Artificial: A Study and Application of Immersive Storytelling using Virtual Reality

by

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Abstract

This project serves as a pre-production for a larger scale immersive film in virtual reality. The goal of this project is to create a film that places the audience in the point of view of the main character by using virtual reality technology. I explore how this change can affect the audience's immersion in the film. Additionally, I examine how the use of virtual reality can help connect the audience to a character lacking emotion and empathy.

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Terminology

Virtual Reality: An artificial environment which is experienced through sensory stimuli (such as sights and sounds) provided by a computer and in which one's actions partially determine what happens in the environment. Abbreviation **VR**

(https://www.merriam-webster.com/dictionary/)

Autodesk Maya: Autodesk Maya is an industry leading 3D animation software application developed by Autodesk that enables video professionals who work with animated film, television programs, visual effects, and video games to create highly professional three-dimensional (3D) cinematic animations.

(https://www.edulearn.com/)

Unity: a cross-platform game engine developed by Unity Technologies …The engine can be used to create three-dimensional, two-dimensional, virtual reality, and augmented reality games, as well as simulations and other experiences.

(https://en.wikipedia.org/)

Rig: Rigging is a technique used in skeletal animation for representing a 3D character model using a series of interconnected digital bones.

(https://conceptartempire.com/)

Introduction:

One of the fundamental ideas constantly influencing everything I create is the traditional storytelling principle of "show, don't tell." In writing, this is a common technique using specific, descriptive words that appeal to readers' senses and stimulate the imagination, making "show" sentences more interesting and engaging (Tankard-Hendrickson 44). In visual media, such as film, this is just as important. If a film can convey its meaning to the audience with limited use of narration or dialogue, then it is more successful than a story completely reliant on these aspects, such as silent films focusing on character movement and interaction. This concept led me to explore what elements of the storytelling process connects the audience with a story. I used similar storytelling methods to engage the audience with the plot, help the relate to the characters, and immerse themselves in the world of the film.

Story Synapsis

In my film, a scientist, isolated on a solo space flight, creates an android companion to overcome his loneliness. Though he creates a nearly perfect android, it lacks emotions, and as a result is a poor substitute for a human. Not to be discouraged, he works long and hard to create a program that will allow the android to feel human emotions. Terrified of destroying his only companion for his own selfish desires, the scientist locks the program away from the android to keep her safe. The film explores the day the android disregards her creator's warning and activates the program that will allow her to feel human emotions. Though the audience will watch the film play out through the eyes of the android, its creator is the protagonist of the film. As the audience watches him struggle with creating a perfect copy of a human, I hope they will connect with both the

creator's efforts, as well as the android's eventual desire for what its creator worked on for so long.

Research

In most film and visual media, a disconnect exists between the filmed world and its inhabitants, and the members of the audience (Mulvey 835-6). The viewers know that the characters onscreen cannot hear them, see them, or even know they exist, and are therefore free from any responsibility, guilt, or any other associated emotions one might feel when confronted with a similar situation in reality. Because the audience naturally feels a slight sense of separation from the action, properly engaging them into an emotional moment can prove difficult if not done correctly.

A key element crucial to the success of a story is presentation, and how this connects the audience to the flow of the story. The position of the audience also plays a key role in how they interpret the story. A successful storyteller thinks about how a film will be received from the intended audience's point of view, and he must choose what is significant and why to show it to the audience (Glebas 18). Creating likable or relatable characters can help an audience to feel more connected to the story. Removing a key aspect of relatability, such as emotions, from a character creates a new set of challenges in engaging the audience.

My solution came from an unexpected source: video games. Many story-based and "sandbox" video games employ the technique of immersive storytelling, by placing the audience in the role of one of the characters and having the player control how the story progresses. While sandbox games differ by having no set story progression and

allowing the player to do whatever he or she wishes, story-based games put the player in the place of the story's protagonist. Though the main character in most games has no programmed personality, players will often project themselves onto their characters and provide their own interpretation of the character, often facets or variations of the players own personality (Hart).

