

Here in Manila 2081: A 3D Mockumentary Film Exploring the Viability of a Workflow That Utilizes Photogrammetry to Create Realistic CGI.

Verona, Jannu Manoel B.

Co-Authors

Mr. Conrado Constantino V. De Jesus

Abstract

Recent technological advancements have made way for new workflows to be adapted in 3D and in VFX. My study aims to prove that the workflow I have integrated in my 3D mockumentary film is able to produce realistic CGI with minimum resources and limited time. Using primarily photogrammetry as an alternative process in modeling and photo textures for texturing, utilizing these techniques for worldbuilding to further emphasize realism. I conducted a preliminary interview to gather data about the techniques in photogrammetry as well as how to optimize it for rendering and a post-survey sent to industry professionals gathering their thoughts towards the workflow. Based on the post-survey results, it shows that the output of the study was able to produce realistic visuals which means that a workflow integrating photogrammetry is an effective process for creating realistic CGI.

Keywords: photogrammetry, photo textures, worldbuilding, mockumentary, workflow, CGI

Introduction

I am a 3D artist who focuses on creating conceptual environments. These environments range from something as small as a desk space to mountainous landscapes. I give precise details towards world building and concept art because I have this ideology where still images do not necessarily convey any narrative unless the artist gives meaning to not only the subject but also to the objects surrounding it. I believe that concept art is a crucial piece of detail in any workflow. In the entertainment industry, they start off with iterations and concepts before beginning production. This is the phase where you brainstorm and gather ideas to form an abstract design of a possible output. Concept art can influence a scene as artists try to visualize the story by channeling ideas through a creative output. The composition and framing of the scene from Dune (2021) where their carrier was swallowed by the giant worm was directly inspired from an earlier concept art. It is the early conceptualization that turns into a material for shows, movies, and video games. Whether you are in a massive entertainment studio or doing freelance work, concept art will always provide a vision towards the final image of the

output you are trying to produce. I have been doing 3D for over two years and have been doing freelance 3D work for about seven months.

I have experienced apprenticeship in a VFX studio supervised by professionals, doing 3D and compositing work for them. Outside this internship, I find it hard to find local clients that will commission for something as niche as 3D concept art, especially environment concept design. Most clients would rather see a 2D render as it is faster to create and most of the time, they only need a single perspective view for concept art. I usually find commissions from foreign clients from countries whose CG industry is emerging like Australia and Japan. These clients would often commission for environment conceptualization or to recreate a physical set digitally.

During this time, I have learned new techniques and further integrated them into my workflow. First was using photo textures to somewhat resemble a detailed model with little to no mesh geometry. The process was easy and it was light enough that I could make detailed work without compromising render times. The next technique that I have incorporated was photogrammetry. Photogrammetry uses real world data through a series of images stitched together to form point clouds that then a 3D software can use to convert that data into a 3D model (Prior, 2022). Although the 3D model could sometimes be heavy on the load for the software, with proper optimization and retopology the model can be light enough that it can be repopulated within the scene without any problem.

These two processes seem tedious at first but in actuality, they save a lot of time since you skip some processes in a usual 3D pipeline. In a normal 3D workflow, you have to model something whether it is hard surface or an organic model. Photogrammetry bypasses that since you only have to scan by taking photos of it. Another process that photogrammetry and photo textures bypass is the process of texturing. With photo textures, you are using real life photographs and using them as textures and with photogrammetry, once you have scanned an object, the software automatically bakes the texture of the scanned object into the mesh. Although these processes are very useful, there are limitations and proper modelling and texturing would still be a must at certain times mainly when doing a more detailed and close up shots of a model. This process is meant to supplement something like the worldbuilding and environment design of an artwork and is not intended to be the end all be all process of 3D.

After learning and thoroughly experimenting with this process, I wanted to test their limits and know how far I can push the CGI created through primarily photogrammetry. Through this animation I wanted to know what is possible to create within a certain time frame and limited resources. Trying to figure out if the workflow I have integrated is enough to create visuals that can be on par with some studios proving that quality CGI can be done even with only a single person.

Thesis Statement

A workflow that integrates photogrammetry is an effective alternative process in creating realistic CGI with limited time and minimal resources.

Project Description

My thesis output is a 3D mockumentary film. I created a 3D environment that depicts a dystopian-cyberpunk Metro Manila set in 2081. Using 3D for most of the props and environment whilst using photogrammetry to make the assets. The mockumentary style is to mock automation with a sense of irony as it is done in 3D. I will utilize mockumentary techniques such as a handheld camera to further sell the realism of the animation. Adding characters that directly converses with the audience, making them a part of the film. Calling out cliches and exaggerating stereotypes of automation and aspects of Metro Manila to add familiarity. Little details of world building and character deliveries to create a narrative that further blurs the line of fact and fiction.

The story follows a floating robot companion named TR-4V15. He serves as a tour guide showing the audience Metro Manila in the year 2081. It is a mockumentary, so he addressed the audience directly as if they were there. The companion a funny robot. Its tone is a bit condescending to the point of mockery but still has a sense of humor enough to make the audience engage to the story. As TR-4V15 tours around Manila, there will be jobs that will be highlighted wherein machines or robots have replaced humans. The companion continues to talk about a fictional economic collapse as exposition to further add depth to the story and deliver a bit of context to why machines are now prevalent. The beginning will focus on middle class, pink and black collar occupations. Explaining why they are replaced and what kind of machines are invented to replace them. The middle of the story is going to show how automation replaced artist and that creating art is not a viable career option anymore. Towards the end the scene will shift to show the megacorporation running the TR robots. The brutalist design of the environment depicting the lifelessness of the corporation. As the camera comes close to breaching the walls everything glitches and bugs out as everything becomes chaotic. The story will have an open ended ending as it fades to black and cutting to a warehouse where there is this guy who is connected to a VR haptic machine and a TR bot comes down to "check" on him. After that everything shuts down and fades to black.

