Big data in practice

Digital data can be very fine and detailed: Sensors built into smartphones measure data and trackers save hundreds of exact location coordinates and routes traveled; cookies record not only that you have visited a website, but also how long you stayed on individual subpages, what buttons you clicked, and which menu items you selected. These records are continually and automatically saved.

Data collection processes often run unnoticed in the background. Data are also shared through mindless actions or negligence: Users often determine themselves the sensor data that apps may access. For instance, people who track their walking using a fitness app have enabled the GPS sensor and the movement and acceleration sensor, possibly even while shopping. As a result, the people reveal more information than they are aware of. Numerous practical examples show how multifaceted big data is.

The Internet of Things

In addition to smartphones, many other devices also collect and autonomously exchange data, such as in your home. In a "smart home," for example, speakers, televisions, or toys are operated using voice commands, heating thermostats or blinds can be controlled remotely via a smartphone, and apps analyze data about power usage to display how energy can be saved. The Internet of Things includes developments in which devices automatically record and exchange data, for example, to optimize a process. In addition to smart homes, smart production in industrial enterprises and smart cars are key areas where technologies of the Internet of Things are used. Even small devices enrich big-data collections with usage data that allow conclusions to be drawn, such as how the house was heated and ventilated.

Cloud computing

Data from these numerous sources are usually saved in the "cloud" and no longer on users' own hardware. As a result, users can access the data from any device. Accordingly, cloud computing refers to processes in which data are stored and used at external, central storage locations. It is also used, for example, in language translation services, which leverage enormous collections of translated texts that have been stored on servers (thus in the cloud).

Virtual gaming worlds

Even in virtual gaming worlds, large databases form the starting basis, for example, the Google Maps geodata captured worldwide for the Pokémon Go mobile game. On the other hand, all users who play Pokémon Go or similar games continually generate new data since they have to move and allow themselves to be tracked in the real world – this is part of the game's principle. These data are of interest to private companies as well as to other entities.

Personalized advertising

Industry is interested in data partly because it can use the data to offer target group-specific advertising. Companies want to place their messages in the most targeted and fitting way possible, which is more likely using big data than in traditional mass media or perhaps via billboard advertising. The target groups can be narrowed down much more precisely through detailed user profiles.

Data-driven election campaign

Political election campaigns, such as in the United States, are also already making use of such data profiles. In a data-driven election campaign, one goal is to reach people very selectively. Silent volunteers on social networks help spread the respective campaign message: For instance, they place expedient opinions on relevant topics in front of undecided voters without disclosing that this was done as part of the election campaign.

Government surveillance

The government also gathers and analyzes volumes of data. Players in this case include the police, intelligence agencies, tax investigators, and other government authorities. They use the bigdata process to pursue their goal of detecting and preventing crimes at an early stage, solving crimes, and safeguarding internal security. In the process, data of people who have not committed crimes are also collected. This is referred to as data by-catch.