Virtual Reality (VR)

The introduction of virtual reality (VR) into video games has only served to heighten this sense of immersion into the gameplay and story. VR creates a 360 view of a game and allows a player to freely explore a world without using a traditional game controller. When compared to other types of digital games, those played in VR are often viewed as being more realistic (Pradeep 6). VR offers the possibility to "remove" the audience from their own reality and place them into another. Like our own imagination when reading fiction, we know the world we enter is fake, but we allow ourselves to believe that perhaps it is just another reality (Ryan 115). Likewise, allowing a player/audience to see things from a character's point of view helps connect them to a character that they might not otherwise feel for, by imagining him or herself as the character. After suggestions to have certain scenes shown from the android character's perspective, the logical next step was to convert the entirety of the film to be a point of view (POV) film using VR to place the audience in the shoes of the protagonist.

Virtual Reality in Film

When compared with traditional methods of filmmaking, VR films are still fairly new technology. Despite this, VR is quickly gaining popularity as a storytelling medium due to its immersive capabilities when applied to filmmaking. VR engages the audience

in the film more and increases the emotional response of the viewers more than other methods of watching a film. A 2010 study discovered considerably more emotional connection and response the films presented in a VR environment, regardless of film genre or audience (Visch 6). During SIGGRPAH Conferences, the VR Theater is consistently one of the most popular attractions due to its innovations in the budding field of VR filmmaking.

A crucial factor of the effectiveness of VR immersion lies in the virtual environment that exists within the VR headset. Because the field of view within the headset is directly influenced by the viewer, the environment and assets within it must be able to be viewed from any angle. In addition to the environment and assets, sound design also plays a large part in the simulated realism of VR. A well-crafted environment or set will cause the VR "world" to feel more natural to the viewer and avoid the appearing too artificial, which hinders the immersive experience.

Thesis Statement:

With this project, I completed the pre-production for an animated short film that is both visually appealing and emotionally engaging. I hope to make the audience connect with an emotionless character by inserting the audience into the place of that character using VR. In most cases, screenwriters and filmmakers influence audiences to empathize with emotionless/semi-emotionless characters by presenting the character as content with his own apathy and make this a character trait, as seen in the character of Meursault from *The Stranger* (McCracken 80). Alternatively, apathetic characters can be placed on a journey to find his or her own identity, much like the android characters from both Bicentennial Man and A.I. Both methods are powerful individually; however, I believe

that by forcing the audience to take the place of the emotionless character, viewers will more quickly understand how both the android and its creator feel and lead them to connect with these characters.

Documentation of the Project

This project has been in production since the spring of 2019, and underwent many changes, rewrites, and reworkings to arrive at its current state. The original script was written a few years ago as part of a screenwriting class, and then adapted to shortened it to be more suitable for an animated short film. When this iteration still proved to be quite long and dialogue heavy, the script received a final rewrite that eliminated all spoken lines and condensed the film to a running time of around two minutes. From this point, I began pre-visualization work for the setting of the film, as well as many key props. Because the film spans several decades via flashbacks, I explored various technologies and designs characteristic of older generations, as well as speculative designs for the technology of the future.

Utilizing the finalized script, I created a simple storyboard to map the flow of the story, as well as solidifying a first visual pass of how the film would look upon completion. The digital version of this storyboard was taken into Adobe Premiere Pro and used to create an animatic to rough timing of film, which can also be used as reference for sound design later.

With the story completed, the next step was to create the character designs. Character design is arguably the most crucial element in an animated character's appeal. It conveys to the audience, without words, the character's personality. I created several

iterations of designs for both the human scientist (Alex) and the android (Vega). Vega's design is especially important as she lacks emotion throughout most of the film, and therefor makes her a difficult character for the audience to relate to. An appealing design, as well as experiencing the film through her eyes, will help with this.

