

Introduction to XR

First session of the course we were introduced to what XR is, how we will be examined and different kinds of use cases of XR. Some of the things we were also shown, was the VR Lab and history of XR throughout the last 60~ years.

What is AR/VR/AV/MR/XR and how do the terminologies compare?

Augmented reality (AR)

Augmented reality is a system that you can make virtual objects coexist in the same space as the real world. F.x. Ikea has an application that can show you their furniture in your living room, before you decide to buy it.

Virtual reality (VR)

A virtual reality system will immerse the user in a virtual environment, where you feel present in that environment. This could for example be a FPS (First person shooter) game where the user is in a specific location virtually and can interact with a virtual gun.

Mixed reality (MR)

A Mixed reality setting is where both the real and virtual realities are combined and produce new environments. This could be for example be a cooking application or game, that is based in your own kitchen, where it shows you your own kitchen, but all the ingredients and guide to making the food is virtually in the same environment.

Augmented Virtuality (AV)

Incorporated real world elements into the virtual world, this could f.x be used as a training to for doctors. To be able to see where the bones are in the human body virtually.

Extended Reality (XR)

Is the umbrella term used for describing AR, VR and MR, but is intended to combine the physical world with the digital world.

How do XR applications compare to traditional desktop and mobile applications? Advantages/disadvantages?

Some of the advantages of XR applications compared to traditional desktop applications and mobile applications could for example be:

- **Immersive user experience.** Instead of the traditional 2D screens of desktop applications and mobile applications, the user can experience a virtual scenario or a world, where it feels like they are IN it. This could be training for pilots or medicinal / doctor students.
- **Enhanced Interaction.** Physically using gestures, voice commands or movement, the user can interact, which creates a whole new kind of interaction with what you are doing, instead of maybe using your finger or Mouse / keyboard the traditional way.

Some of the current disadvantages of XR would be that you need specialized devices right now (So VR headsets / AR glasses etc.) which IS getting cheaper as the years go on.

Also the headsets are not that portable, as the battery life could be longer and some of the models of VR headsets that exists are still a bit heavy for everyday use. Traditional desktop and mobile applications are still more accessible and practical for “normal people” but as time goes on, it will become cheaper and more compelling to more users.

What use cases does XR have?

Throughout the blog post for now, we’ve already addressed some of the use cases through examples. but:

- Training (pilots, medicinal industry, machine workers)
- Entertainment (Gaming, Social gathering in virtual environments, concerts etc.)
- Education (Storytelling, History, Museums)
- Navigation
- Retail shopping digitally
- Almost endless possibilities with XR, these are just some few use case examples.

How does XR add value to the end user?

XR is still something thats new to a lot of people, some of the things would be enhancing interaction and immersing people in a virtual or augmented environment.

- Better understanding with visualization of eg. presenting data visually in 3D or AR.
- Simulating real world scenarios, could be for pilots or doctors, with virtual bodies.
- Visiting places without actually visiting them, this could add value for people that maybe have disabilities or doesn’t have the resources to travel to places they want.

How does current XR technology compare to an idealistic future vision of the technology?

Idealistically we would like to make the devices more sleek and lightweight, make them have unlimited power and be fully standalone and wireless.

- Right now most of the devices are pretty bulky and have a limited battery life.
- Some of the devices still require additional cables or external sensors for tracking.

Should of course also be affordable for everyone as well as being as close to our real life vision. (Higher field of view, better resolution) and feeling as possible (Haptics feedback etc). So full sensory feedback for the future.

How does immersion and presence factor into XR?

Immersion and presence are two of the most critical factors in XR.

- Immersion would be the ability to engage with stuff inside of the virtual world, where presence will make us believe that we are indeed in another reality.

How is input technology and interactions different in XR?

With XR we have things such as hand controllers, body tracking and haptics, where on the other end we have mouse, keyboard and touchscreens. Traditional interaction is usually only a 2D screen interaction we're having, where in XR its 3D spatial interactions. We of course also have Voice commands and gestures and we're not limited to a screen in XR.

What problems can XR solve?

Possibly endless amounts of problems within certain areas. Throughout the Blog, a lot of example have been stated. A few examples XR could solve:

- Cost of training personnel (Healthcare, pilots) very expensive equipment
- Dangerous scenarios (Military, Firefighting) can be unsafe, in a Virtual Enviroment there's no dangers.
- Access high quality training or education anywhere in the world with a XR device.
- Remote work or meetings, where you have to attend physically, is possible with XR. (You're there KINDA ;))

It's beginning to be a bit long, so we'll stop for now.

Thanks for reading.

- Nicklas & Christian (Turbo Torben)