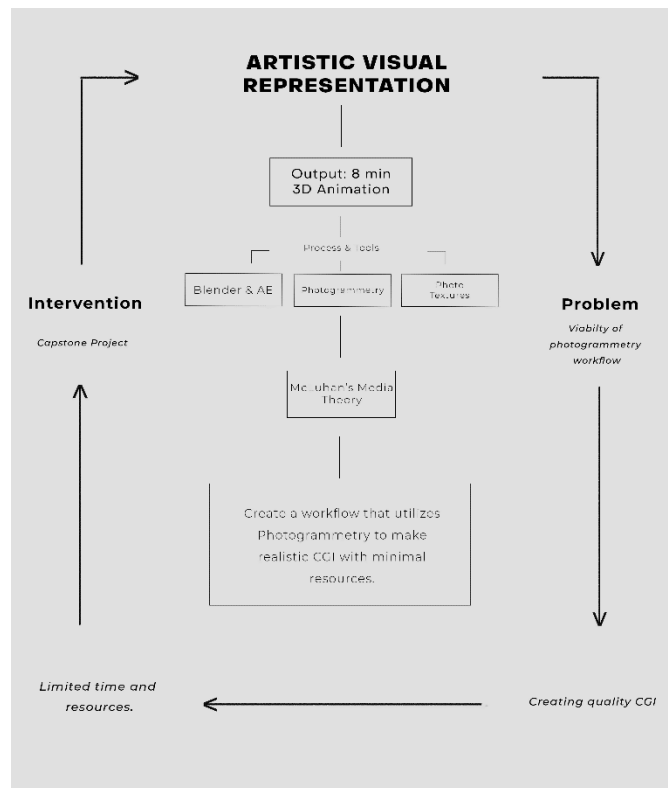
Theoretical Framework

My research will be governed by Marshall McLuhan's Media theory with the idea being the medium is the message. The point of photogrammetry being used to convey a realistic story in itself tells about the 3D medium being pushed to forward to create something of high quality with low resources. With mockumentary, introducing irony is a message that conveys that jobs will be automated, yet it won't necessarily be beneficial as it will also have negative effects. This theory will further emphasize the point of a 3D mockumentary as an effective tool to tell a message as it will not only focus on the medium but on how the medium is going to be used to add perspective or reshape the societal notion on automation and its effects.

Creative Framework

Figure 1

Framework for Here in Manila 2081: A 3D Mockumentary Film Exploring the Viability of a Workflow That Utilizes Photogrammetry to Create Realistic CGI.



The creative framework I have created displays the primary problem that my capstone project tries to solve. It visualizes the process I want to prove when it comes to 3D animation given the

time frame and the limited resource and budget I have. This creative framework also shows the tools and pipeline I used for the entire project.

Design Process

Pre-Production Stage

During the pre-production stage, I focused on two things. First were the assets I used. I have tried finishing the 3D assets before the actual production so I would have numerous of options when doing worldbuilding. I have also compiled some assets I have done for personal projects and put them all in an asset library where I can easily access them when creating the 3D environment. Doing this gave me more time on the animation and worldbuilding.

For the process of photogrammetry, I tried two methods to create a 3D mesh with textures. First was the more traditional way of photogrammetry where you take numerous of photos and letting a photogrammetry software stitch those photos together. For this method I used a DSLR to take a video instead of hundreds of photos then exported that video into an image sequence. There is no difference if you either do video or photos as long as your camera settings are the same, it just comes down to personal workflow. I then loaded up the images to my chosen photogrammetry software which is Meshroom and let it calculate the point clouds. After that it is just cleaning up the mesh in Blender.

Figure 2

Me taking a video of a person for photogrammetry.



Figure 2

Scan clean up in Blender



For the second method, I used a camera phone with LiDAR scanner. Most Apple cameras have integrated LiDAR scanners. LiDAR basically calculates light to measure distance thus being able to scan objects in 3D. I used Polycam, an iOS application made for photogrammetry. This method was a lot quicker since it uses LiDAR and automatically converts the data into a 3D mesh within the application.

Figure 2

Example of a scan done in Polycam.

