Virtual Reality as a Medium in Contemporary Art
- work process of the Captured In-Betwixt as a case study

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ABSTRACT

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I research the evolution of 360-degree videos, virtual reality (VR) and the new technology evolving in new media art in the contemporary art scene. I am interested in how immersive VR world is becoming comparable to the real one. I also present a report of the process of making my own artwork on the research topic. Based on this research, a video installation with VR glasses titled ‘Captured In-Betwixt’ was created. This installation is included in the Atomic Jungle online exhibition (www.atomicjungle2020.com). A physical exhibition will take place in the near, healthier future. My artistic part of thesis comes from the inspiration I got from the movie ‘Ready Player One’. The movie is based on a story of people living in the Virtual World. They are lonely in their real life but then they put on the VR headset with which they enter the world called the Oasis with their virtual body – avatar where there are many more individuals doing the same thing. They are in a way alone in the room with the headset but with the VR world they are together with other people – Alone together.

Even more than new technology itself I am interested in the topic of embodiment. I want to challenge myself with this research and see how easy it is to trick your brain that at that moment when you put the VR headset on that your brain really believes that you are there in that environment. I want to create my own virtuality with filming with my 360-degree camera in a real physical world and then transport it through VR headset in a virtual one. I want to research the relationship between 360-degree video and VR. Is something that is made and exist in a physical world still considered as virtual? If it exists in both virtual and real environments, can it still be considered virtual? What is the difference between what is real in virtual reality and what is artificial?

The research material includes also the analysis of the artworks by Milica Zec and Marina Abramović. ‘The BR41N.IO’ Brain-Computer Interface Designers Hackathon, VR and BCI center the lab RUK (Network of art research and culture centers), the art and science festival Speculum Artium and video festival Digital-BigScreen in Trbovlje in Slovenia have been great source of knowledge, impact and inspiration for my thesis.

Key words: 360-degree video, virtual reality, immersive art, installation
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1 INTRODUCTION

In this written part of my thesis I research the evolution of 360-degree videos, virtual reality (VR) and the new technology evolving in new media art in the contemporary art scene. I am interested in how immersive VR world is becoming comparable to the real one.

I also present a report of the process of making my own artwork on the research topic. Based on this research, 360-degree video with single-channel video installation titled ‘Captured In-Betwixt’ was created. This installation is included in the Atomic Jungle online exhibition. Due to the COVID-19 virus our exhibition for now has to be online, a physical exhibition will take place in the near, healthier future. My artistic part of thesis comes from the inspiration I got from the movie ‘Ready Player One’. The movie is based on a story of people living in the Virtual World. They are lonely in their real life but then they put on the VR headset with which they enter the world called the Oasis with their virtual body – avatar where there are many more individuals doing the same thing. They are in a way alone in the room with the headset but with the VR world they are together with other people – Alone together.

I have been working and collaborating as well as showing my own artwork at the art and science festival Speculum Artium and video festival DigitalBigScreen in Trbovlje in Slovenia for many years. It has had a great impact for my thesis as well as ‘The BR41N.IO’ Brain-Computer Interface Designers Hackathon, VR and BCI center the lab RUK (Network of art research and culture center) in Trbovlje in Slovenia, which have been great source of knowledge and inspiration for my thesis.

Art and technology have always been inseparable. From televisions to computers to smartphones to now VR headsets. They have invaded our homes and are now part of the everyday life of a large portion of humans. I myself have been always fascinated about Sci-Fi movies. They were always presenting this crazy dystopian future and I have been always curious when it will become reality. As a kid I loved watching Cartoon Network. It is where I first learned the basics of English
language from. There was this cartoon called ‘The Jetsons’ (1962). It is a futuristic cartoon made in the 1960s and it is showing the future life. The cartoon is set to be happening in approximately in the year 2062. In the show that they have flying cars, a cleaning robot, they read the news on screens and so on. Most of the things such as robots, holograms, artificial intelligence, drones that we see in the movies and cartoons are these days our reality. Movies such as ‘Avatar’ and ‘Ready Player One’ are for example especially focused on the future of virtual reality, which I find kind of scary and fascinating at the same time. Even more than new technology itself I am interested in the topic of embodiment.

The artist is always seeking for new ideas and materials. Technology has become a big part of the contemporary art. It is determined under Digital art. From the beginning till now it has had different names; in the 1970s it was called Computer art. By the end of the century digital art has become an established term. Now it goes under the umbrella term ”New media art”. (Meredieu 2003.) Filmmakers are more and more interested in virtual reality. Artists such as Milica Zec and Marina Abramović try to educate people about climate change by setting them in the virtual world that is collapsing due to pollution. What is the boundary between immersive 360-degree videos and virtual reality? Is something that is made in the real world and put in the virtual space still virtual or is it real? What actually is virtual?


2 VIRTUAL REALITY

Virtual reality (VR) is a simulated experience of reality that can transport you or give you the sensation on transportation to a new different magical world, which looks like real world or completely artificial. It is an exciting and powerful tool in new technology. It not only allows the viewer to sit back and look at the movie, the experience is so immersive that one feels as becoming part of it. The viewer is placed at the epicenter of the story. They can interact with the space with sensors and make the story more powerful. Since technology is evolving very fast you might put on the VR headset and ask yourself; How is this so realistic? How is the VR space so convincing? The VR environments are starting to be designed as realistic as possible. Just like with the ordinary videos, virtual reality videos can be created at the beginning when a video is being recorded or captured using 360-degree video cameras. The videos can also be made from computer generated content using VR immersive video enabled applications. The formats adopted by virtual reality videos will vary from the software and the device used in the production of the videos. (Brown 2017.)