For the character designs, I initially wanted to create hyper-realistic characters, and use their similarity to reality to connect with the audience. Following a critique session, it was recommended that I try a more stylized design, as audiences tend to have more response to stylized characters in a VR environment than realistic ones. (Lewis) Additionally, hyper-realism is a very difficult design choice, and often results in almost lifelike characters that look slightly wrong, this is known as the "uncanny valley." Then I altered my character designs to lean more towards the realistic side of the spectrum, but still retain stylized aspects to increase appeal and simplify the workload to create them.

With the designs solidified, I created a naming convention to keep my files organized and began creating the assets for the film. Using Autodesk Maya, I modeled the props and setting of the film, the interior of a spaceship. These were bit of a challenge, due to the vastly differing styles of old and new technology but ended up being much simpler to model than the characters. The model for Alex was somewhat simple to create, since I have modeled a few human characters before, and am familiar with the workflow. Vega, however, presented a lot of new challenges. Due to being mechanical, she had to be modeled in such a way for the rigging to manipulate her model in a mechanical manner. This is more difficult than the rigging for an organic model because all the moving joints are visible on a mechanical character, whereas on a human the bones are under a layer of flexible "skin." I took a lot of inspiration from futuristic

androids for her final form, and modern prosthetics for her beta form. These decisions allow her to move like a human, while still retaining her robotic appearance.

Following the completion of the character models, I used a free rigging tool called Advanced Skeleton to create a rig for both Alex and Vega. I knew that the models still needed some more cleanup work, but for now, I would continue to the animation using these simple rigs as a proxy, and then replacing them with the better models later. After creating the rigs for these models, I reached out to some peers who excel at character modeling and design for critique. A suggestion I received was to expand my cg knowledge by experimenting with tools I was unfamiliar with, namely nCloth and xgen, Maya's cloth and hair simulations respectively. Using this critique, I set about creating a more detailed model of Alex, with the intention to implement these aspects into the model later.

To begin with the animation, I enlisted the help of some friends to create a simple, live-action version of the script, to be used as reference for the animation of the film. At this point in the process, I realized that the scope of this project was far broader than I originally anticipated, and much of my time was being spent on research and design for the new techniques and ideas I was implementing for this film that I had never explored before. I had a long talk with my advisor about what my next course of action should be, and he suggested revising my project to include only pre-production and research and design, and complete the rest of the film once I am confident in these new practices. I agreed and revised my timeline to include most pre-production and one animated scene to use as a work sample. We also decided to use a real-time rendering software called Unity

to eliminate render time (a highly time-consuming process in animation) and include the possibility for limited interactivity later in production.

In addition to eliminating render time and possible interactive elements, utilizing Unity as the film's platform will allow flexibility for the final presentation of the film. Though the film has primarily been designed to be watched via VR headset, Unity can also create the same film as a 360 video. Many video hosting websites (such as Vimeo and YouTube) have 360 video capabilities and will allow audiences without VR headsets to also view the film, by using their computers to navigate the 3D space in lieu of VR controllers.

Methodology

At the start of this project, I originally constructed the methodology and timeline based on production schedules for both professionally produced and student animated films, in addition to an animated production I participated in prior to this project. For most pre-production, I followed this schedule closely, but it soon became apparent that this method of production was not entirely fitting for creating a VR film. After changing the rendering software from Renderman within Maya to using Unity as the real-time renderer, I moved all the assets into the 3D painting program Substance Painter. Within this program I created the textures for the models to fit them to the style of the film and appear to have more detail than the models alone could provide.

Challenges

The largest challenge of this project was creating and developing the methodology. VR films are fairly recent technology, and their workflow deviates heavily

from the standard film production schedule. The timeline and plans I constructed initially fell apart once I began experimenting with various new ideas and methods to improve the film. A lot of time my became dedicated to exploring the possible ways to improve the film and learning how to incorporate these methods into what I was planning/had already completed. Due to the constant changes and improvements being added to the film, my original schedule could no longer work, so I narrowed the scope of my project and constructed a new one.

Another challenge of this project was the inability to hide anything from the camera. Since the viewer controls the camera in VR, any aspect had the potential to be seen at any time, and I was unable to rely on certain elements never being seen. While accommodating for this issue caused certain tasks to take longer than usual, the end results reflect the extra work I put into them and fit well into the VR environment.