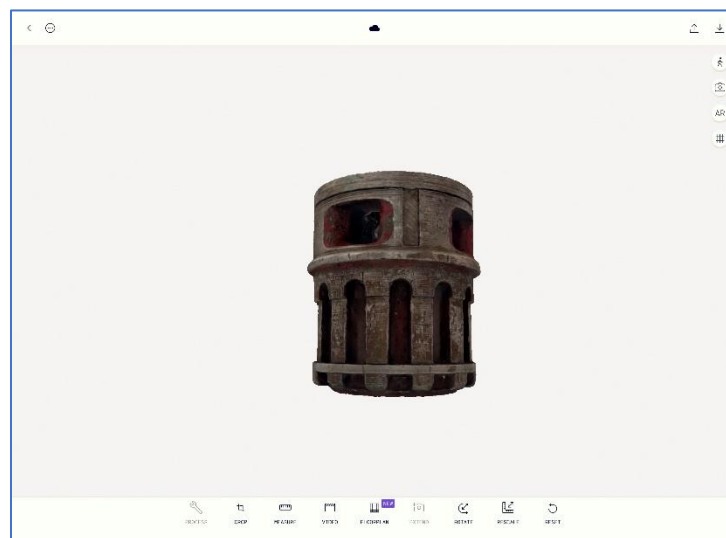


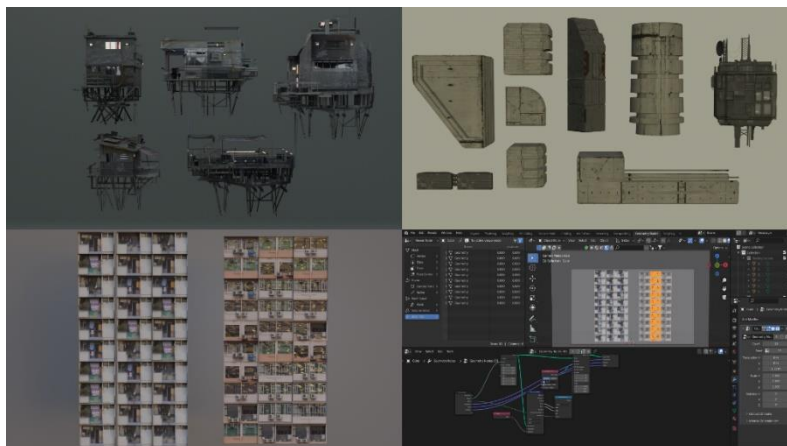
Figure 2

Example of photogrammetry assets I have scanned and put together in an asset library.



Figure 3

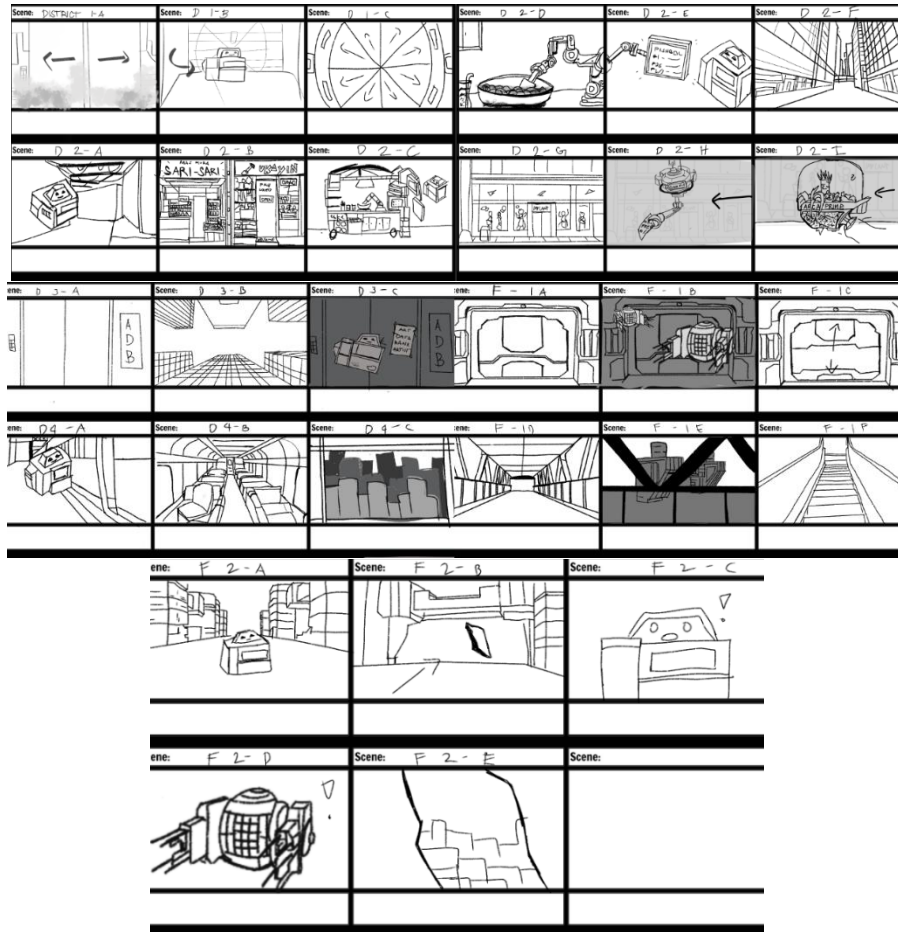
Example of modular environment assets I have set up for worldbuilding.



The second thing I have done in the pre-production stage is to iron out the story and create a storyboard. Although some parts were changed during the production this workflow allowed me to mainly focus only on the animation part during the production stage.