2.1 SHORT HISTORY

"Listen! I'm Albert Ludwig—Professor Ludwig." As Dan was silent, he continued, "It means nothing to you, eh? But listen—a movie that gives one sight and sound. Suppose now I add taste, smell, even touch, if your interest is taken by the story. Suppose I make it so that you are in the story, you speak to the shadows, and the shadows reply, and instead of being on a screen, the story is all about you, and you are in it. Would that be to make real a dream? In his room Ludwig fumbled in a bag, producing a device vaguely reminiscent of a gas mask. There were goggles and a rubber mouthpiece…” (Weinbaum, S. 1949. Pygmalion's Spectacles)

This is from a short fiction story called “Pygmalion’s Spectacles” by a science fiction author Weinbaum, who wrote it in 1935 and was later published in 1949. The story centers around the implications of a technology that is surprisingly close to what we now call virtual reality. It is said that in this book VR was for the first time mentioned as Sci-fi technology, which is today our reality. In the book a scientist devises a pair of glasses that can "make it so that you are in the story, you
speak to the shadows, and the shadows reply, and instead of being on a screen, the story is all about you, and you are in it." (Weinbaum 1949.) This is basically the technology that we have today.

Now moving forward this fictional glasses took a little more time to be developed in real life. The very first idea of them was presented in the 1960s by Ivan Sutherland. In the year 1968 he and his students at the University of Utah (USA) invented the first head mounted display called the Sword of Damocles. The name was fitting: The Sword of Damocles was so large it had to be suspended from the ceiling. Nonetheless, it was the first "head-mounted display"; users who had its twin screens attached to their head could look around the room and see a virtual 3D cube hovering in midair. Because you could also see your real-world surroundings, this was more like AR than VR, but it remains the inspiration for both technologies. (Rubin and Grey 2020.)

![Ivan Sutherland’s development of the first head-mounted display (HMD) system (1968)](dsoure.in)

The official word Virtual reality for this technology came in the use in the 1980s by a VPL ("Virtual Programming Languages") company cofounded Jaron Lanier. He has been on the cusp of technological innovation from its infancy to the present. A pioneer in virtual reality (a term he coined), Lanier founded VPL Research,
the first company to sell VR products, and led teams originating VR applications for medicine, design, and numerous other fields. (Lanier n.d..)

2.2 VR TODAY

Today it is hard to imagine any professional not to work with new technology such as computers or smartphones. Computer graphics are used in science everywhere in western countries. Can you imagine architects or engineers working without a computer? It is easier to understand volume of massive things since the three dimensional graphics were invented. People became even more curious, instead of just watching a special image at a 2D screen they wanted to step inside the three dimensional space and interact with it. That technology, which is today due to more advanced innovations and more in use, is called virtual reality (VR).

The break-through came last year when Oculus Quest was released. It is wireless and it requires no extra computer to play things on it. It is very easy to transport and use it where ever you go. The price of it is very affordable. Beyond gaming, VR technology will be more and more used in all kind of fields. One of the most promising examples is the use of VR to address pain management. Recently, a New York mother gave birth with the assistance of VR designed to mitigate pain. (Rauschenberger 2020.) VR is trying to trick and convince your brain that at that moment you are somewhere else. For example, on the beach. With this tactic they are trying that you forget the pain and focus only on what you are seeing in front of your eyes.

Companies which have big machines that they want to sell use VR to show their clients the large products that they cannot travel with. Especially during this situation where the world is dealing with an epidemic and you still want to keep the connections with your client VR comes in very good use. This is the easiest virtual reality and it benefits especially industries that build products which are naturally represented in 3D like machine manufacturing and construction. In virtual reality, you can see the 3D model so observing and developing it is easier than in 2D. You can also present photorealistic products that do not exist yet, says Kari Pel-tola, Chief Product Officer at Wakeone. (Business Tampere 2020.)
2.3 DREAMING ABOUT THE FUTURE

In the future instead of traveling for example to Japan to see the cherry blossom you could just put on the VR headset and go there in virtual reality. As in the year 1960 Marshall McLuhan said: "The world is getting smaller and smaller. With technology you can visit any place." It is like a teleport. On the other hand, is it powerful enough? Can it give you the same feeling as you would really be in Japan? For now, maybe not, but in the future, it can really become really immersive.

You will operate a robot of yourself with the VR avatar on the other side of the globe. The same will happen with the conferences. If there will be too much hassle to travel around the globe for a business meeting, the meeting will be held in the virtual space. People still need and want a personal touch that VR can offer and it will be used in the future more than Skype meeting. People will want to be able to be physically there in the virtual world. (Soccini 2020.) The good thing about VR meetings is that you can physically in VR work together from anywhere at any time. Where you can with your avatar move, point, sketch and interact like in real life. And you can reduce travel expenses by not traveling. With that you can save money and protect the environment.

PICTURE 2. VR avatars (glue. Universal Collaboration Platform 2019)

One downside of VR is that current avatars (computer-generated characters that represent us) are visually simple due to technical constraints. However, with all
the work on avatars that Facebook is doing, very soon, our virtual self will be so similar to our real self that it will be like looking in the mirror. (Rogers 2020.)

In Steven Spielberg’s movie ‘Ready Player One’ (2018) that is set in the year 2045, is showing a world where everyone does everything in VR. This movie might raise some questions like; How much does the reality of VR match what “Ready Player One” promises? How immersive is technology today comparing to the movie? Is this movie a Sci-Fi that became reality? Is it again mix between real and artificial? “Ready Player One” doesn’t waste a whole lot of time explaining how gadgets used in the film work, but Wade who is the protagonist, his headset, which is also used by most other characters, essentially looks like a pair of fancy ski goggles. Light, wireless, and apparently working without any external hardware, it is capable of transporting you to the virtual world of the Oasis where ever you are. (Roettgers 2018.) In comparison to today’s technology there is a wireless head set with very good quality so far called Oculus Quest. It is not as light looking as the one in the movie but the headsets are improving fast. Oculus Quest is our first all-in-one gaming system built for virtual reality. Now you can play almost anywhere with just a VR headset and controllers. (Facebook Technologies n.d..) In myself am using Oculus Quest in my artwork.
In the movie the protagonist Wade Watts is awarded with a special full-body suit that provides haptic feedback. Wearing the suit, he can feel as the punch that came in the VR would come from the real physical world. This kind of suits already exists. Teslasuits are the company who are making them and they actually look very similar to the one in the movie. TESLASUIT’s full body haptic feedback system is built into the suit and can be engaged on actions, on demand, or in response to motion capture comparison. This feedback provides users with sensation and a sense of touch in virtual and augmented reality. This electro-stimulation improves the learning experience by increasing immersion, fostering 360-degree awareness, and engaging muscle memory. (TESLASUIT 2020.)