Conclusions

This project has been a bit of a passion project, as my largest goal as an animator is to engage the audience and create memorable work. To expand my abilities as an animator, I chose to create a film that evokes audience concern for a character that they cannot empathize with. This led me to examine techniques used to elicit audience emotion for similar characters. By providing an emotionless character with either contentment with their own apathy or providing them with a desire for self -exploration, the audience can connect with these traits and support the character, even if they cannot relate. Using these techniques, combined with the immersive possibilities of VR, will allow this film to connect with the audience despite the main character being inhuman.

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Appendices:

Appendix A: The final script for the film *Artificial*

INT. SPACESHIP LABORATORY - DAY

Darkness, then a sharp BEEP sounds and a HUD display spelling out "startup sequence: initiate... success," blinks in front of the camera view. The HUD blinks out and our "eyes" open mechanically, the view is blurry at first, but soon shifts into focus like a camera's aperture. Give a few moments for the audience to take in the new surroundings. A large window on one wall reveals the star-filled sky beyond the hull of the ship. We are sitting on a cot, a desk to our right holds a futuristic computer. A cork board above the computer desk holds old newspaper articles. The articles range in date from 80s/90s, and contain various articles about a breakthrough space mission, the brilliant scientist on the expedition, etc. Also a few photographs on the board, several of Alex and the android, and one quite weathered photo of teenage Alex posing with a girl, who looks much like him, she beams brightly (note: these photographs will be drawings, not renders). Other pieces of technology are strewn about the room but much of it seems to be in severe disrepair, most equipment completely gutted of its internal mechanisms, wires hanging out of empty computer towers, etc. We reach around to the back of our neck and pull the wires connecting us to the computer free from their ports, the charging icon on our HUD flashes off. We are seeing through the eyes of an android, one with obvious care taken to make us look sleek and uniform, a stark contrast to the state of the other mixed-generational and destroyed equipment.

We rise and step over to the monitor of the computer. It has a very futuristic looking design, a sleek glass screen with a holographic display projected onto it. An alert on the screen indicates that power levels are critically low. The android swipes it away. Another window takes its place and reveals that several systems (oxygen, climate control, etc. are offline). The android swipes it away as well. The desktop of the computer is entirely blank, save for lone icon in the center, labeled simply "H.E.A.R.T." The android taps on the program. An install window springs up and fills the entire screen. The window contains a warning, and demands administrator permissions, the android types something onto the keyboard and initiates a "manual override" and receives a final confirmation screen. The

android hesitates for a moment, then selects "install."

Immediately, our vision is assaulted by an orange-colored light and the scene loses focus. A box in the corner indicates the process of installing the H.E.A.R.T. program, indicating that "happy" is installed and "sad" is in progress or something like that. A window reading "memory files" appears on the HUD and files reorder themselves.

BRIGHT FADE:

INT. SPACESHIP LABORATORY - DAY

(1980) FLASHBACK MONTAGE

(note: each memory file is accompanied by a date in our HUD) (note: everything taking place in the past is tinted orange and has a glitchy-holographic look to it.)

Our eyes open and focus again, a man in his early-mid 40s stands in front of us, studying us intently. He has a kind face, but appears to be low on sleep, surviving on coffee and raw determination. The room is much different than in the future, populated by massive computer towers and various other old technology, though all of it functions well. Alex waves his hand experimentally in front of our face, then looks overjoyed. We are immobile, and glancing down reveals that our "body" simply a glorified box housing our inner mechanical equipment and wires connect us to various ports and outlets.

ORANGE MATRIX DISSOLVE TO:

Some of the equipment from the first memory has been either pushed aside or broken down for parts, and newer technology has replaced parts of the ship. We have a higher point of view now and looking down reveals that we now have a proper upper body, though not beautiful and clearly just bare-bones construction. The android experimentally moves her shoulder, flexes her fingers, etc. Alex is there again, grinning at us proudly.