Figure 4

Initial storyboard for Here In Manila 2081



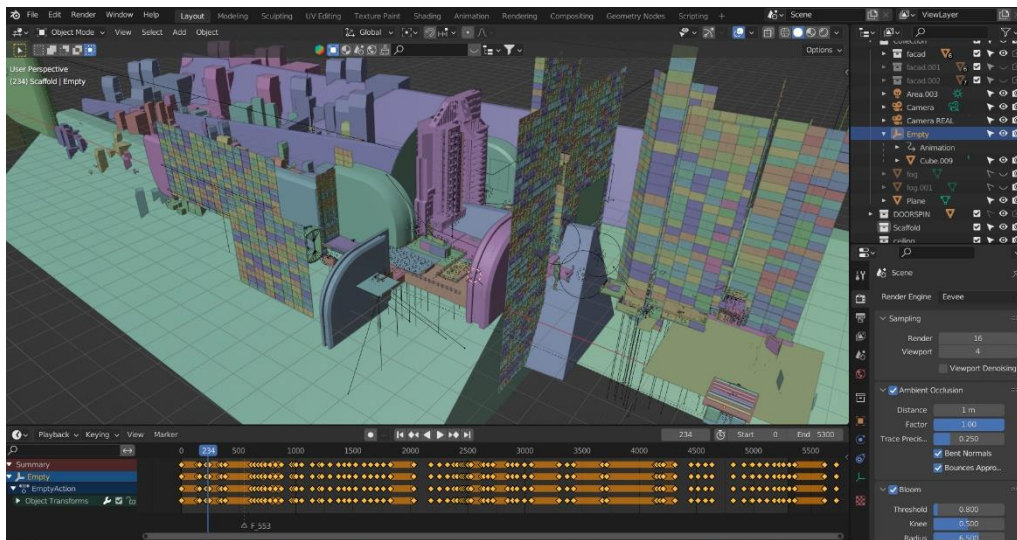
Production Stage

For the production stage, there were two things I have to work on. First was the worldbuilding where I have divided my story into three different settings, The District, The Facility, and The Slums or the Room scene. I have to create each environment as a whole for seamless animation as I will be doing a first person camera animation. Each scene should have detailed worldbuilding as I am very particular with telling a story with environment design and I have to tell an expository story whilst being a mockumentary.

Figure 5
Early Environment Concept Art for Here In Manila 2081



Figure 6
Worldbuilding – District Blender Scene



The second was the rigging of my characters. This did not take long as I only have a few characters to rig, and I only had to do a basic IK (Inverse Kinematics) rig for my bots. Lastly, arguably the hardest part of the production, the animation. I animated both the characters as well as the camera as I wanted it to feel as immersive as possible which means the camera needed to be animated as natural as possible. At the same time, I needed to manage the entire animation as it is animated in one take meaning, I needed to render an entire scene. I have concluded that the best way to do it was to render in one file but render in separate batches, in my case I have divided the load per scene. I also have made simulations such as fluid, rigid body, and cloth simulations for some environment details.

Figure 7
Concept Art for TR Bots

HERE IN MANILA 2081

TR-AV15



Jannu Verona

HERE IN MANILA 2081

TR-GR 51



Jannu Verona

HERE IN MANILA 2081

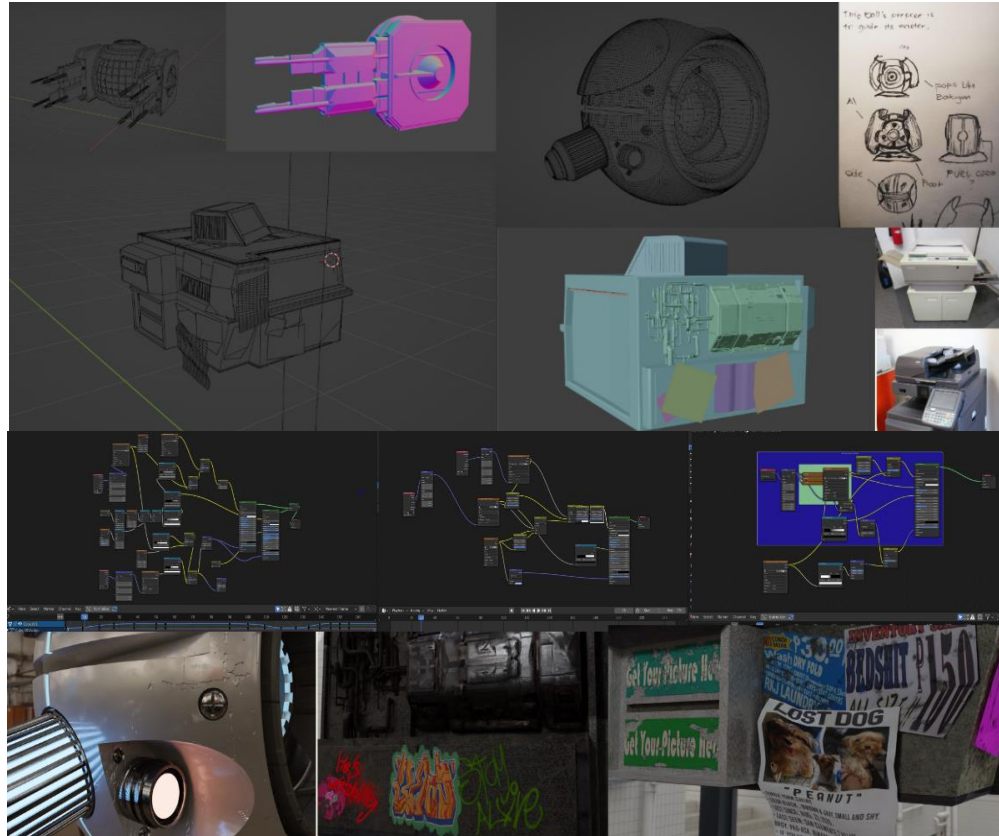
TR-41L 5589



Jannu Verona

Figure 8

Early Process for TR Bots



Post-Production Stage

The post-production stage consists of two processes. The first process was the voice overs and the sound effects/foley. For the sound effects I have used sound effects that I either downloaded or bought online and have credited in my animation. Lastly is the offline and online editing of the entire project. The offline edit was not that hard as the entire animation is mostly one take. For the online edit, it was mostly color grading and making sure that the quality of the final render was fit for certain type of screens for different viewing. The initial plan was to composite everything in After Effects, but I decide to composite additional elements in Blender instead.