PICTURE 4. Still from Steven Spielberg’s movie Ready Player One (2018)
2.4 TRICKING THE BRAIN AND BODIMENT IN THE VR

Embodiment is defined as the sense of having a body, and the body can be considered to be both the subject and object of medical science and practice (Galagher 2001). Nowadays VR allows a replacement of a person's real body with a virtual body representation, allowing the person to feel embodied in a virtual body. There is a lot of research in the medical field where help is offered to patients who has lost a limb. Their brain is tried to be tricked with the VR body in which they still have all of their limbs. With that they try to get rid of the phantom pain. The human body is designed so that it needs to make sense to the brain of vision, hearing and touch. The brain’s interpretation of the senses is called perception. For instance, we can see a dog running across the room, hear her bark, and feel her fur brush against our skin—these are sensations that we come to understand and perceive as experiences. The sensations all come together through perception to give us the experience of the dog. It is this interplay of sensation (using vision, hearing, etc.) and perception (our brain’s interpretation of this information) that creates our experience of reality. (Penn & Hout 2018.)

2.5 MY EXPERIMENT VIDEO WITH THE BCI HEADSET

I started my research in the autumn 2019 when I got to learn about Brain computer interface (BCI) at ‘The BR41N.IO’ Brain-Computer Interface Designers Hackathon. The Unicorn Brain Interface is a hybrid, wearable EEG headset on the market that allows users to write, draw, control robots and much more just by thinking. It acquires brain waves from 8 hybrid EEG electrodes that can be used wet or dry. It is a tool where you can operate computer based things with your brain. (g.tec 2019.) You put on a high-quality EEG headset on your head, which monitors your brain activity. The one that I used is designed with the software called Unicorn. When you first set it up on your head you need to do a calibration that your brain activity is matching with the software. You do that by selecting certain characters from the software and you need to focus on them for a certain amount of seconds. To help your brain focusing there are human faces appearing in front of different characters. They say that the human brain can remember faces easier than symbols.
I tried to learn the basics of using BCI. I took part in a workshop or the so called ‘The BR41N.IO’ Brain-Computer Interface Designers Hackathon. It has been created as an education opportunity to study current and future developments and unlimited possibilities of brain-computer interfaces and neuro technologies in creative, scientific and clinical fields. BR41N.IO helps students and professionals to understand artificial intelligence, life science, art and technology, and how they become a unity to evolve innovative and exceptional BCI headpieces. (BR41N.IO 2020.)

When I used BCI headpiece first time, I made paintings with my brain. Since I do not have skills in programming yet I was only able to make simple shapes with the Unicorn software with my brain. No mouse or keyboard involved, only ‘headset’ and my brain. It was a great experience for me just to try out the software and see the potential within it for my future artworks when I want to learn more about programming or get help from others in that field. From that first try out I got the inspiration to make the first steps of this research.
PICTURE 6. The painting that was made together with me and Lili Anamarija No at the The BR41N.IO’ Brain-Computer Interface Designers Hackathon, Delavski dom Trbovlje, Slovenia (Jazbec 2019)

The second time that I used BCI headset was at the lab RUK that has opened its doors in 2019 in my hometown Trbovlje, Slovenia. It is an art and science research center where apps and projects with BCI and VR are developed. I tried to operate the Sphero with only my mind with the aid of BCI there. The Sphero is a kind of a robotic ball with lights. You can move it and change the colors of it. If you have skills in programming you can form your own paths that the ball can move. I also tried to spell my name only with my brain. I see huge potential in this, not only in art scenes but obviously also in medical recovery. In the future people who have suffered a stroke or are paralyzed will be able to operate equipment with their brain.

The reason why I mention BCI with my VR research is that I see there a connection with the VR. In VR you are trying to trick your brain so that you and your VR body are really belonging together to this environment. BCI can be in co-operated to it so that you will be able in the future use your brain to move objects in VR, though I think it sounds still like Sci-Fi now. For example, in Star Wars films,
where you can move objects with the force so in the future in a similar way you will be able to do the same with BCI in VR. You will not need a remote control anymore you will be able to move objects with your mind with the aid of BCI. Even though my BCI experimental video did not end up to be my artistic part of the thesis, it still had a huge impact to my current artwork and this way became a part of my research. I started my planning process with it. It is essential for me to learn and understand it more for my future artworks. I cannot do it now, since all the equipment needed are so far away at the lab RUK in Trbovlje from Tampere where I am working and living at the moment. I will research it more in the future when I’ll have an opportunity to be closer with the needed equipment.

