Artificial intelligence – Introduction of practical examples

AI is already used in a number of application areas: For example, we increasingly control smartphones using virtual assistants. Or we listen to music suggested to us by music streaming services based on our current preferences. Furthermore, AI systems are used in industry, in human resources, and in criminal prosecution or will be used for these purposes in the future. AI is thus quite versatile.

Not all AI applications work the same. They can be divided into four work modes:

1. **Pattern analysis**
   Numerous systems recognize patterns in data. These include applications for image or speech recognition.
2. **Pattern prediction**
   AI systems not only recognize patterns, but they can also make some predictions about possible future patterns. This helps, for instance, in detecting diseases at an early stage in medicine.
3. **Expert systems**
   These AI applications make targeted knowledge available. For example, AI at hospitals helps doctors select the correct diagnosis from a variety of possible diseases.
4. **Robotics/automation**
   AI can also control robots and other machines, which enables operations such as self-directed manufacturing of products in a smart factory.

Depending on the work mode used, the AI applications can fulfill different functions. This distinction allows the numerous applications to be sorted into four higher-level functional areas. Some AI systems fulfill several functions simultaneously:

- **Dialog processes – Human to machine**
  This category includes AI systems that "communicate" with us in our language or understand our vocal commands and then perform a task. We therefore no longer have to learn cumbersome keyboard or screen dialogs if we want to use computers. Virtual assistants fall into this category, but also humanoid robots that have the capacity to "communicate" and respond to spoken words of a counterpart. Voice-controlled AI applications are also sometimes used in industry, for example, in smart factories where people centrally control the production process and the machines are networked together.
- **Machine-to-machine processes**
  Machines are networked with each other in these processes. They autonomously exchange information via AI systems without people having to intervene during this process. Some systems even independently learn in this way. Parts of the smart factory work according to this principle.
- **Smart automation**
  This category includes applications that solve tasks autonomously without people having to intervene – often to lighten people's loads. Self-driving vehicles are one example of this. To date they exist only for research purposes and always have people on board to intervene in an emergency. Another application area is again the smart factory because numerous production processes take place there without assistance from people. In the area of human-like robots for the care of sick, older, or physically disabled people, trials and test runs are

taking place in which the humanoid robots automatically take over certain tasks such as reminding people to take their medications or demonstrating physical exercises.

- **Intelligence reinforcement and decision support**
  This category includes systems that help people make decisions. They feature the ability to process far more information (as data) than people can to arrive at a result. Furthermore, the systems are able to systematically search for particular characteristics. This area includes facial recognition, which helps identify criminals, for example. Automated selection processes support human resource managers in finding suitable applicants. For this purpose, AI searches through the received application documents and prescreens the applicants.