Review of Related Literature

The content of this review of related literature will focus on the technical aspect of my multimedia art project mainly mockumentary and the utilization of photogrammetry in 3D. With mockumentary, I want to show the effectivity of the irony that it brings to further showcase the underlying problem of automation. In the case of photogrammetry, the topics I have included display the techniques and application of photogrammetry. These cases exhibit the use of photogrammetry to lessen the time for modelling and texturing making a realistic 3D animation within months more feasible. Lastly, I have included works that have used mockumentary as their genre and works that have incorporated photogrammetry to create a realistic environment.

The Utilization of Photogrammetry

Photogrammetry is the process of forming a 3D object or a representation with the use of photographs capturing various angles. It has been around since 1840 with the French surveyor, Dominique F. Aragon, using the technique to map the topography of a landscape. The later integration of this technique was for scientist to measure the distance of mountain ranges as the drones would have the ability to capture images form above (Dvivedi, 2020). Only in the late 1990s was this tool used to great effect for the creative industry with its integration to films like Star Wars Episode I: The Phantom Menace (1999) and The Matrix (1999). Nowadays, photogrammetry is used to create realistic 3D renders to add to the CGI of a film. Basically, the more photos you have, the more data will be generated to make your 3D mesh look more believable. This also saves time and budget as you only need to capture photos to generate your mesh compared to the more common modelling and texturing workflow. Directors are able to create a new type of storytelling as they the ability to easily create a digital set where they can manipulate space (Frazer, 2021). This ties into my 3D output as this way of doing 3D will greatly save time, money, and will be lighter on my hardware to render. Photogrammetry also fills the irony I am trying to convey. The fact that I am using some sort of technology that automates images to form a 3D mesh directly applies the theory I am using it being “The Medium is the Message”. The use of automation in my field to create my output already implies that automation is slowly being integrated to numerous occupations. In addition to that, since I will be doing photo scans of real world objects, this will add a depth of realism to further make my output more believable and assess if it is an effective tool to convey the underlying problem of automation in a socioeconomic aspect.

Mockumentary as a Genre

Mockumentary is a style of filmmaking that blends a documentary approach with a more narrative fiction to create a satire film or TV show (Evans, 2020). The early visual style of mockumentary was from the French New Wave of the late 1960s, the style of Cinéma-vérité. Cinéma-vérité was a style of documentary used by French filmmakers with the idea of “using reality as a means to their various ends”. It attempts to portray realism by undergoing numerous filmmaking techniques such as handheld camerawork and natural environment to capture the essence of the moment (McGarry, 2019). Mockumentaries use this style to emulate reality with the ability to add fictional narrative to convey a message or even just to provoke a response such as a simple laughter. It uses the familiarity of the audiences of common documentary conventions to convince them that what they are watching is real. Mockumentary depicts a fictional story hidden behind the concept of reality.

With my multimedia art project, mockumentary is utilized as way to neutralize the contradiction of my medium and my chosen topic. Mockumentary is the perfect tool to bridge 3D and reality through a narrative that portrays the possible problems of automation. Although masked with satire, this medium also exaggerates the point to further entice the audience to believe that the economic collapse depicted in the film might happen in the future. The use of mockumentary also opens the possibility to incorporate stories for the interviews I will be conducting to characters in film. Whether the characters are human beings or bots, I have the option to anthropomorphize these bots and make them feel sentient. Mockumentary gives me a huge playground to execute my ideology and tell a convincing story even though the setting is not yet present today.

Cyberpunk as a Genre

The cyberpunk genre is movement that was popularized in American science fiction in the early 1980s. Bruce Sterling, William Gibson, and James Patrick Kelly are a few of the many figures that helped the cyberpunk movement to take off. These writers were the ones who pioneered the genre as they wanted to shape and change the idea of media especially with the initial rise of the digital revolution (Wayne,ND). Although each writer would have a different take on the genre, they would often have the same design and ideology. The concept of high tech lowlife as the main characters of cyberpunk are mostly seen as hackers, punks, and cultural rebels that have the ideology of individualism and revolt against corporate control. They also have incorporated technology into everything, even introducing the idea of implants. Cybernetic implants that enhance their physical or mental capabilities. The notion of machine and man becoming one.

This relates to my multimedia project as it is the main design and concept of my thesis. Cyberpunk as concept is inherently political. It is seen in the making of the plot of my story as the protagonist tries to alter the system in order break the oppression of that the government

tries to hide to the rest of the world. In pop culture, cyberpunk is characterized by neon lights, holograms, and other rugged technology. I have incorporated those designs as well as adapt the very core principle of cyberpunk which is the resistance to corporate oppression. This genre depicts what can an oppressive government do with technology to further seek power and stay on top of those they rule.