PICTURE 7. Moving Sphero which is on the floor with BCI mind control (Jazbec 2019)
3 INSPIRING ARTWORKS BY MILICA ZEC AND MARINA ABRAMOVIČ

3.1 MILICA ZEC’S ‘THE GIANT’

Milica Zec (born 1982) is a New York and Los Angeles based film and virtual reality director, writer and editor. She was born in Belgrade, Serbia and moved to New York after graduating in 2006 from the Faculty of Dramatic Arts in Serbia. I met her first time two years ago when she visited and showed her VR artwork ‘The Giant’ (2016) at DigitalBigScreen 360°video festival in my hometown Trbovlje, Slovenia. I have always loved making video works. When I saw her work ‘The Giant’ I really got inspired to create my own 360-degree videos. The power of that technique is so strong. You are placed in the epicenter of the artwork. You cannot escape the scene you are really part of the story. She had a very hard childhood because of the Balkan war. Serbia was suffering from it. In her work ‘The Giant’, which is based on true events you are trapped in the active war-zone. The parents in the story struggle to distract their young daughter by inventing a fantastical tale. Inspired by the real events, this immersive virtual-reality experience transports the viewer into the family’s makeshift basement shelter. The parents’ fairytale intensifies as bomb-blasts draw closer and closer... (The Giant n.d..) What makes the work even more powerful is that you have on a kind of a vest, which is in sync with the film; when the bombing happens in the movie the vest on your back vibrates. Because of the vibration that you can really physically feel you are present in the VR environment you are placed in. Based on my research you do not have a body in this work but due to the vest you still feel you are present as an observer and you are very much part of the situation that the family is going through. In a way you feel like that family. You feel emotions of sorrow and scared. You share the family’s emotions. You feel remorse for all the families that are suffering in the wars today. You can really educate audience with this kind of artworks. Through VR you are placed in someone else’s world that is collapsing, you can really step in their shoes. This is the characteristic of VR that really interests me to add to my own artworks. The empathy you are able to have through the emotions you feel when you are placed in the VR environment.
PICTURE 8. The Giant at Digitalbigscreen 2018, Delavski dom Trbovlje, Slovenia (Jazbec 2018)

PICTURE 9. Milica Zec, Still from The Giant (2016)
Just a few months ago when we had the last festival Speculum Artium in Slovenia Miliza Zec was there with her second VR work called ‘Tree’ (2017). This virtual-reality project transforms you into a rainforest tree. With your arms as branches and your body as the trunk, you’ll experience the tree’s growth from a seedling into its fullest form and witness its fate firsthand. (Tree Official n.d..) This is a great example of the virtual embodiment. First you are a seed in the soil. When you are growing from the soil you can really smell the soil. Because Zec really took account all of the human senses on how to bring you fully and really to the virtual world. She doesn’t focus on just your vision but tries to trick your brain with the skin senses and the sense of smell so that your virtual avatar or body is the real one at that very moment when you are wearing the VR headset. As in ‘The Giant’ you wear again a special west that vibrates on your back. That means that when you are growing out from the soil you can not only see the movement but you can also feel it on your body physically. The smell of soil and the vibration trick your brain in believing that the virtual world is the world you are in. The technology is evolving so fast that the quality of video is really convincing. The next step is when you grow up is that you become a tall tree. In your hands you hold two controllers, which are your hands in the VR world. Your hands are actually branches of the tree. Suddenly you start to make funny dance movements because you feel like you are a dancing tree. There it is again a "special effect" added. That is the wind. There is a fan blowing at you and with that you really get the feeling you are up in the sky. You remain a happy tree and you can see the birds flying around you. Then suddenly the forest starts to burn. The fire is getting to you. You subconsciously start to move your hands, the branches, in the VR space as you want to take them out from the fire, which is getting closer. Then the "special effect" changes to rather warm air blowing on your legs and body. You really start to feel like you are on fire. That is a great example on how to put someone in somebody else’s shoes, someone who is for example suffering. You can experience it right on your own skin. As if this tragic thing would be happening to you. The only down part of this project so far is that the special effects at the scene are made by humans. There is always an assistant or a guide next to the work. That can give you the soil under your nose when you are growing. When you are a tall tree they blow with a fan around you. And the same goes with the
heater. It is a bit difficult to install it for a long exhibition. You always need to have someone standing there and working for this art work. In a way it is like a performance. It looks so real in the virtual world, but so silly in the real one with people blowing wind on you. This work is a great example of spreading the awareness of a certain problem on this planet. Art today is a great form of inspiration for people and showing them what is wrong. By putting you in the center of the problem in the VR world it is an effective way to inspire people to make changes in their lifestyles.

PICTURE 10. Me watching the Tree at Speculum atrium 2019, Delavski dom Trbovlje, Slovenia (Jazbec 2019)
PICTURE 11. Milica Zec, Still from Tree (2017)

PICTURE 12. Tree at World Economic Forum in China (2018)
3.3 MARINA ABRAMOVIĆ’S ‘RISING’

“Only when we change ourselves can we change others. Water matters.” - Marina Abramović

Marina Abramović (1946) with her VR work ‘Rising’ (2018) addresses the issue of the rising heat of our planet Earth. It points out how climate change affects to our planet and how the water is rising. It transports the viewers into a world where they witness rising sea levels. When you put on the headset you come face to face with the VR avatar of Abramović. You watch her when she is in the water tank made of glass where the water is rising. Viewers are invited to make contact with the artist and after that they find themselves surrounded by a scene of melting polar ice caps.
To reach even more audience and attention to this concern, Abramović also launched an app called Rising. The app guides users make better everyday choices to help the environment and offers to view Abramović in Augmented Reality. The artist in Augmented Reality, beckons from within a glass tank that is slowly filling with water from her waist to her neck. Abramović urges viewers to reconsider their impact on the world around them, asking them to choose whether or not to save her from drowning by pledging to support the environment, which lowers the water in the tank. (Acute Art 2018.) You can download the app for free on your phone. In my opinion it is a great opportunity to promote your work and a great cause to save the environment. What actually is augmented reality? It is the result of using technology to superimpose information - sounds, images and text - on the world we see. (Emspak 2018.) It is an interesting tactic on how to inspire people to make a change. If they do better in the real life they are saving the life of the virtual Abramović. If you are a decent human being, you feel sorrow and empathy for the character and you are subconsciously trying to save the planet at the same time. The project is made together with Acute Art, which is an organization that is collaborating with leading contemporary artist. It allows them to translate their creative vision into new digital mediums – including virtual, augmented and mixed realities. Now the company’s focus is on reaching a wider audience by way of the Acute Art app, which offers 360-degree video versions for free. These are less immersive than a headset experience but can be downloaded by anyone with a smartphone. The app also offers variations that works with Google Cardboard VR viewers, which use special lenses to create a 3-D
effect. (Johns 2019.) This is a good example of sharing the art to the public, but on the other hand it would be better to have the work on YouTube, where you can look at it with better quality headsets.

