VIRTUAL AND AUGMENTED REALITY
MODULE SUMMARY

1001 TRUTH – an initiative by Deutsche Telekom AG

PUBLICATION DETAILS

FUTURE TECHNOLOGIES

Virtual Reality – A new world?

Virtual reality (VR) is a world created by a computer. People enter this world with the help of so-called VR glasses. When the users put the glasses on, they can no longer see the real world. They only perceive the virtual world.

In virtual reality, users can see and often move in any direction. Their movements are transferred directly into the virtual world – when the user turns his head to the left in the real world, he also looks in this direction in the virtual world Diving into virtual reality conveys the feeling that what you see is real. This feeling is also called "immersion".

Augmented Reality – Augmented living, working, learning

In augmented reality (AR), reality is supplemented with additional digital information. Reality can be augmented, i. e. enhanced, in two ways:

On the one hand, digital information can be displayed on a screen (e. g. on a smartphone or tablet). The device's camera captures reality so that special AR content such as text, videos, images or virtual objects are directly displayed in the context of reality.

The digital information can also be displayed directly in front of the user's eyes: AR glasses are used for this. There is a small screen inside the glasses. In this way, digital information reaches the user's field of vision directly.

Back to the future

First attempts to create a virtual world were made much earlier than you would expect.

1838 – "Stereoscopy"
One of the pioneers of augmented and virtual reality is "stereoscopy". A subject is photographed from two slightly different angles. Then the images are inserted into glasses. This gives the motif depth – it looks three-dimensional. Stereoscopes are still sold today as souvenirs. Often they show landscapes or well-known sights.

1957 – "Sensorama"
Morton Heilig's "Sensorama" (1957) was one of the first attempts at giving users an experience beyond reality. For example, the VR machine made it possible to experience a motorcycle ride up close. An odor simulator, motion sensors and the corresponding films were used in the machine.

1968 – "Sword of Damocles"
The first device actually worn on the head was called the "Sword of Damocles". It was so heavy that individual elements of the machine had to be fixed to the ceiling. In 1968, the first images were inserted into the user's field of vision via mirrors, tubes and glasses.

1984 – "Virtual Reality"
The term "Virtual Reality" was first used in the 1980s. The expression is often traced back to the computer scientist Jaron Lanier. Together with his colleagues, Lanier also developed one of the first data gloves – a device for moving objects in the virtual environment.

1992 – "Augmented Reality"
The term "Augmented Reality" was used by Boeing employees Tom Caudell and David Mizell in the 1990s. Their idea: to help company employees build airplanes with the aid of AR glasses.

Gadgets and devices

AR-enabled Smartphones and Tablets
Newer smartphones and tablets enable the display of AR content – i.e. virtual objects merge on the display with reality. The smartphone cameras "scan" reality and immediately use the digital content. For example, an AR app can display new furniture directly in a specific room.

Virtual Reality Glasses
VR glasses are required to immerse oneself in virtual reality. In addition to the glasses, controllers are also used. With the help of these controllers, users can move objects in the virtual world – e.g. they can "pick up" and "store" them. Other special sensors and tracking systems such as "data gloves" enable precise control in the virtual world.

Head-up Display
The "Head-Up Display" is often used in vehicles such as cars or airplanes. Additional information such as speed or route descriptions are projected onto a glass panel in the driver's or pilot's field of vision. Pilots no longer have to look down during a flight, for example, and thus receive important information without diversions.

Smart Glasses
Data glasses or "smart glasses" make elements of augmented reality (AR) visible. Additional information such as photos, texts or graphics are faded directly into the user's field of vision – either through a small screen in the glasses or through a projection directly into the eye.

Holography Glasses
Holographic glasses not only display information in the user's field of vision. Parts of reality are augmented or even replaced with virtual elements (holograms). A digital board game, for example, can be faded in and played directly on a real table.

Setting out into new worlds

The market for VR glasses continues to grow. Especially in the video game industry, glasses are advertised as a technology for the living room. Currently, a large number of different devices are available in a wide range of prices.

