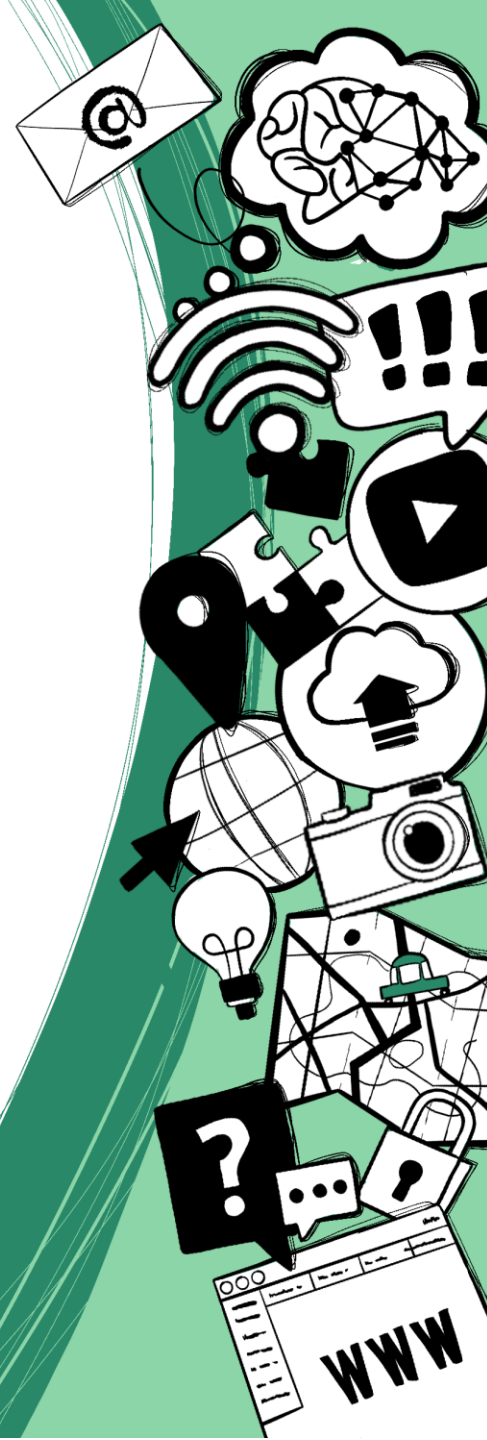
ENARIS

Supervised Learning Quiz



mobilis
interaktív kiállítási központ

TU Graz

OESTERREICHISCHE COMPUTER GESELLSCHAFT ®
AUSTRIAN COMPUTER SOCIETY

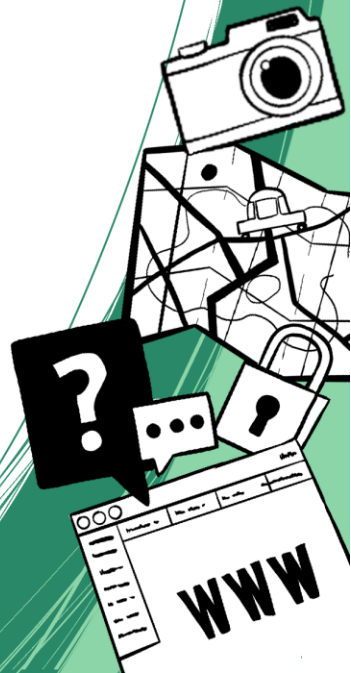
Interreg
Austria-Hungary 2014-2020
European Union – European Regional Development Fund

Training

It takes **equally long** to **train** a Supervised Learning model as it takes to **use** it inside an application.

