



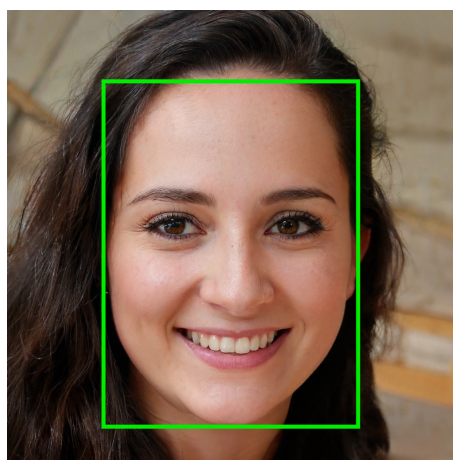
CAN YOU FOOL OUT FACIAL RECOGNITION?

The AI system can recognize you better than your teacher after two weeks of school? How does it do that?

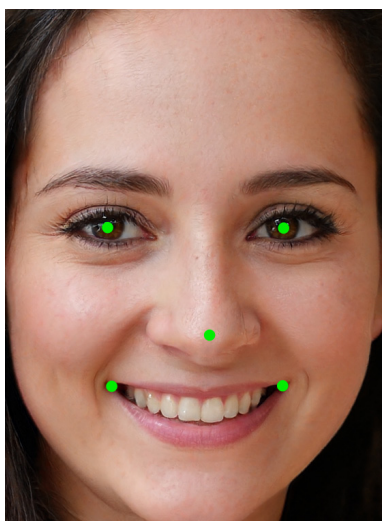
First, the AI system needs to find a face in the image.

In the image on the right, it has already succeeded, as indicated by the green rectangle. It then outputs the position of this rectangle as coordinates. You may be familiar with this concept from your math class.

Next, the AI system cuts out the area within the green rectangle. We also call this area the ROI (Region of Interest) because the most important part of the image is located here: the face.



Where is the face in the picture?



The most important points are marked in the face.

How does the AI system recognize the actual face?

You may have seen movies where facial recognition is used. In those, the computer always looks for specific points on the face. Our AI system works in a similar way. It identifies various significant features on the face, such as the tip of the nose, the corners of the mouth, or the distance between the eyes. These points are marked in green in the image. The AI system outputs coordinates for each important point.





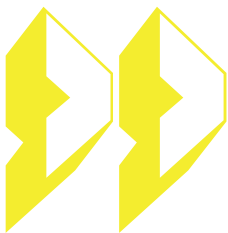
Now it's made suitable: To better work with the distinctive points, the AI system ensures that these points always lie on the same coordinates across different images. Therefore, the image is rotated, stretched, or compressed so that the measured coordinates end up on the specified coordinates. Then it looks almost as if the person were looking directly into the camera. You can try out such changes in image editing programs, for example.



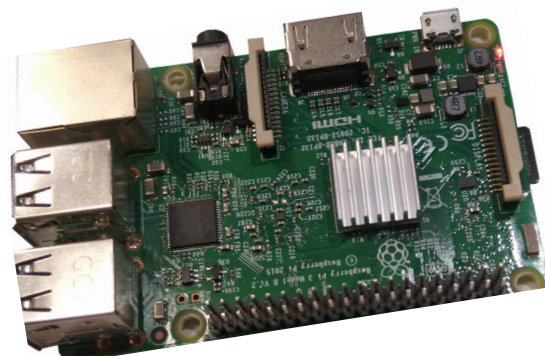
Rotate, compress, stretch

Now our image is ready to be compared with another image!

For each image, a set of points containing the distinctive information is stored. The AI system then compares the values of the points from the original and the comparison image to determine how similar the two images are. In principle, it is like comparing every single point, every wrinkle, or every hair on the face. This process yields values ranging from „absolutely similar“ to „not similar at all,“ which helps the AI system assess the similarity of the images. And, as you may have noticed, the system is not easily fooled and can still recognize you even with significant changes!



Pretty powerful, this facial recognition, isn't it? And our entire system fits on a **mini-computer and a **USB stick**. How well do you think systems used at airports and by the police work then?**





SOURCES

Sample photo for face recognition

created by <https://thispersondoesnotexist.com>

Photos Raspberry Pi & Intel Neural Compute Stick 2

created by Annabel Lindner