Telling a Story and Exposition through World Building

World building is a crucial part of telling a story and when creating an environment that characters live in. It sets the groundwork for your story, your characters to develop, and every interaction they will be doing in that fictional work (Masterclass, 2021). Whether it is a novel, a movie, or even a game world building functions to provide a detailed and established set of rules for that world so that everything is laid out for your characters to develop. World building creates harmony, yet it can also be the one that sets off conflicts. It establishes basic structure and identity to your universe. An example of this is Gorge Lucas' Star Wars. Star Wars is a fictional universe yet we, as an audience, could feel some sense of connection the world. It is because the world is still rooted in their own laws. You can see every planet having a distinct style and stories that were well crafted into its design. A universe of mixed aliens and humans, technology mixed with ancient wonders. The world the Gorge Lucas has created tell stories just from the world alone.

World building will be an important aspect of my project as I try to conceptualize Manila in the future. Although it is a real place, it is set in a future that I am envisioning and predicting. No one knows what the laws in the year 2081 will be. No one knows what kind of world and technology we will have at that time. So, the principle of world building in 2081 is crucial as I still want to root my project in reality but at the same time, I want to inject some creativity and personal ideology into it. I want to shape Manila into a world that falls into a cyberpunk dystopian with its own obstacles and problems. A world that has its own personality and own people that faces day to day life in this world.

Related Works

McLuhan's Media Theory in Art

Figure 8

Assemblance by Umbrellium



Assemblance is an interactive exhibit where people enter a space that has interactive light structures Umbrellium created and manipulated. People who attend then become player, working together to create complex form – or ruin it. The artist discussed that the reason for this work is to explore how people interact with each other and their surroundings – how people can work together to build their environment (Cultivating Culture, 2018). This is a prime example of technology being used to more than just its intended purpose.

A crucial idea of my study is McLuhan's theory of "The Medium is the Message". The same theory can be applied in the Assemblance as the laser forces interaction and experience and even without the actual form or the output, which is the light forms created by the audience, the light/lasers themselves are collectively the message. Just like my output, Umbrellium used their medium to further raise the message they are trying to convey. They also used technology as a medium to create an unorthodox art piece that further explores their medium and its process.

Dynamo Dream

Dynamo Dream is short film by Ian Hubert released last May 2021. Ian Hubert is 3D and VFX artist that specializes in environment design and world building. Dynamo Dream is a story about a girl saving someone in high authority which lead her to be given a favor in which she used to contact her boyfriend. Ian displayed his expertise in world building in creating this short film. He utilized photogrammetry and image textures for his 3D process.

Figure 9

Dynamo Dream World Building and Environment Design



Figure 10

Example of Ian Hubert's use of Photogrammetry and Image Textures.

This 3D film is the main inspiration for the style of my multimedia art project. From the visuals, the techniques, down to the execution, Ian Hubert's style is the style I will adapt to my 3D mockumentary. His clever use of photogrammetry to recreate and build set design to makes world that feels realistic. I will also incorporate his workflow with 3D and compositing real world object or human to create a narrative outside the bounds of a real life set. Dynamo Dream also showcases a futuristic setting. Although more on steampunk/ dieselpunk, I believe I still incorporate some of his design into mine.



Blade Runner

The visuals of both Blade Runner (1982) by Ridley Scott and Blade Runner 2049 (2017) by Denis Villeneuve will have an influence on the lighting of this project. Blade Runner is set in a futuristic cyberpunk dystopian where replicants are hunted down. Replicant are basically

cybernetic humanoids. I will be focusing on Denis Villeneuve direction on the film. His use of colors to convey and control the tone and atmosphere. The colors help lead the transition of each scene making the flow of the story feel connected even though it is an entirely different scene. Every scene feels like a new world yet still tells the same story.

Figure 11

Blade Runner 2049 Memory Lab Color/Environment Design



I want the color of my film to be another layer for storytelling. I will adapt mainly his use of neon colors when creating the environment especially when I will be creating the design for the main district for my film also, his use of white as color and space. Lastly is the environment design for a cyberpunk theme world. I want to incorporate design such as tall brutalist building to impose power. The cyberpunk design that clearly separates the ruling class from the lower. The dynamic nature of Denis Villeneuve's cyberpunk design once again, is another layer of storytelling I will integrate in my film.

The Office

The Office is a TV mockumentary that follows a local paper company in Scranton, Pennsylvania named Dunder Mifflin. The setting is often times just in one office with the characters interacting with each other like normal co-workers. The audience would see the daily life the workers there and that mundanity usually if the cause of drama or conflict. The characters themselves have more depth and delivers different personalities that mixes well with each other to form an effective comedic outcome. The have meaningful interactions and relationships even the secondary characters. The characters do not feel one dimensional as they are portrayed as actual human beings rather than just comic relief and this adds a layer of

realism even though the entire premise of the show is to mock the daily life of an employee. They have motives that drives their action which leads to their actions to push the story forward.

The Office brilliantly showcases the essential mockumentary techniques such as deadpan humor. Deadpan humor is basically delivering a joke with a straight face. The show also exaggerates and over dramatize mundane things that happens during the day. Although it breaks realism, combine it with other techniques and it leads to a well written mockumentary (Evans, 2020). Lastly are the mockumentary troupes such as the handheld camera which is the main camera movement the show uses. The Office is one of the most famous shows to incorporate mockumentary as a genre.

This is relevant to my work as it will help me get the mockumentary troupes and help me make a mockumentary that is efficient in conveying my message. I will use the same camera motion which is a handheld camera feel instead of following the employees, in my film the audience will follow TR-4IL as they tour around Manila. I also want to incorporate the character of Michael, the main character of The Office, to some of my characters as he is quirky and silly in some sense.