ORANGE MATRIX DISSOLVE TO:

The equipment of the ship has changed again, with more cannibalized computers and technology. Our viewpoint is higher again as we now have a lower body and legs, though still with the same basic construction. Alex watches us excitedly, and we continue to experiment with our new

limbs and figure out their purpose. He helps us stand and looks pleased.

ORANGE MATRIX DISSOLVE TO:

Alex stands in front of us, a few steps away. We place our hands on the cot and attempt to stand, taking a stumbling step and falling forward as we lose balance. The android lets out a distressed BEEP! and Alex quickly catches our arms, to prevent us from falling. He lets go once he's certain we have our balance and steps away.

ORANGE MATRIX DISSOLVE TO:

We take much more steady steps, bringing a small stack of floppy disks into Alex's office. Alex beams at the success, the android is so close now, so human, almost.

ORANGE MATRIX DISSOLVE TO:

Alex stands in front of us, hands clasped together. If anyone cares to look, our body has been upgraded once again, our limbs more functional and more uniform of design now. The technology in the lab has changed again. Alex shows us a small disk labeled HEART and taps his own chest for emphasis before smiling.

ORANGE MATRIX DISSOLVE TO:

We sit in a chair, hooked up to a computer via wires. Alex turns away from the computer screen and pulls a brightly-colored artificial flower out of his coat pocket and hands it to us. We examine it, feeling the petals, unsure of its purpose. Alex looks on with a hopeful expression. The HUD flashes an interface for the HEART program, beta version 7.2 It fills a progress bar halfway before sparking an error message. Alex sighs.

ORANGE MATRIX DISSOLVE TO:

We are sitting in the same place; the computer is now touchscreen. He turns to us and presents us with the same flower, this time with a brightly colored bow. The HEART interface appears again, this time beta version 59.8. Similar error messages appear as we hold the flower. Alex's face falls but quickly turns back to a very fake looking smile, hiding his feelings for her sake.

ORANGE MATRIX DISSOLVE TO:

We stand in the door frame of Alex's office, it's in complete chaos. Papers scattered across the room, pencils on the floor, etc. Alex sits at his desk, his head resting on his folded arms. The flower from before lays crumpled and forgotten on the floor. He sits up slightly and brushes away some stray tears. The HEART interface appears again (beta 149.4), and errors appears again, much more violently than before.

DISSOLVE TO:

A small-time code in our HUD indicates the passage of many years, counting up much more quickly than before.

Alex offers us various objects, more error messages/flashes of dark

Alex looks as us, and at the computer with HEART

Alex locks HEART on the desktop, giving us a sad smile

An orange light gets brighter and brighter as the scenes pass until

WHITE TO:

INT. SPACESHIP LABORATORY - DAY (PRESENT)

Everything is back to normal, but we are less stable than before. Our hands are shaking terribly, and our legs seem just as unstable. The HUD reads that H.E.A.R.T. install is complete. The interface runs and completes without the errors from before.

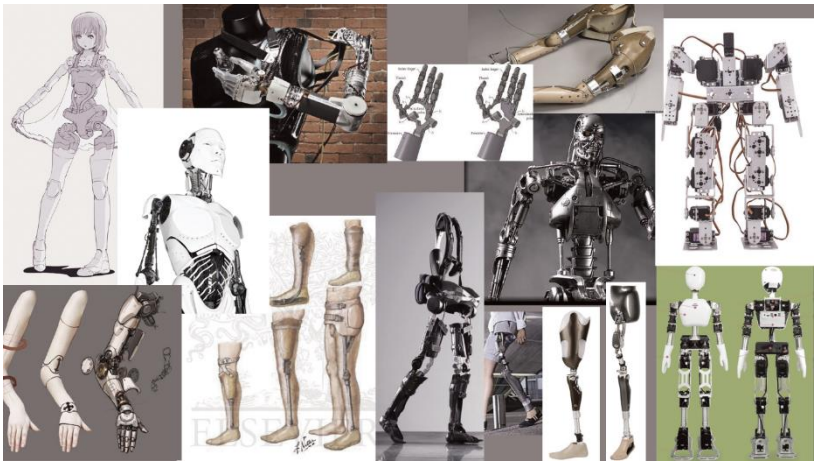
The picture of Alex and the girl is still pinned to the bulletin board. We remove the photograph next to it, one of Alex and the android and hold it close. A red warning appears on our HUD indicating critical system error, shutdown eminent (it is blurred and not in focus). We stumble towards the window. More red alerts form on our HUD and everything begins to lose focus.

