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Informatics & AI

Experiment guide

Train your own Artificial Intelligence!

Have you ever wondered how your smartphone recognizes your face or how voice assistants like Alexa and Siri work? They use artificial intelligence (AI) to learn from experience!

How does it work?

In this experiment, you will train your own AI with Google's Teachable Machine website. You will learn how machines recognize patterns and how we provide them with data.

Artificial intelligence (AI) learns by example. It recognizes patterns in data and makes predictions. To do this, the AI must be trained to learn step by step and improve its results. In Teachable Machine, you train a model by taking different images and teaching the AI to differentiate between them. This is also how facial recognition or image recognition works on smartphones!

Did you know?

Did you know that AI decides what content you see on social media? Algorithms recognize patterns in your behavior. If you look at something for a long time or react to it by liking, commenting and sharing, the machine learns what interests you and shows you exactly this type of content more often!

Start the experiment!

You need.:

- Computer or tablet with internet access and webcam (or already saved images of objects)
- Various objects from 2 - 3 categories (e.g. apples, pens, water bottles, ...)



Let's go!

Step by step:

- 1 Go to the Teachable Machine website:
<https://teachablemachine.withgoogle.com>



- 2 Select "Image project".

- 3 Create two or three categories (e.g. "apple", "pen"). Make sure that only objects are photographed and not people.



- 4 Take several pictures with your camera for each category.



- 5 Train the model by clicking on "Train Model".

- 6 Test your AI: Show it an object and observe whether it recognizes it correctly! If the AI cannot yet clearly distinguish the objects, add 5 more images to each category and observe what happens.

Continue your research!

- What happens if you show your AI images with poor lighting or from other angles? Try it out!
- Can you teach the AI to recognize emojis or hand gestures? Experiment with other objects or try to train a model for other tasks!
- How many image examples does your AI need to distinguish between an apple and a pear? Is it more or less than for an apple and a pencil, for example?
- If you only take pictures of green apples during training, can your AI reliably recognize a red apple? Think about what this could mean for the assignment of human faces, for example.
- You can also start an “Audio Project” to train an AI with sounds.
- Attention - Pose Project would be another possibility, but you would have to record yourself. Check with your parents beforehand.

Background knowledge

Various research groups at the Institute of Science and Technology Austria (ISTA) are working on artificial intelligence and machine learning. Christoph Lampert's group is working on making computers smarter. Computers are often only really good at one thing - for example, playing chess or distinguishing images, as you have just taught your AI. AI cannot simply transfer its knowledge to other tasks.

Researchers at ISTA are therefore working on methods that allow AI to combine information from different tasks! These findings will help to develop better AI models that can be used in medicine or robotics in the future, for example.