Results and Discussion

For this study, I did a preliminary interview before the production and a post-survey to gather final responses towards my output. My preliminary interview was divided into two interviews tackling different aspects of my work. The batch of interviews were for the creative part of my project. I have done interviews to gather information for the technical aspect of my output. I have conducted interviews with 3D animators. Doing so helped me gain more knowledge towards my medium. Find possible techniques to render better results. I have a personal workflow but gathering knowledge from professional 3D artists can hasten the process especially when having a delicate timeline. This also include artists who greatly utilize photogrammetry. My second interviewee were artists that have the same style and method as me. Meaning artists that usually create futuristic landscapes and cities. This was crucial as I am recreating Metro Manila as a cyberpunk dystopian city. In line with this particular part of my research, I have done an ethnographic visitation of popular places around Metro Manila could drastically help me visualize the idea of those places in a futuristic setting.

The second part of my preliminary interview were for my subject research where the purpose was to get insights for the story and flow of my animation. I interviewed artists that are against AI art and artists that are for AI art. I wanted to know the general perspective of most artist and why they have that stand on AI art. This helped me gauge their reaction and if

possible, gather real life experiences of artists that have encounters with problems AI art has caused and possibly integrate these stories into my output.

For my post-survey results, I specifically sent out surveys using Google Forms to industry professionals. I decided to only send the surveys to 3D and VFX professionals because it limits the factor of bias and gives me more information on whether the process of Photogrammetry in animation an effective alternative process since they have more experience in that field and their opinion would have a massive weight in determining the probability of the overall process.

Post-Survey Results

1. Are you aware of the process of Photogrammetry in 3D and VFX?

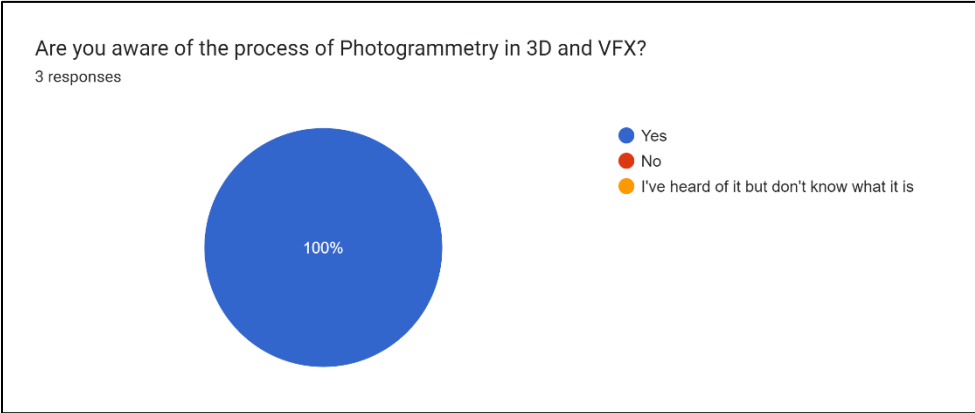


Figure 1.1 Number of respondents who are aware of the process of Photogrammetry.

Based on the pie chart seen on Figure 1.1, it shows that every respondent has an idea of what photogrammetry is. The response shows that the process of photogrammetry is common especially when it comes the industry level of 3D and VFX. This helped me gauge whether photogrammetry is dated enough to the point where it is a mainstream 3D and VFX tool.

2. Have you tried using Photogrammetry?

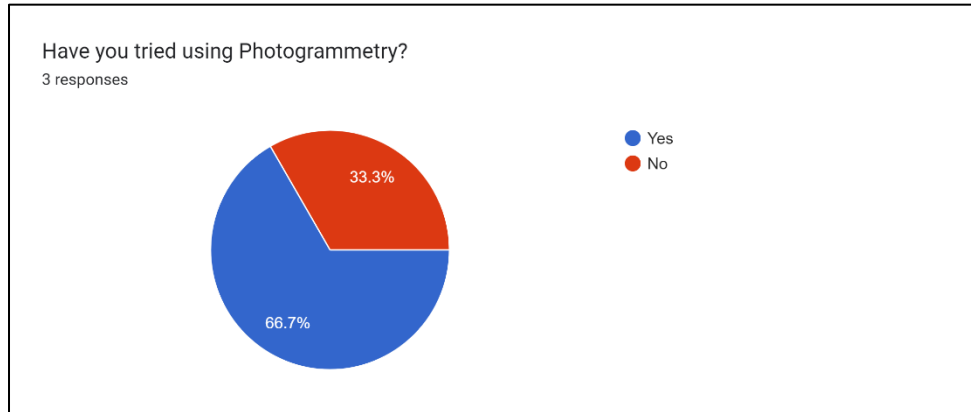


Figure 1.2 Number of respondents have experienced using photogrammetry.

The pie chart shows that only one respondent have not yet personally tried photogrammetry. Figure 1.2 shows that photogrammetry, whether you are using the traditional method of taking photographs or using LiDAR integrated apps, is accessible to almost everyone who has the time to scan objects. The data showed me that most of these professionals have some way of scanning objects and the knowledge to stitch these photographs to create a 3D model.