PICTURE Photo from the app Rising – Abramović in my living room (Jazbec 2020)
Captured In-Betwixt is a 360-degree video with a single-channel installation. The name means that you are captured between two worlds. Betwixt is an older word for between. The 360-degree video is made to only watch it on VR headset, the best option for example is Oculus Quest. Single-channel video is made to be projected on a big wall. Part of the installation are three masks. They are made with paper mache and acrylic paint. On the floor there are footprints that are made from a clear matt acrylic medium. They are representing water footprint that are leaving away from the 360-degree video. Because in my video you are placed in the water and I wanted to create this illusion between reality and virtual. I decided to have a whole installation build rather than just have the VR headset there. With the installation the whole space becomes this twist between reality and virtuality.

From Marina Abramović’s Rising (2018) I got an inspiration of using water in my video. I made a test where instead of making a computer animated water I use real one. I wanted to see how the use of real life footage differs from the effects made in 3D computer made environments. Is it still virtual while it is exists in physical world and in virtual one? I think it is still virtual due to you are still not really placed in the water when you put the head set on.

What happens when something that should be virtually made is instead made in the real, physical world? If it is exists in both virtual and real environments, can it still be considered virtual? What is the difference between what is real in virtual reality and what is artificial? Masks have been used by human beings since ancient times for the purpose of rituals and the embodiment of natural forces. They were, in a way, ancient forms of avatars. In the modern age of technology, an avatar can be a virtually-built body – a mask that grew to encapsulate our entire form. Such avatars are often used as a tool of self-presentation online and in the virtual world, and tell the audience what kind of character is being portrayed. They are a representation of an entity, of a person, of you – in a virtual space. It is something that embodies something else.

In my work I use masks as a transitional tool that enables such role play and identity shifts. I challenge the power of virtuality and embodiment, how real and
immersive the virtual space is becoming and how easily blurred are the boundaries between real and artificial for our brains to perceive. The virtual world in my work is deeply connected to the viewer’s inner world and to their emotions. The viewer is embodied in a body they imagine and the virtual environment causes real emotions all this is built with feelings that are based on the movements of the visual surrounding in the 360-degree video. I try to find this boundary by mixing moving image with a new, immersive 360-degree video – a combination that creates a virtual experience that puts the viewer in the very center of the story, becoming part of the video rather than only watching it. It is, perhaps, the beginning of something unknown.

4.1 ‘DO YOU LIVE IN A BOX?’

The theme of embodiment has been since the last year very interesting to me. I made in the summer of 2019 a work called ‘Do you live in a box?’ There I researched again the power of what is real and what is artificial. If something that is made in a real physical world does it still count as virtual in virtual reality? I used a Theta 360-degree camera which I placed on a Barbie doll’s head. For that video a box was build and in that box there were four Barbie dolls sitting one in each corner. The viewer watches on of them. The trick happened then when I edited the video and it was ready to be watched through VR headsets: the viewer becomes a Barbie. You feel you are sitting in the box with the other Barbies. Due to the older model of the camera the quality is not so good, but it still convinc your brain that you are there. When my work ‘Do you live in a box?’ was exhibited the video was on the VR headset and there next to it was the box in which a hole is made so you can peak inside and see the Barbies sitting inside. Here it is again the question between what is real and what is not? Because when you put on the VR headset you basically are sitting inside that box that is physically present next to you. On the other hand, this artwork talks about social issues. The embodiment is a great tool in the VR, it puts you in someone else’s shoes. When you are sitting in the box in your Barbie avatar you can hear whispers around you that are maybe talking about you or society. A box is just a metaphor. When I ask you with my title: ‘Do you live in a box?’ I’m not talking about the place you live in. I’m talking about the roles imposed on you, and that are expected from you. These might be
the ‘boxes’ you put yourself into or the ‘boxes’ you let others put you in. The ‘boxes’ into which the society boxes you. Mentally, we usually put people ‘in boxes’. This enables us to categorize people we meet without giving it another thought. It’s part of the human nature. The most common boxes you are placed in are for example: “You’re not smart enough…”, “You’re a woman…”, “You’re not old enough…”, “You’re too old…”, “You have tattoos…”

‘Boxes’ are perceived as a narrow space, offering a narrow view. They provide borders, direct focus on a single aspect, and shape our life. What if you find yourself in a box you don’t belong in? What if everyone else puts you into a box they think you belong in? What if society puts you in a box they think you belong in on account of your appearance, or your current economic status? How do you exit the box, when the exit instructions are printed on its outside? How to change your box?

The installation represents a box that society boxes you in. The “monsters” outside are people who box you in. With the 360-degree video experience, the installation represents a nightmare you can’t wake up from.

This was my first starting project in which I started to research the power of embodiment in 360-degree video. This work was for the first time shown at the gallery DLUL Ljubljana, Slovenia 4.9.-15.9. 2019 as a part of the group show called Virtual consciousness. The second time it was exhibited, was on the video festival DigitalBigScreen 17.-19.10. at Delavski dom Trbovlje, Slovenia. In March 2020 it was supposed to be shown at the group show ‘Virtual consciousness Bugojno’ in Bosnia and Herzegovina. Due to the Corona virus situation the event is moved in the future till the situation is cleared out.
PICTURE 16. ‘Do you live in a box?’ installation at DLUL, Ljubljana, Slovenia. 4.9.-15.9. 2019 (Jazbec 2019)

PICTURE 17. Still from ‘Do you live in a box?’ (Jazbec 2019)
4.2 WORKING WITH 360-DEGREE VIDEO AND VIRTUAL REALITY

One of the big challenges with working with 360-degree video is that you have to be cautious and think about the environment and the surroundings in where you want to film. You must plan really carefully it beforehand. Since the camera is capturing all the angles around you, you really must plan with imagination. It is very difficult when you want to hide something you must really prepare the scene and think what you want to show and what not. Virtual reality where you build your own scene on the computer is challenging and takes time compared to 360-degree video, but in a way you are more free to do whatever you want. When with 360-degree video you in a way have to create the virtuality by yourself, which for me is the most interesting part of the process. Instead of sitting for hours at the computer you can create your virtual scenes in a real physical world with your hands. It comes again to my question is it still virtual if I made it in a real world. My thoughts are yes, because once you put the headset on and you watch the 360-degree video the elements only exist there. When you take off the glasses they were at that moment existing for you only in the virtual world.