a. True

b. False



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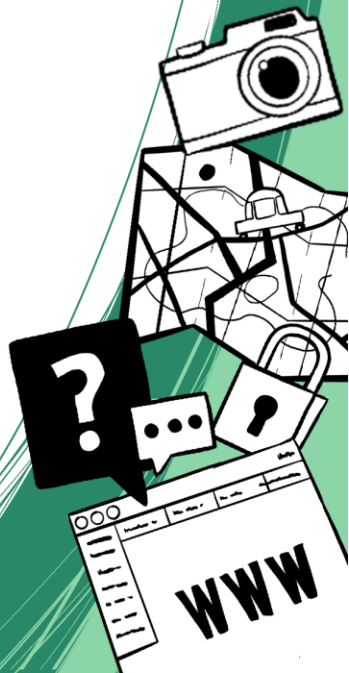
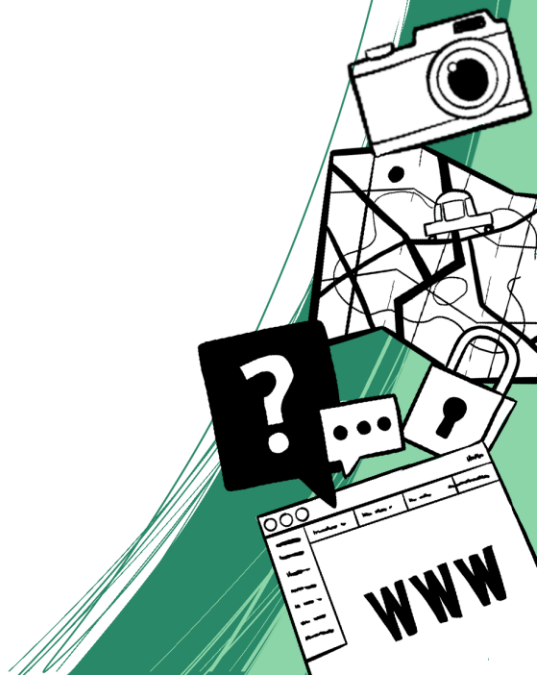


Training

- Depending on the type of algorithm and the size of the training data, **training** the model usually takes from few seconds **up to multiple days** (or even weeks). **Using** it however is a matter of **milliseconds**.



Models

Pre-trained models drastically **reduce** the time required to **train** a Supervised Learning model.

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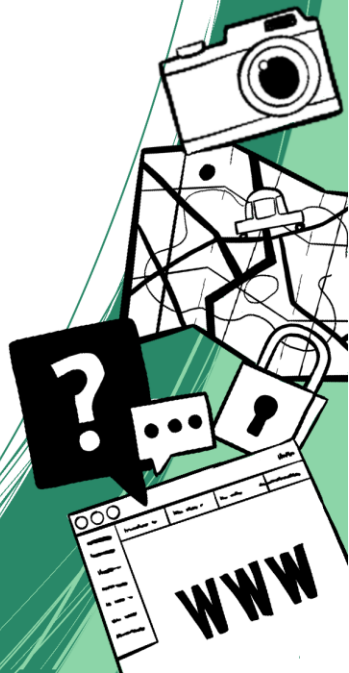

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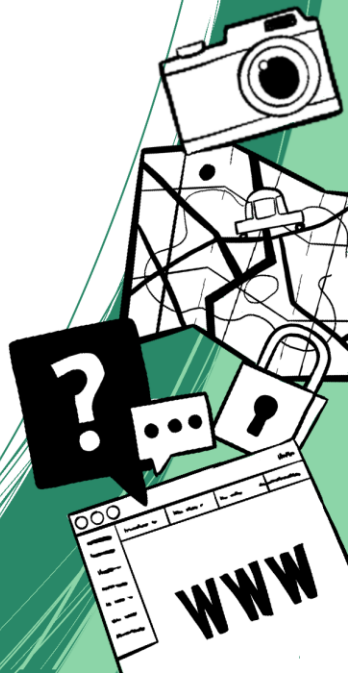


Models

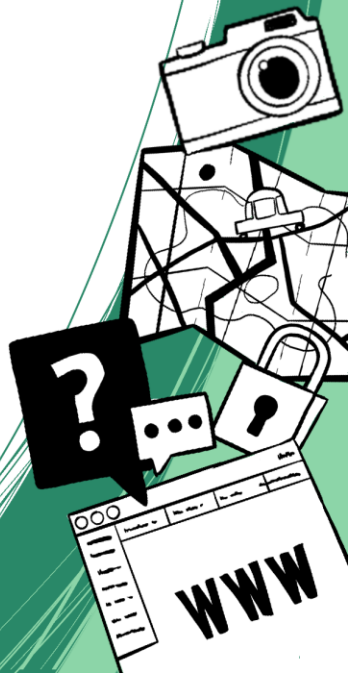
- While the training process can be quite long, a lot of it can be done **beforehand** so that the model only needs to be **adapted** to the new data. This **drastically reduces** the required training time.
- **Teachable Machine** uses **pre-trained models**, otherwise the training would take much more images and the results would most likely be less accurate.