We collapse backwards and slump against the wall beside the window. As black creeps into our vision we hold he picture closer.

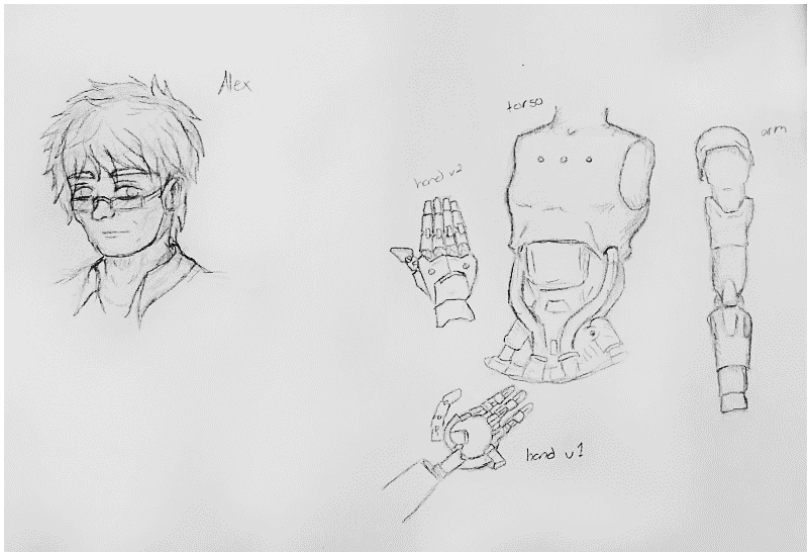
Black fully takes over the screen.

