DIGIT RECOGNITION.

DRAW a digit on the screen.
Is the digit recognised correctly? The „heat map" (coloured pictures of your drawing), shows you which parts of your digit are important for recognition.

CHANGE the digit.
How does the bar diagram change? When is another digit recognised?
What happens when you draw a letter?

There is an artificial neural network behind the digit recognition, which always recognises a digit from the drawing. This is because the artificial neural network was exclusively trained with it. The bar diagram illustrates the probability of each possible digit. This allows you to assess how reliably the drawn digit is recognised.

The „heat map" is generated by retracing the parts that were relevant for recognition („LRP" – Layer-wise Relevance Propagation). This method makes it possible to comprehend the recognition process in artificial neural networks. You can track the process by slowly converting a „3" into an „8".

This method already revealed that an artificial intelligence has identified a horse based on the copyright information in an image, instead of the actual horse in it (see yellow mark in Fig. 1 and the red-coloured area in Fig. 2).

Fig. 1: Original horse image (Sebastian Lapuschkin, Fraunhofer Heinrich Hertz Institute).
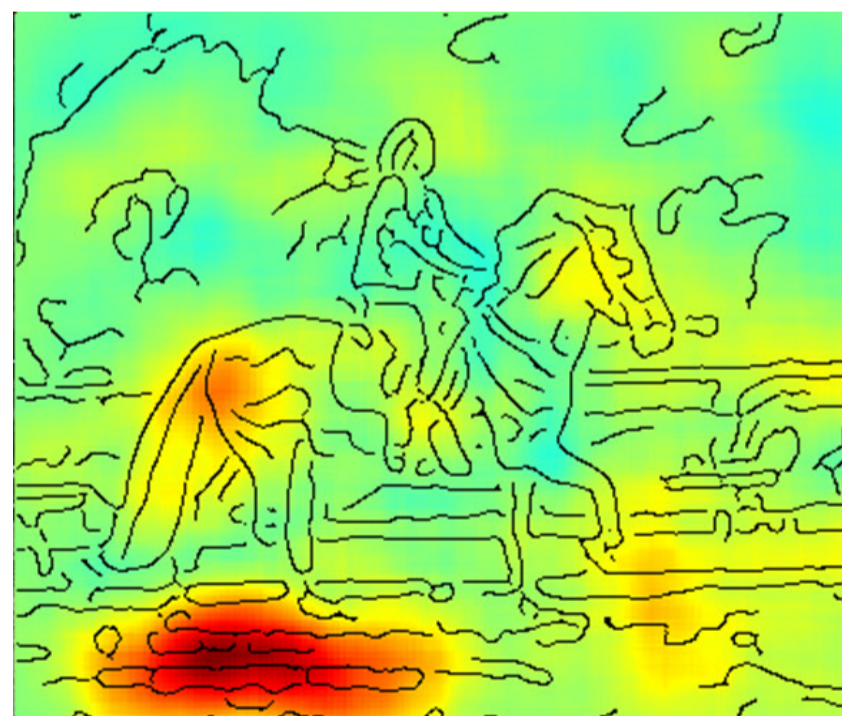

Abb. 2: LRP „heat map" (Sebastian Lapuschkin, Fraunhofer Heinrich Hertz Institute).

Idea and construction: Fraunhofer Heinrich Hertz Institute.