Fingerprints

Fingerprint scanners use Supervised Learning to detect and differentiate between different persons.

a. True

b. False



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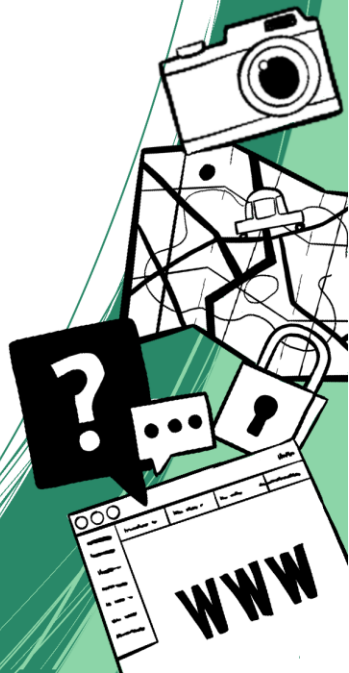


Fingerprints

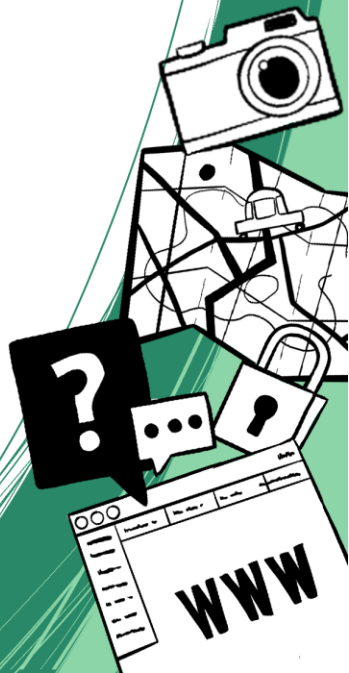
- Fingerprint scanners use **pre-trained networks** to detect **features unique to each person**
- As the network is already trained using it is very fast (it only has to decide if the recognized features are similar enough)

Chess

Modern **chess**-computers use Supervised Learning to always make the **best move**.

a) True

b) False



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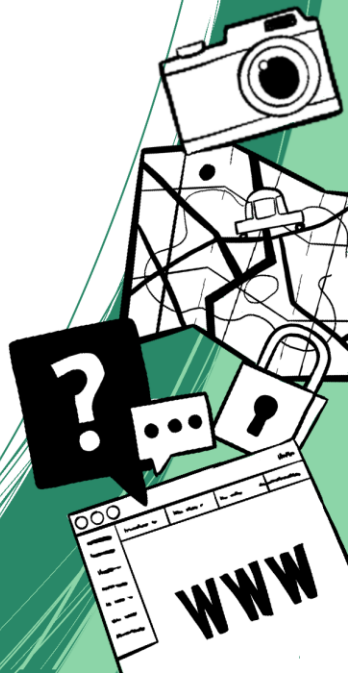


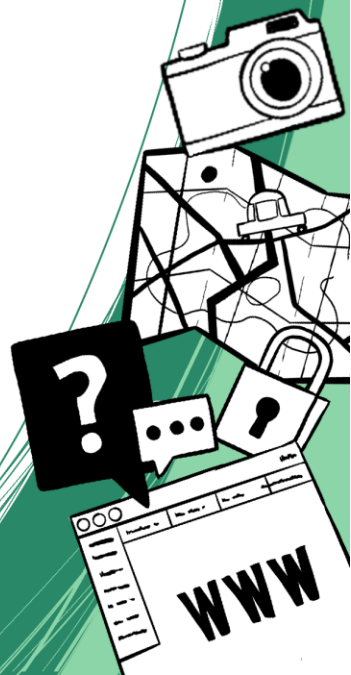
Chess

- Chess has **too many different board states** (roughly 10^{44}) to use for classical training
- These kind of problems are typically solved using **Reinforcement Learning** (letting the AI play millions of games and give rewards depending on performance)