An easy and inexpensive way to experience virtual worlds is with the cardboard glasses from Google. You can buy them for under 10 Euros. Once you have assembled them, you simply place your smartphone with the corresponding app into the cardboard glasses. Samsung has developed a similar pair of glasses. However, for the "Samsung Gear VR" you also need the corresponding smartphone.

A lot of exciting applications and games have already been developed for higher priced VR glasses such as "Oculus Rift", "HTC Vive" or "Playstation VR". To use the glasses, you need either a powerful computer or, in the case of Playstation VR, a Playstation console.

VR- und AR-Apps

Ikea Place (AR)
With Ikea's official AR app, furniture and decorative items can be tested in your own home before you buy them. The app shows the desired object on the display at exact the place you want it to stand in your home.

WWF Free Rivers (AR)
The AR app from the environmental protection organization WWF displays a river landscape on any

table. In the app, users can change the course of the river and the surroundings - e. g. by building a dam. The consequences can be seen immediately in the app.

Sky Guide (AR)
"Sky Guide" is a very popular app for hobby astronomers. Using an AR function, the app recognizes constellations in the night sky via the camera. The name and the constellation are then shown on the display. The app can also differentiate satellites from stars or planets.

Google Cardboards (VR)
The app "Google Cardboards" for the glasses of the same name is a collection of short VR applications. With it, users can for example, visit an art gallery or travel through the Arctic with an arctic fox.

Discovery VR (VR)
Go lion-watching in the savannah, fly through canyons or experience life at the other end of the world - the "Discovery VR" app makes it possible. 360° videos that can be viewed with the VR glasses play a particularly important role here.

Within (VR)
Exciting stories and unforgettable experiences - the VR app "Within" promises this and more! The content designers use the app primarily for storytelling and are constantly expanding it.

Is it all just a game?

Virtual reality is on everyone's lips in the gaming industry. Large trade fairs such as "E3" in Los Angeles or "Gamescom" in Cologne advertise the opportunities offered by the technology.

The possibilities are endless: in the video game "Moss" for Playstation VR, for example, you are accompanied by a small mouse that speaks and cooperates with you in the virtual world again and again. In the game "World of Tanks" you can take part in tank battles in war zones. But many people also see dangers in VR - precisely because the worlds are becoming more and more real.

Do video games have to become more and more realistic?

AUGMENTED EDUCATION

Any questions?

Journalism quickly recognized the potential of technology. After all, the users are very closely involved in the coverage.

However, the proximity can also be dangerous: according to journalist Eva Wolfangel, the striking images and experiences "play with their user's empathy". That is, they play on their compassion. People are always being influenced – positively or, when necessary, negatively.

Clouds over Sidra

The project "Clouds over Sidra" impressively illustrates the effect of virtual reality. The project shows a day in the life of twelve-year-old Syrian Sidra in the Jordanian refugee camp Za'atari. This can perhaps help understand the worries and fears of the refugees. According to director Chris Milk, a film like this uses the peculiarities of virtual worlds to consciously draw attention to injustices. The people who can actually change the world – e. g. politicians – can be there at first hand. This enables them to have a better idea of how those affected feel. Experiences in the virtual world may then have an impact on their decisions.

A new perspective

In virtual reality, people are not only closely involved. They experience situations that they would usually not be able to experience.

Imagine being able to see what blind people can only see through other senses. What would that kind of world look like? How would it feel?

ARTE Creative's "Notes on Blindness" project tries to convey this feeling through the diary of a blind person. The app is available free of cost for Android and iOS.

A field trip to mars

Anything but boring: with virtual reality, history, politics or biology are becoming more tangible than ever before. Have you always wanted to know what it felt like on a medieval battlefield? Virtual realities make it possible.

A question of acceptance?

A study in Germany shows that about one in six Germans has already experienced virtual reality. However, one third of Germans rule out regular use for themselves. Why is that?

