Big-data practical example – Virtual gaming worlds like Pokémon Go

Computer games normally consist of a completely virtual world: Everything is programmed and exists only as code. In contrast, Pokémon Go is a new type of online game that uses the real world as a gaming backdrop and combines a virtual world including fantasy creatures with reality. For this purpose, the developer acquires and uses information such as extensive geodata of the players.

The following text discusses how virtual gaming worlds make use of the real world, what data the players transmit, what value this has, and who might be interested in the data.

How do the virtual gaming worlds make use of reality?

With Pokémon Go, virtual gaming worlds and the real world were merged for a game designed for large-scale use. The game accesses the satellite location data – GPS coordinates – acquired by users' smartphones. The game thus detects the players' current whereabouts. This approach is also called geolocation. Depending on the player's whereabouts, the game displays virtual creatures in the real world recorded by the camera, allowing players to interact with the creatures. Furthermore, the entire game was developed based on reality – basically meaning the entire globe – and uses the locations as a backdrop. In addition, it adapts the virtual creatures, their characteristics, and their behavior to the surroundings. The ways in which players can act is also always related to their whereabouts. The game also allows players to mutually recognize each other in their immediate – real – vicinity and to make contact, such as to trade creatures or their characteristics.

What does this have to do with big data?

To implement these game ideas, the Pokémon Go developer accesses the big-data pools of Google Maps, in which geographical information is recorded for nearly every location on Earth. For the game, this means for example that virtual water creatures are always found near water. In addition, events taking place in the game can also be influenced by the real weather and time of day, for instance, if particular virtual creatures appear only at certain times of the day or react to the weather. To this end, the game must take current weather data into account. All this requires that large databases with dynamically acquired information are linked and provided to the players in real time.

At the same time, the players themselves provide an enormous amount of data. They reveal where they are, how much time they spend there, what they are interested in, what web services they use, and much more. These movement and action data are highly valuable to the game's developer and potentially also to third parties, especially advertising companies.

Pokémon Go and similarly structured games or apps with geolocation depend on receiving certain data. For this reason, the games need and ask for players' consent – such as to be allowed to access the GPS tracker, which provides the geographic coordinates of the player's whereabouts, or to access the sensors that record how the smartphone is oriented and how fast a player is moving. Nevertheless, they also use every piece of data recorded by the numerous web trackers, such as which websites, apps, or services the smartphone users access. The transmitted data also include logged moves, visited Pokéstops, game levels achieved, how long the user plays the game, and gaming partners. Precisely because the people with Pokémon Go are moving in the real world, the data are particularly valuable: They provide information on the players' actual behavior. In addition, device data such as the device model, manufacturer, operating system version, the unique device

identification (UDID), memory utilization, and country code are retrieved. A very detailed data profile of each player is obtained.

What is worrying about this?

Pokémon Go contributes to detailed data collections and data profiles of individual users that contain a wealth of personal data. These data could be used, for example, to display local geo-based advertising adapted to the player's current location. The developer can thus profit through advertising income from the detailed data profiles. For instance, the advertising could promote products and services in the player's direct vicinity. However, so far the developer has dispensed with in-game advertising.

Furthermore, the collected data are also of interest to third parties. The general terms and conditions that each player must accept allow the developer to share the data with third parties under certain conditions. These conditions are worded very vaguely. It is known that when users play Pokémon Go, a stream of data is transmitted to other companies that specialize in data analyses as well as tracking and marketing services. Using the detailed profiles, companies can place targeted personalized advertising – even far removed from the Pokémon Go gaming world. Moreover, the data can also be used to improve digital maps. So far, the game's developer and the service providers it shares data with have not revealed how exactly they use the collected data. The users are thus deprived of sovereignty over their own data.