

UDC 004

## NEUROFILTERS IN THE DIGITAL SPACE

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Today we would like to tell you about the use of neural networks in the Photoshop graphics editor.

By itself, a neural network is a mathematical model, as well as its software or hardware implementation, built on the principle of the organization and functioning of biological neural networks - networks of nerve cells of a living organism.

Let us consider secure neural networks that are starting to be introduced into one of the most popular graphics editors – Adobe Photoshop 2021. In this case, neural networks are configured to facilitate work in specific cases. Where is it necessary? Firstly, it is really helpful for ordinary users with no experience when they need to do something quickly, even without watching any training videos. Secondly, it is really necessary for experienced users as it considerably reduces time for photo processing.

Of course, you should understand that these are test versions of neural networks in Photoshop so not everything will work perfectly now but every year there will be more of them.

Let us consider a couple of filters as an example. Let us start by replacing the time of day with the help of the sky, adding a haze effect of range in photography, colouring a black and white photo, removing coloured dead pixels due to a bad camera, transferring makeup and filtering with human changes in the photo.

We'll start with the simplest filter, Sky Replacement, and this is just an image taken from the Internet. Next, we just go to editing and from the pop-up list click on replace the sky. This neurofilter independently selects the mask of the sky and, the light-shadow pattern will change as in the example below.

A photo before editing



Already processed photo



All subsequent neurofilters are displayed in the first panel where you can enter by clicking on the filter and in the pop-up list click on Neural Filters.

There is one more interesting filter that allows you to change the emotion in the photo. Let's look at the example given below. A woman came to a photo session at a modelling agency but she couldn't show a smile. An editor wanted to see a different result and used the filter.

Result before:



Result after:



Here are only a few examples of using neurofilters. But it can give us some understanding of how they work and can affect our future. When they are used frequently neurofilters can analyze the results, develop independently and improve their system. This is only the beginning, because developers of the future neurofilters for Photoshop promise the same simple clicks on a couple of buttons to offer the

following list of possibilities – restoration of a photograph of your ancestors, removing dust and scratches from a photo, reducing noise on bad cameras turning even the most horrible pictures into something worthwhile, removing glasses from a photograph, recreating from a photo to a drawing of a person and much more!

### References

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## СУПЕРЕЛЕМЕНТНІ АЛГОРИТМИ ОБРОБКИ ВИМІРЮВАЛЬНОЇ ІНФОРМАЦІЇ

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Суперелементні алгоритми обчислень (метод підконструкцій) прийнятні для будь-якого типу аналізу. Використання суперелементів (підконструкцій) є процедурою, що об'єднує групу часових вибірок даних вимірювань в один суперелемент – масив вимірювальних даних. Масив вимірювальних даних представляється єдиною матрицею (даних вимірювань температури, тиску, швидкості, динамічних навантажень), що дозволяє проводити розрахунки