Scenario 1: virtual reality

Imagine you are walking through a pedestrian zone. No one is on the street. All you see behind every window are people wearing VR glasses. No one speaks with anyone.

Many people are afraid that virtual reality will lead to people preferring to spend their time there and not in the real world. For outsiders, it is simply not clear what people see, experience or do behind their glasses. Those who are in virtual reality live alone and no longer need company.

Will we no longer need the company of real people due to virtual reality? Will this turn everyone into a single player in real life? Einzelspieler?

Scenario 2: augmented reality

Imagine you are at a job interview. The person sitting across from you is wearing smart glasses. After each of your answers, your conversation partner waits a moment and then formulates a new question. You have the feeling he knows more than you do.

Many people are afraid of a situation like this and ask themselves: which information does the person with the smart glasses have that I do not? What are the smart glasses recording? In the future, will smart glasses be able to recognize when I am lying or telling the truth?

What impact would this have on you in a situation like this? What kind of feelings does this trigger in you?

AUGMENTED WORK

Safe working conditions

Many employees work in dangerous working environments. In laboratories, for example, it is often necessary to work under isolation and with the highest safety precautions.

Augmented and virtual reality can help people recognize dangers more quickly in the future. Warnings are displayed directly in the employees' field of vision. In addition, drills for dangerous situations can be repeated as often as desired in the virtual world.

Connecting global teams

Working and cooperating internationally is always difficult when teams want to discuss, meet or get to know each other. This could change in the future with the help of so-called "VR conferences". Virtual space becomes a conference room - long journeys become the exception.

More than a thousand words

Nobody likes to buy a pig in a poke – a purchase decision is significantly influenced by what a customer sees.

Just imagine: you could enjoy the view from your hotel room even before your dream holiday begins. Or you could sit in your new living room before it has even been built.

The marketing industry has already realized: a virtual or augmented world says more than a thousand words.

An advantage at work?

The British journalist Alex Hern used virtual reality at work for one day. His conclusion: the technology is particularly useful for international teams and certain professional groups. For his own work, he found it rather stressful – aching eyes, concentration problems and problems switching between virtual and actual reality. But the potential is there, says Hern, the technology simply has to become more user-friendly.

AUGMENTED EVERYDAY LIFE

Example 1: Medicine

Augmented and virtual reality support doctors in planning their work. The technologies help patients, for example, to better understand therapies and operations. They also enable operations to be planned precisely and various methods to be tested safely.

Example 2: Art

Art has always aspired to transport us to foreign worlds. Huge panorama paintings such as the "Panorama of Racławice", from the Polish city of Wroclaw, are supposed to integrate the viewer directly into the action. Virtual worlds can also achieve this.

The American artist Chris Milk sees VR as "the last medium for storytelling". As an art form, no other medium has the ability to close the gap between the viewer and the artist like virtual reality.

Example 3: Psychotherapy

There are many reasons for developing fears and phobias. However, therapy is often very time-consuming and expensive. This is where virtual worlds can help. Patients do not have to be exposed to any danger (e.g. actual heights) and are thus, often more motivated to start therapy voluntarily.

Example 4: Architecture

On paper, every building is perfect. But is that also the case when people actually enter it?

In virtual and augmented worlds, the dimensions of space - i.e. size and depth - are realistically represented. If the desired effect is not achieved during planning, the architects can immediately try out alternatives.

It is often difficult for customers to imagine a finished project. Virtual and augmented reality, on the other hand, present building plans very vividly. This makes it possible, at a very early stage, to adapt the plans to the wishes and ideas of the customers.

Escape to virtual worlds?

The film "Ready Player One" by director Steven Spielberg conjures up this image of the future:

In the future, humanity only lives in the virtual world. They earn their money and meet other people there. The more beautiful the virtual world, the more chaotic and broken reality is. That is why more and more people are withdrawing into the OASIS, the digital world.

But is a future like this even realistic? What do you think? Can virtual and augmented realities become dangerous for people?