Training

During **training**, the following **part** of a Supervised Learning Algorithm is **changed automatically**

a) the algorithm itself
b) the model
c) the parameters
d) the labelled data



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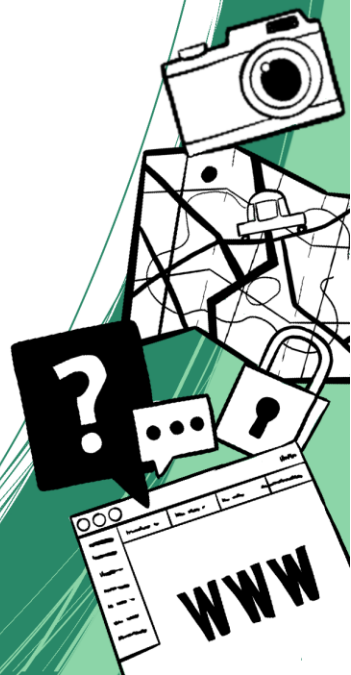
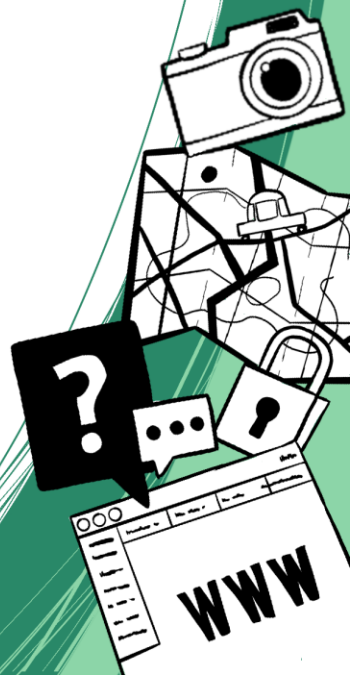


Training

- During training only the **model** is changed
- When changing anything else (parameters, training data), the training usually has to start from the beginning



Pathfinding

Google Maps uses Supervised Learning to find the **best route** to the destination.