For filming my 360-degree video I used Insta 360 one X. It can film in 5,7K resolution and it has a motion stabilization. The camera itself is not waterproof. Since I wanted to use water in my experiment of embodiment, I ordered a Ventrua case for the camera. Which makes it waterproof and is suitable for underwater shooting at a depth of up to 5 meters. For watching my 360-degree video I am using Oculus Quest. It is so far one of the best VR headsets for watching virtual reality content on the market. It is very affordable and it does not require a computer to run your videos. My video is made that way that the power of embodiment in it only works if you watch it on a VR headset – Oculus Quest. The video is made to be seen on loop. It does not matter on which point you start watching it. The length of it is 3 minutes and 28 seconds.

For my 360-degree video I created so called characters or avatars in a physical world in my kitchen. I used this playful technique called paper mache. Where you cut up your old newspaper in to stripes. Then you mix in a bowl baking flour and
warm water. You need a balloon or some similar round shape to start building on it with the paper mache. For me the balloon shape was the best since I wanted to create a human face shape. It is a very simple technique that I used to do a lot as a kid. I find an interesting combination between an immersive 360-degree video and this paper mache technique. When the masks were dry I painted them with acrylic paint.

PICTURE 18. Working with paper mache (Jazbec February 2020)

PICTURE 19. Working with paper mache part two (Jazbec February 2020)
I made four masks for my video. I did not want to name them separately I want to keep them more abstract, that is why I just refer to them as masks or avatars. Two of them are portraying a human like happy clown figure. One of them is an animal, a pig and the fourth one is this kind of an alien looking figure. They do not reference to any particular real life characters. They are a creation of my imagination. I designed and created them with no planning. They are in a way just the opposite of what usually people put as their avatars online. People online try to look as pretty as possible and this characters are more real and scary. Meaning that not every character must be portrayed and romanticized that everything in the world must be cute and beautiful. I find beauty and fascination in odd and scary things. They awake more feelings in people. They awake uncomfortable and tense emotions. Through this characters I want to embody the viewer in my video with emotions. Embody them with feeling rather than having a virtual body. The feelings of embodiment are built with the movements in the video. What the characters around you are doing to you. You as the viewer are placed in the epicenter of the story. You are placed in a glass tank on a table and surrounded with this strange looking characters all looking at you. One of them starts to interact with you. Taps on the glass to see if you are present. Then they start to pour real water on you. Since it is filmed with real water I think it feel even more realistic that if it would be computer made. You get the feeling as you are an animal trapped in this tank and you have no way to escape. This is the power of virtual reality. You can be placed in any location or environment and the artist has a full control over the viewer and wants to show him/her exactly what he wants. You cannot turn away from it, since everywhere you look in the headset you are a part of the artwork.

I was subconsciously inspired by David Lynch. In his movies and art works he is often mixing reality with this strange dream like worlds. Especially in Twin Peaks (1990), Eraserhead (1977) and in his early animation works. I find a connection with his films and mine because we share the use of to the strange figures and odd events.
PICTURE 20. Close up of the masks (Jazbec 2020)

PICTURE 21. Still from the 360-Degree video, Captured In-Betwixt (Jazbec 2020)
PICTURE 22. Still from the 360-Degree video, Captured In-Betwixt (Jazbec 2020)

PICTURE 23. Still from the 360-degree video when water is being poured on you (Jazbec 2020)
4.3 WORKING WITH A SINGLE-CHANNEL VIDEO In-Betwixt

In-Betwixt which is also part of my installation is a single-channel video projection. It was originally meant to be a 360-degree video. It was my first starting point of my experiment to embody the viewer into a virtual body. In the end it was visually more functioning as a single-channel video projection. For that work I build a VR body/avatar for the camera. My first idea was to put the camera on me, but I had difficulties mounting the camera on my head. Because I wanted to have a real power of embodiment in my video by using my own body and tricking the viewers mind that this was his/her body. The difficult part I was dealing with was that when I recorded having the camera on head, you could actually see my head in the video. I did not want that. I wanted that when you look down you only see the body from neck down. In this style it was impossible to make it work for me. I found some videos on YouTube where somebody does so, but when you look down in the video on your body there is a black hole that you see. They tried to censure the head and it does not look right to me. It is not realistic for the brain. I tried another option where I build a fake body for my camera. It works better. On the other hand, it is a bit stiff because you do not have any movements. Because of that my video was in the end working best as a single-channel projection. It is
projected as big as possible on the wall. Because it was filmed with Insta360 one X you can edit it very smooth in their Insta360 studio software. The transition in the video is very smooth and moving like that you get the impression that the wall would be moving as well. And the person in the video is so big that it looks like it will just step out of the wall. I edited the video that the shadows are light color and the light parts are dark. Here I again wanted to create this illusion between the real and virtual or in other words to create this kind of a dreamy world. A combination between what is real and what not.

PICTURE 25. Building a body for my camera (Jazbec February 2020)
The video is made as a loop and it is long 1 minute and 59 seconds. It is again build in a way that it does not matter when do you start watching it. As my 360-degree video this video was also filmed in my kitchen.