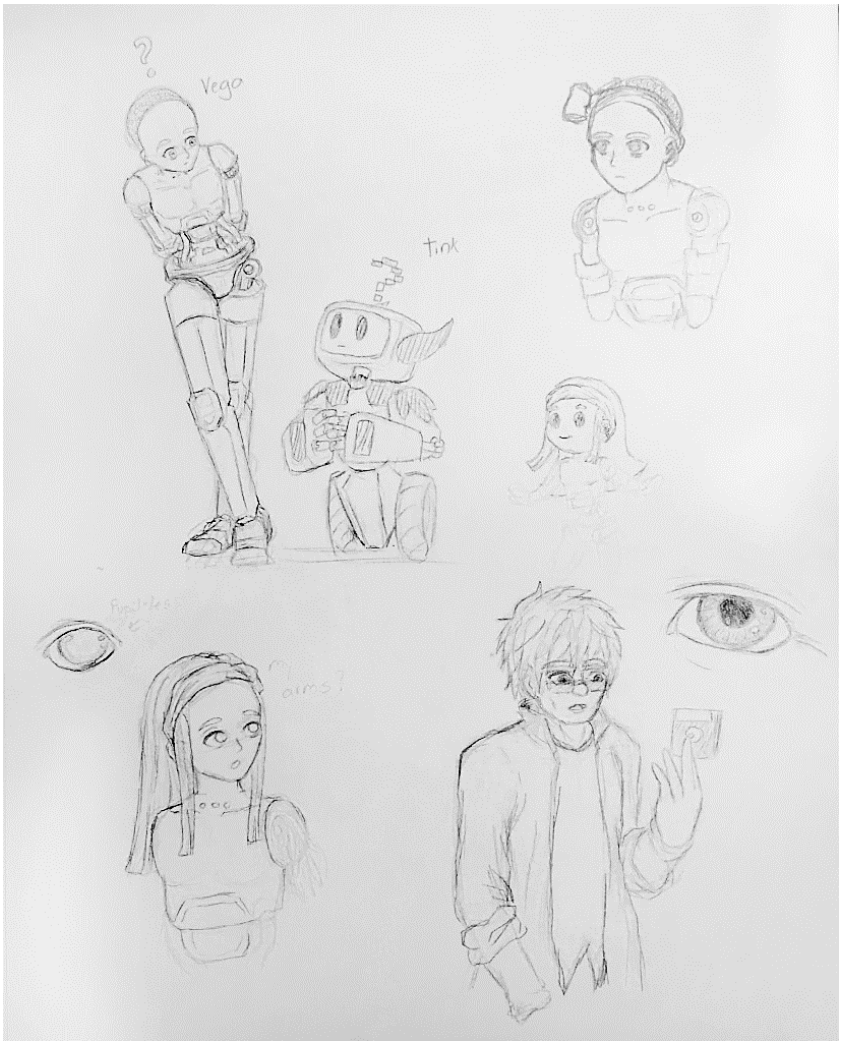
CREDITS

Appendix B: Pre-visualization for the environment and characters

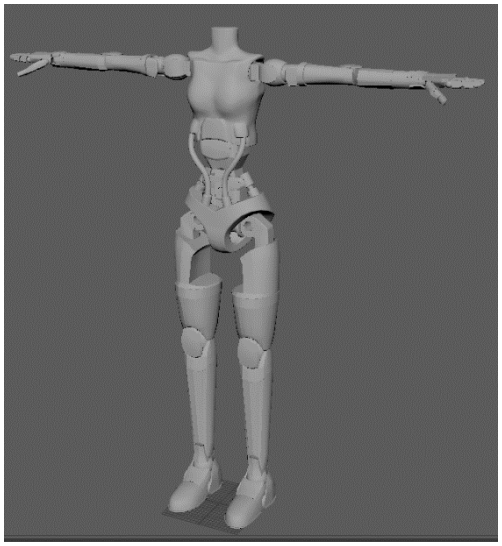


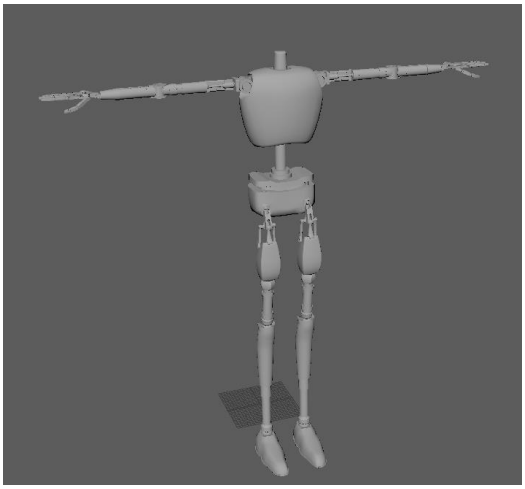
Appendix C: Character Design sketches

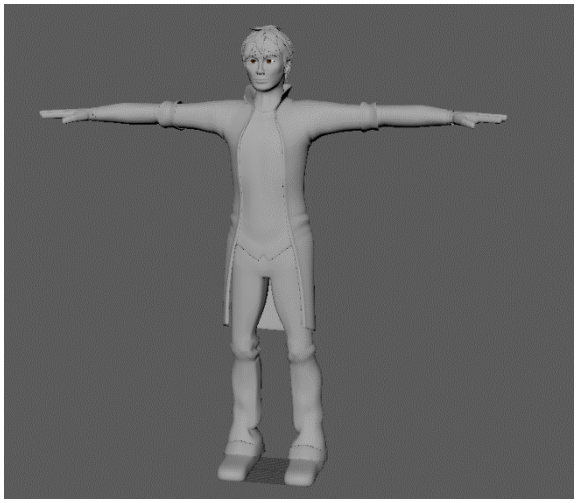




Appendix D: Completed character models







Appendix E: Completed set and prop models