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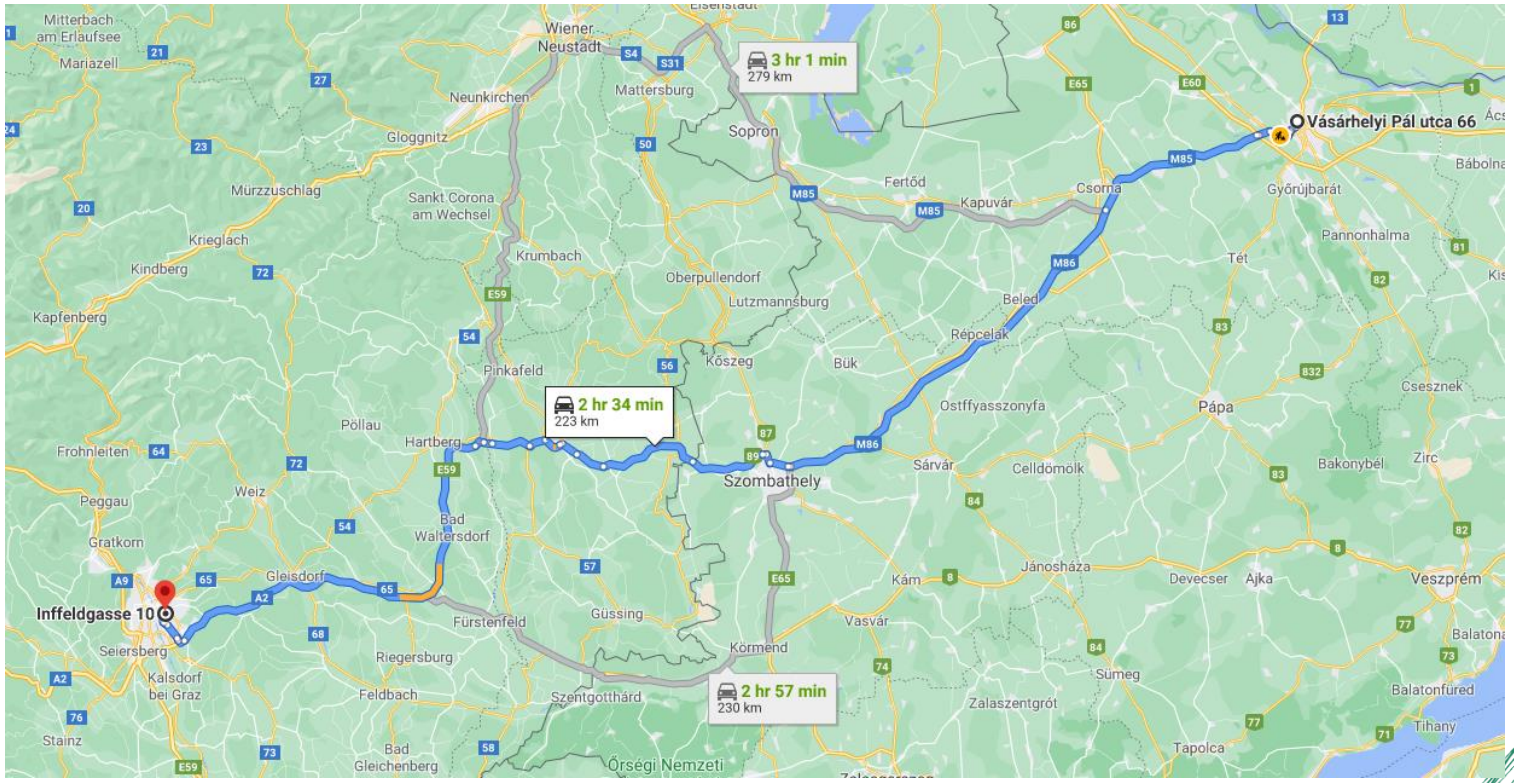

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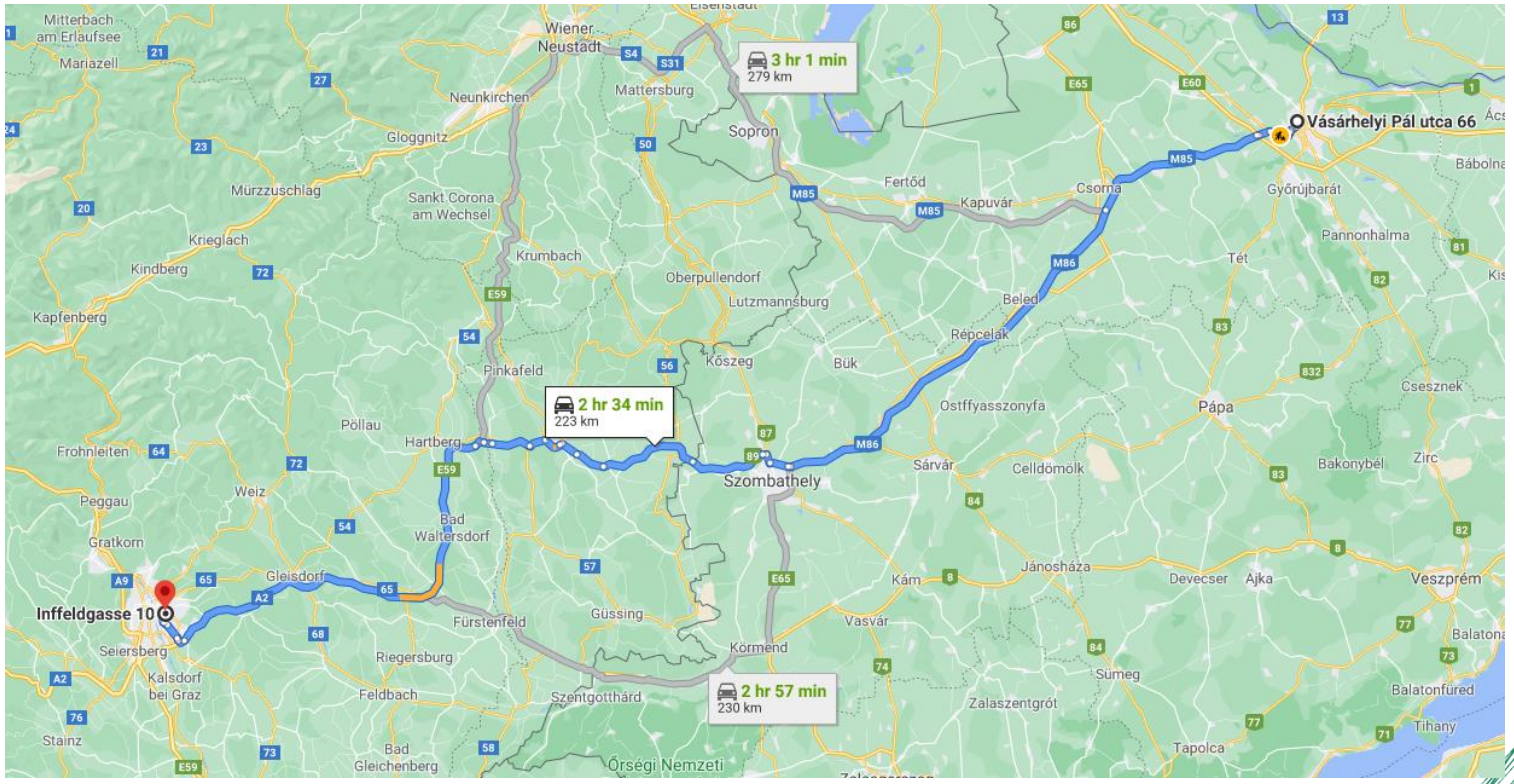

