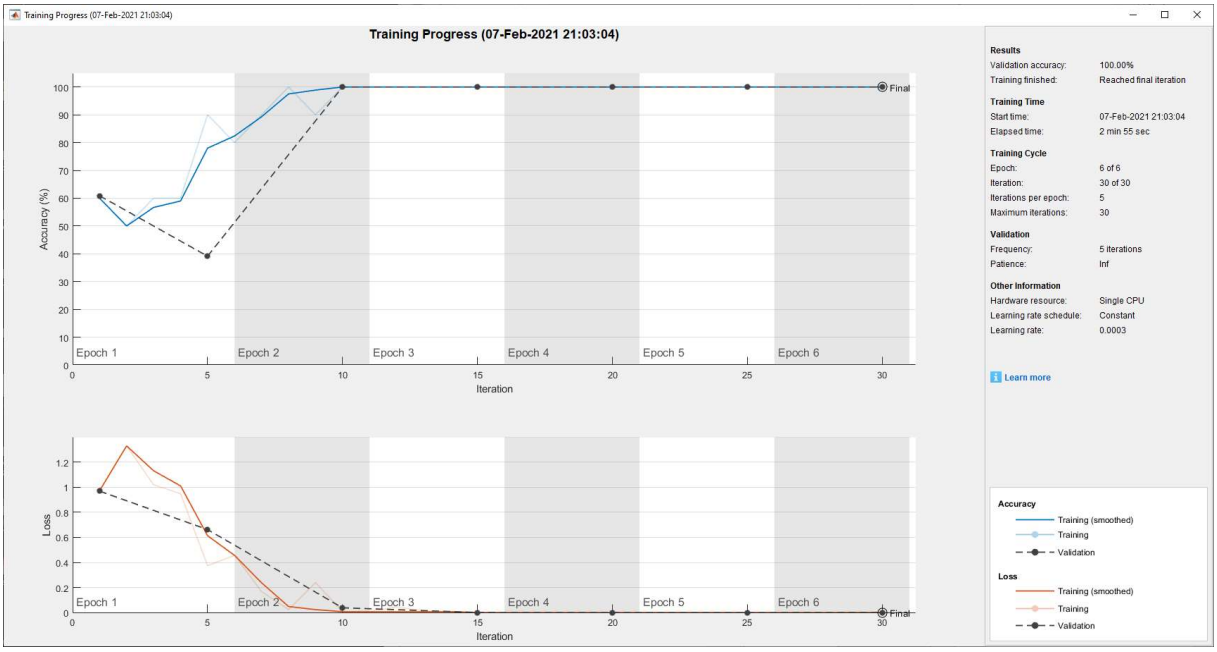

Fig. 2 Neural network learning process

After the calculation, the images with the assignment of the labels NoLoan and YesLoan categories and their percentage of classification accuracy are displayed. See Fig.3.

Fig. 3 Evaluation of images and their accuracy

A confusion matrix can be displayed, which indicates a correctly learned DNN and proves the applicability of the method. See Fig.4.

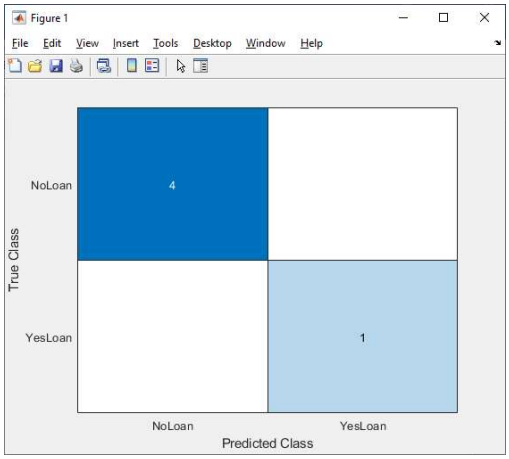

Fig. 4 Confusion matrix

The article is an example of a possible methodology of evaluation of clients for the provisions of loans via deep neural networks.