The story of the video is open for the viewer to interpret. It is a twist between reality and a dream. It is in a way an opposite or negative aspect of reality. Since it was installed in the kitchen where it was filmed it represents it’s negative. With the opposite colors. I myself am preforming in the video. I am playing chess with soldiers with the person in front of me. As the masks were a big subject in my virtual video I wanted to wear some kind of a mask in this video as well. It was filmed before the COVID-19 epidemic. Now after words due to the mask I am wearing the viewers might get an impression I am wearing it to comment on this virus situation. The video itself got a new meaning. It became even stronger. Like you would be playing chess with the virus. The sound of it is a ticking clock that I put on in the video. It gives an anxious feeling like you need to be in a hurry that the clock is ticking for something to happen. It is in a loop so the anticipation for something is always there. But the surprise is that nothing happens. You are captured in this loop between real and virtual.
PICTURE 27. Still from the single-channel video called In-Betwixt (Jazbec 2020)

PICTURE 28. Still from the single-channel video In-Betwixt where you can see the details on the table (Jazbec 2020)
PICTURE 29. Barbara Jazbec Still from the single-channel video In-Betwixt (Jazbec 2020)
4.4 INSTALLATION PROCESS OF CAPTURED IN-BETWIXT IN MY KITCHEN

Due to the COVID-19 virus our physical exhibition that was supposed to happen in April in galleria Himmelblau is moved to the further and healthier future. Till the we prepared and online show. I decided that I wanted to install my installation in my kitchen where it was filmed. It gives even more power to my question between what is real and what is not due to its installation in the spot of creation. My whole project has a nickname “The Kitchen Project”. I was fortuned enough in this quar- antine times that I have all the equipment needed to execute this installation at my home.

The installation consists of Oculus Quest headset on a chair. On that my 360-degree video is playing on loop. In the installation there are white footprints going away from the chair. They are representing water marks. As if the person from my VR video would come to the real physical world and walk away leaving water marks on the floor.

On the big white wall in front of the VR chair there is the projection of my single-channel video titled In-Betwixt. It is projected as big as possible. Under the pro- jection there is a shrine of the masks from the 360-degree video. It is in a way suggesting that you can pick your own avatar from there. The red mask is missing because it is representing that is being used at that moment in the 360-degree video. This whole combination between all the elements that are carefully placed on each spot are representing the twist between reality and virtuality.
PICTURE 30. Installation Captured In-Betwixt (Jazbec March 2020)

PICTURE 31. Installation Captured In-Betwixt (Jazbec March 2020)
PICTURE 32. Close up of the VR headset Oculus Quest, Installation Captured In-Betwixt (Jazbec March 2020)

PICTURE 33. The footprints in the Captured In- Betwixt Installation (Jazbec March 2020)
PICTURE 34. Close up of the footprints, Captured In-Betwixt Installation (Jazbec March 2020)

PICTURE 35. Close up of the altar of masks, Captured In-Betwixt installation (Jazbec March 2020)
PICTURE 36. Captured In-Betwixt Installation (Jazbec March 2020)
5 VIRTUAL GALLERY

Virtual Gallery is a virtual experience designed for VR headsets, presenting artworks of graduating students and letting users look, interact and experiment with art in a virtual space. It is a way for traditional art to exist and develop in new media formats, such as VR. It has the possibility of adjusting for future uses and becoming a long-lasting opportunity rather than a one-time showcase.

As every year this year we also created so called virtual gallery for showing our original artworks in an additional VR environment. Since the art scene is becoming more and more digital it is an innovative and important way to exhibit our works in that way. It is important that we follow the trends in immersive art and technology. Virtual Gallery was developed and built with Unity by a team of Media and Arts students of different study paths. I myself was part of this project. My role was to be the artistic leader of the VR gallery. I gathered the group. I found people from different study paths and pushed the project further. I was arranging all the meetings and was helping with the design idea. For example, giving ideas on how the main room should look like. All the other rooms were designed by the students them-self. I still helped a bit with their rooms by giving suggestions on what would look better. My role at this moment is social media. I am still today promoting and sharing the VR gallery on Instagram.

Due to the coronavirus situation, Atomic Jungle is exhibited online only for the moment. As such, Virtual Gallery is also online only, allowing the exhibition to last forever in different digital forms. Virtual Gallery is available for download for those with personal VR equipment (HTC Vive), and a video version of it is available for those without.

I am very pleased on how my VR room turned out. It is complimenting my original Captured In-Betwixt installation perfectly. Since in my 360-degree video the characters are pouring water on you. In my VR room happens the opposite. You can have a small revenge on them by spaying them with a water-gun. But be careful they might get upset and come closer...
PICTURE 37. Still from the main-room (VR Gallery Atomic Jungle 2020)

PICTURE 38. Still from Barbara’s room (VR Gallery Atomic Jungle 2020)
6 CONCLUSIONS

My whole project has a nickname “The Kitchen Project”. It points to world famous multi-disciplinary art and performance space in New York called ‘Kitchen’, which was founded 1971. The masks were created in my kitchen, both of the films were filmed there, the whole installation was installed there and I wrote my thesis there. Kitchen which is a friendly place to many people in my work becomes this utopian, surrealistic and maybe a bit scary environment. It maybe is not even looking like a kitchen in my 360-degree video. I was fortuned enough in this quarantine times that I have all the equipment needed to execute this installation at my home.

Technology today is evolving very fast. Insta 360 one X is the camera I was using to film my 360-degree videos. It is a very small and light camera. You can carry it anywhere. It is very affordable and it is filming in 5,7K. Today they have already 8K 360degree filming cameras on the market. It is really difficult to follow the market of technology. You cannot know what day something better will be released. It is a bit different with VR headsets. Oculus Quest has been now for one year the best wireless gaming VR set. For my project I bought my own. I wanted to explore it and use it in my future projects. I find it very easy to use and it connects very easy to my PC and to my iPhone. The graphics are very good. It made me inspired to learn more about VR.