Pathfinding

- How would you even **pick a trainings set?** (there are ‘near infinite’ possible routes, even more than possible chess positions)
- Finding the **shortest path** can efficiently be solved by informed **search algorithms** (e.g. A*)

Self driving cars

A **self driving car** can use Supervised Learning to track and **classify** surrounding objects.

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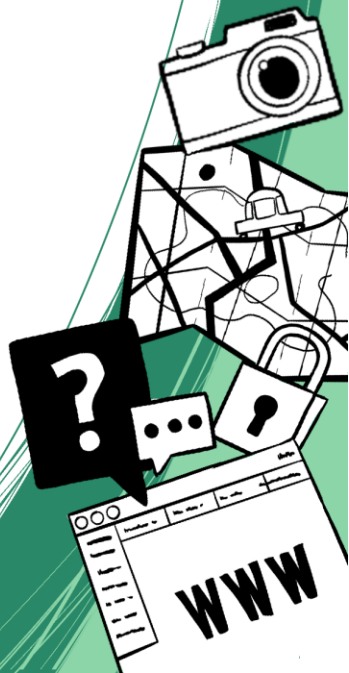
b. False



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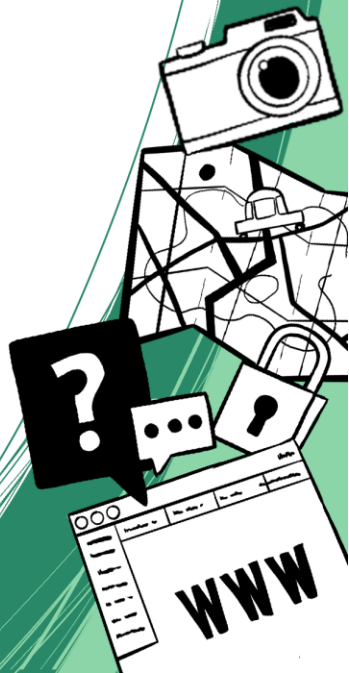

Self driving cars

- Self driving cars are very complex and use **many different algorithms** for different tasks
- Supervised Learning is only used in **some parts** like object classification

ENARIS

Do **you** have further examples of or questions about **Supervised Learning**?