How machines see

This week's Pop-up Science edition is about machines, how they learn and how artificial intelligence can help us in everyday life!

Self-driving cars, robots in the surgery room or language assistants with whom we can communicate. To some, this may sound like plans from the distant future but such smart machines already exist! These machines are so smart because they have artificial intelligence. Artificial intelligence is also abbreviated AI.

AI is an exciting technology of our time. Although we cannot see it, it is all around us! But how exactly do AI systems work? You find the answer to that question on the next page.

You think it is easy to distinguish between a Chihuahua and a blueberry muffin? Then try to find all Chihuahuas in this picture with one quick   look!

You had to look a little bit closer, right?
For an AI, such seemingly simple discrimination tasks can be really hard.

A. Read the following text and underline the most important pieces of information.

No matter if we are searching for something on the internet, translating street signs on vacation or operating our smartphone - artificial intelligence (AI) can help us! With AI, the fire brigade can get through traffic faster in an emergency, a farmer can optimally fertilize their fields or drug research can predict possible side effects before the drug is tested.

What is artificial intelligence?

AI systems imitate the human brain. So, although your calculator can solve very complicated calculations, it is not AI. It just follows calculation rules.

Similar to humans, AI systems are capable of learning from experience. It works much like toddlers.

A small child must see a cat several times to know that it is a cat. Only then has it learned what a cat looks like. The toddler can then also distinguish a cat from a dog, although both have four paws, a tail and fur. An AI learns in a similar way. After an AI has seen many pictures of cats and got the information that there is a cat on them, it can recognize big, small, light and dark cats better and better. When the AI sees a dog, it can mostly distinguish it from a cat correctly. But AIs also make mistakes. They could, for example, mistake a fox for a cat. If you make the AI aware of this mistake, it learns from it. The next time it sees a fox, it may already know that it is not a cat! But unlike children, AIs need much more practice to recognize something correctly, and they also have no awareness of what they are doing.

When we think of the calculator again, the difference is clearer now. An AI can learn and evolve. A calculator simply follows the same rules of calculation, every time you use it.

Where can AI be found?

AI is already used in many fields. In factories, robots take over work steps, smartphones are equipped with face recognition and even a navigation system or language assistants like Alexa are AI systems.

Although you can talk to Alexa, she is not a person! Alexa "lives" in computers and can be in thousands of locations at the same time and speak many different languages at the same time.

Did you know that AI systems can even beat chess world champions? On the other hand, Alexa, for example, is very bad at telling jokes. This may be because AI's have no feelings. So, AIs are not smart all around, their intelligence lies always in solving a specific task they are trained for.

Quick, Draw!

In Monday's experiment you came to know "Quick, Draw!". This browser game was developed by Google. While you were drawing, an AI was trying to guess what you were drawing.

Did you know that this game learns with every new drawing? The more drawings the AI gets to train with, the better its predictions become!

With millions of drawings from over 15 million players, this AI game has learned a lot and with each drawing you help it get better.

Can AI become dangerous?

AI has many advantages. But some people are worried that in the future, states or large corporations could use AI to monitor people. Already today big corporations use personal data and AI to make more profit. For example, watching our searches on the Internet they learn what we are most likely to buy, and then show us matching advertisements. This way, corporations can make more money. Social networks work similarly. This can lead to different people being shown completely different versions of the Internet and thus growing up a bit in different worlds - also called "bubbles". In summary, AI has many advantages, but should also be considered with caution.

B. Try to answer the following questions.

   Tick the correct answers.

1. In this Science Leaflet AI is the abbreviation for …

   ☐ … automated intellect.

   ☐ … artificial intelligence.

   ☐ … ability of interpretation.

2. A calculator is an example for a machine with artificial intelligence.

   ☐ true   ☐ false

3. What do AI systems try to imitate?

   ☐ The behavior of Chihuahuas.

   ☐ The algorithms of a calculator.

   ☐ The human brain.

4. Artificial intelligent systems are not capable of learning.

   ☐ true   ☐ false

5. What is NOT an artificial intelligence?

   ☐ The language assistant Alexa.

   ☐ Manually operated window blinds.

   ☐ A self-driving car.

6. What is an artificial intelligent system better at?

   ☐ Playing chess.   ☐ Telling a joke.

C. Word search

Do you find all the hidden words in the word search this time?

COMPUTER	MACHINE	QUICKDRAW
CALCULATOR	TECHNOLOGY	ADVERTISEMENTS
LANGUAGEASSISTANT	TRAINING	ROBOT
BRAIN	ALEXA	ARTIFICIALINTELLIGENCE

Circle each word. Have fun!

T	K	H	I	E	R	T	H	I	L	H	A	Z	B	D	E	Q	K	Y	B
F	A	H	D	Q	S	E	L	D	Q	S	T	G	F	M	E	H	C	E	L
U	P	G	V	L	A	F	Y	J	M	M	Q	N	M	N	C	M	W	Q	C
Y	J	L	B	U	Z	H	H	L	P	N	U	I	P	S	N	E	E	T	N
P	S	U	D	R	D	D	A	P	Q	S	I	N	N	O	E	N	U	J	J
V	U	R	O	T	A	L	U	C	L	A	C	I	L	Y	G	X	U	U	T
I	I	L	Z	W	A	I	Y	F	G	R	K	A	U	E	I	V	M	E	D
A	E	I	M	Y	E	K	N	H	C	T	D	R	A	U	L	J	K	W	I
E	T	M	C	M	J	X	T	O	B	O	R	T	T	L	L	W	X	O	D
M	G	L	U	A	G	K	V	J	U	I	A	E	Y	H	E	Q	Y	O	T
V	O	R	M	B	V	A	L	M	L	F	W	C	G	H	T	X	B	N	L
R	K	S	R	Y	F	A	S	U	R	W	A	H	K	A	N	I	A	T	X
T	A	D	V	E	R	T	I	S	E	M	E	N	T	S	I	M	P	K	F
G	F	U	D	D	E	D	Q	C	I	A	Y	O	T	X	L	I	V	U	Q
P	M	O	I	A	T	V	E	Q	N	T	D	L	B	U	A	O	X	U	E
U	Y	L	Y	M	U	J	X	X	V	H	I	O	C	Y	I	M	Q	G	A
O	O	X	D	A	P	N	Y	I	V	Q	K	G	O	B	C	R	G	M	R
F	D	Y	Y	C	M	S	G	W	N	H	L	Y	L	R	I	R	G	A	I
Z	N	X	P	H	O	F	M	U	M	U	E	Q	R	J	F	R	N	Q	F
Y	W	T	S	I	C	S	S	U	G	X	D	I	M	G	I	P	T	A	T
W	R	L	A	N	G	U	A	G	E	A	S	S	I	S	T	A	N	T	P
P	P	T	U	E	W	F	Z	S	H	A	K	U	A	U	R	J	R	D	S
R	O	I	N	I	I	W	Z	R	N	E	S	E	E	E	A	U	R	W	N
I	C	M	V	R	I	Z	L	O	O	U	G	A	V	L	C	T	I	A	K
R	D	S	H	D	V	J	D	I	E	J	T	R	A	H	Z	L	S	E	E