I want to develop better skills in making 3D computer environments. That might be my next step combining 360-degree environments with 3D computer made objects. Because still the big difference between 360-degree video and VR video is the space. In 360-degree video you cannot really walk around in the VR space. You are more or less placed to sit on a chair and watch what is happening. When in VR made video or environment you can with your computer make a space as big as you want. You can really walk in the VR space. And since Oculus Quest is wireless you could really freely walk around in a physical world and explore meanwhile the virtual world without any cables limiting you. And combining VR with BCI it makes endless possibilities. When you can operate different computer based machine with only your brain.
My questions at the beginning were: What happens when something that should be virtually made is instead made in the real, physical world? If it is exists in both virtual and real environments, can it still be considered virtual? I think yes! Because once you put the headset on and you watch the 360-degree video the elements only exist there. When you take off the glasses they were at that moment existing for you only in the virtual world. I think also the technology is improving very fast. But for now I see that 360-degree video is more convincing to the brain than VR objects and environments made with a computer. A good example here is Milica Zec’s work ‘The Giant’ (2016), there she is combining video with VR. Humans in it are real actors shot with the camera in real life, then the environment is built with 3D computer graphics. It is more realistic and convincing to the viewer when people in it are real. Good quality 360-degree camera is capturing very realistic pictures they can trick your brain much easier when putting on the VR headset. It is more believable and more familiar to human mind. When computer made VR is still a bit behind in being convincing. It looks more like a video game. Or it depends what you are going for. Maybe you want to have the alien environment looking more artificial than realistic. I am still waiting that the computer graphics will become even more realistic. Maybe it already exists. But I find out with this research that the perfect result in a way are when you mix 360-degree video and VR – 3D computer graphics.

On my Oculus Quest all the VR games that I tried they look very realistic but in a game like style. Not so as real-life. Movies like Ready Player One (2018) and Avatar (2009) are representing virtual reality’s future. In the movie the VR environments are very realistic. I find it kind of a scary and fascinating at the same time. I am curious how fast and how for the technology will go. How immersive will the VR space become. We are already very far with Teslasuit for example that adds feeling to your body when you are in the VR space. But what will actually in the future be the difference between our real world and the virtual one? What if our world will really collapse and we will try escape in this pretty virtual world and not face the reality outside? What will happen to our privacy? We are already so addicted to technology can this make it even worse when the VR quality will improve? As it was said in the Sword Art Online (2009) Japanese Sci-fi animation series, that talks about Virtual reality and its immersive technology. The difference between our world and virtual world will be the amount of data. What does that mean? For example if I was holding hands with somebody in the VR
with my avatar it would not feel the same as in the real world. You can feel a lot more by touching a real hand. You can feel the touch and the warmth of the hand and the person’s heartbeat. This kind of sensory data might be a problem to transform into the virtual world. In the end we never know what technology will bring in the future. Maybe they will break the wall between the real world and the virtual one. That people will not know what is real and what is not. Let’s hope it will evolve only in a positive way and that it will be a help to humanity. I find it very interesting how all those movies that I mention in my research are all considered as science fiction. They are in a way becoming our virtuality in our reality.
7 SOURCES


BR41N.IO (n.d.) Website. What is organized by g.tec logo g.tec neurotechnology GmbH 2020.
https://www.br41n.io/
Retrieved: 11.3. 2020

https://filmora.wondershare.com/virtual-reality/what-is-vr-video.html
Retrieved: 10.1. 2020

Retrieved: 1.4. 2020

Retrieved: 11.3.2020

Facebook Technologies. (n.d.) Website. Facebook Technologies, LLC. Oculus Quest - The next level of VR gaming.
https://www.oculus.com/quest/features/
Retrieved: 5.3.2020

https://link.springer.com/chapter/10.1007/978-94-010-0536-4_8
g.tec medical engineering (2020) Website. g.tec medical engineering GmbH Austria. https://www.gtec.at/history/
Retrieved: 8.2.2020

Giant (n.d.) Website.
http://giantofficial.com/
Retrieved: 8.2.2020

Retrieved: 8.2.2020

Retrieved: 24.3.2020


Retrieved: 11.3.2020

https://arpost.co/2020/03/16/is-2020-virtual-realities-breakout-year/
Retrieved: 1.4.2020

Retrieved: 29.3.2020
Retrieved: 11.3.2020

https://www.wired.com/story/wired-guide-to-virtual-reality/
Retrieved: 30.3. 2020

https://www.wired.com/story/facebook-oculus-codec-avatars-vr/
Retrieved: 29.3.2020


TESLASUIT (2020) Website. The Suit
https://teslasuit.io/the-suit/
Retrieved: 8.3.2020

Tree Official (n.d.) Website.
https://www.treeofficial.com/
Retrieved: 8.2. 2020

http://www.gutenberg.org/files/22893/22893-h/22893-h.htm
Retrieved: 5.3. 2020
PICTURES

PICTURE 1. Ivan Sutherland’s development of the first head-mounted display (HMD) system (1968)

PICTURE 2. VR avatars (glue. Universal Collaboration Platform 2019)
https://images.app.goo.gl/KhCAJoC3MSdxs1Po9 Retrieved: 1.4. 2020

PICTURE 3. Future Facebook Realistic looking VR avatars (Road To VR 2019)
https://images.app.goo.gl/H6BUwT3QFXodBLgn7 Retrieved: 1.4. 2020

PICTURE 4. Still from Steven Spielberg’s movie Ready Player One (2018)

PICTURE 9. Milica Zec, Still from The Giant (2016)
https://www.with.in/watch/giant Retrieved: 1.4. 2020

PICTURE 11. Milica Zec, Still from Tree (2017)

PICTURE 12. Tree at World Economic Forum in China (2018)
https://www.picuki.com/media/1888856520893007617 Retrieved: 1.4. 2020

PICTURE 13. Tree CGA Belgrade (2019)


PICTURE 37. Still from the main-room (VR Gallery Atomic Jungle 2020)

PICTURE 38. Still from Barbara’s room (VR Gallery Atomic Jungle 2020)