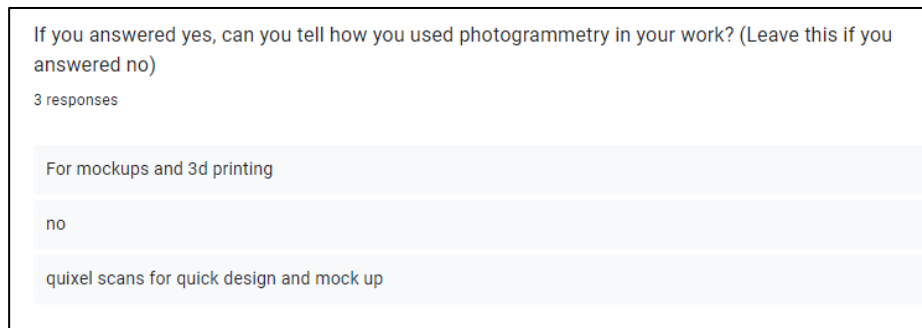


Figure 1.3 Responses to usage of photogrammetry

Figure 1.3 is connected to Figure 1.2. Figure 1.3 shows the ways how these professionals primarily use photogrammetry in their work. Both respondents that answered Yes to Figure 1.2 stated that they use photogrammetry for mockup and basically simplifying 3D tasks or making quick models for design or 3D printing. This helps me gauge how common photogrammetry is being used when it comes to 3D animation or being used as CGI for VFX,

3. In your opinion, does the animation showcased in Here In Manila 2081 look realistic? Rate if from 1-5 with 5 being the highest.

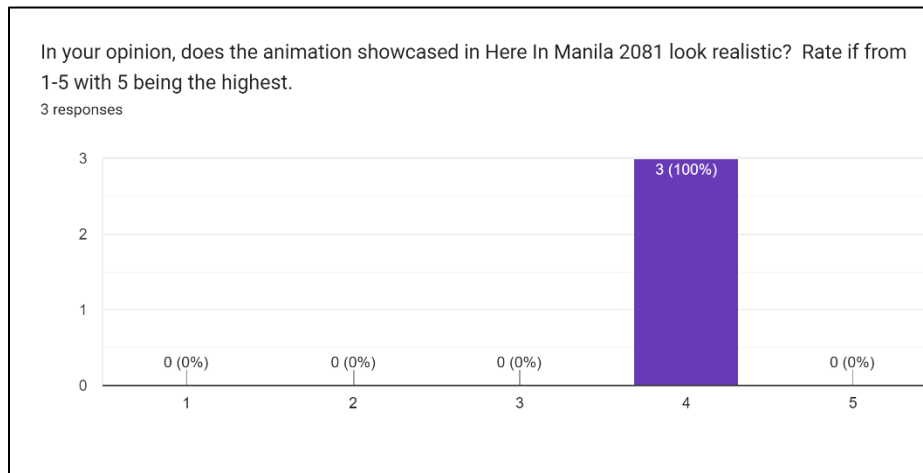


Figure 1.4 Quality of animation

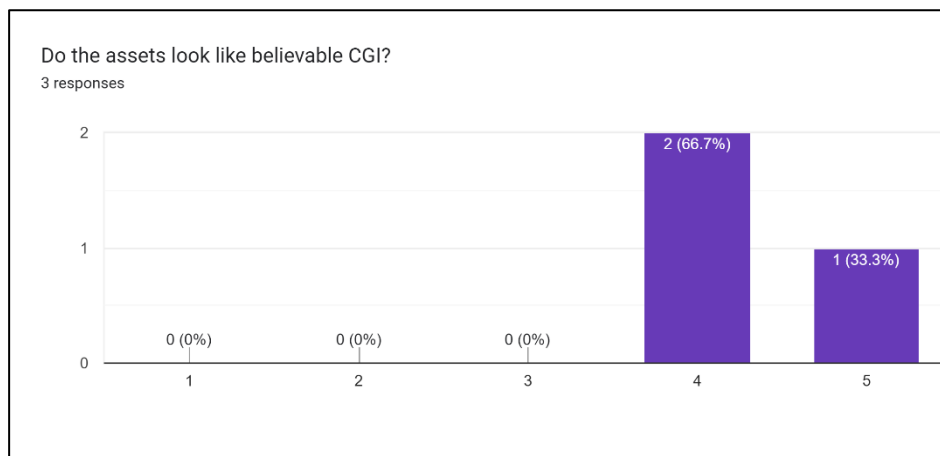


Figure 1.4 Quality of assets

For Figure 1.3 and 1.4, it shows how believable and convincing the technical aspect of the animation. Both the movements as well as the assets used for the world building. For the animation, all respondents gave a rating of four (4) out of five (5). This can be interpreted as the animation being good enough to be believable but still has room for improvement. This proves that the handheld camera added realism to the animation.

For the overall quality of the assets and world building, two respondents have given a rating of four (4) out of five (5) and one respondent gave a five (5) out of five (5). This proves

that the audience are able to feel a sense of realism when watching Here in Manila meaning that photogrammetry is enough to sell realism when you are doing world building and is more than enough to give details to your 3D environment.

4. Are there scenes/assets that don't look convincing?

Are there scenes/assets that don't look convincing if so please identify it and tell your concerns about it. Put N/A if none.

3 responses

The train scene
n/a
some robots have janky animation

Figure 1.5 *Scenes that have minor problems.*

For Figure 1.5, these were the response to scenes that the respondents think the quality of the animation or asset is not on par with other scenes. The first response was a problem with the Train scene and the second problem was with the animation of some bots. Both problems seem to be with the animation of the models. This proves that the problems do not stem from photogrammetry but mainly because of the traditional way of animating in 3D.

5. Given that this project was done by a single person within the span of 4 months with minimal resources, would you say that the workflow used in this animation is effective and efficient?

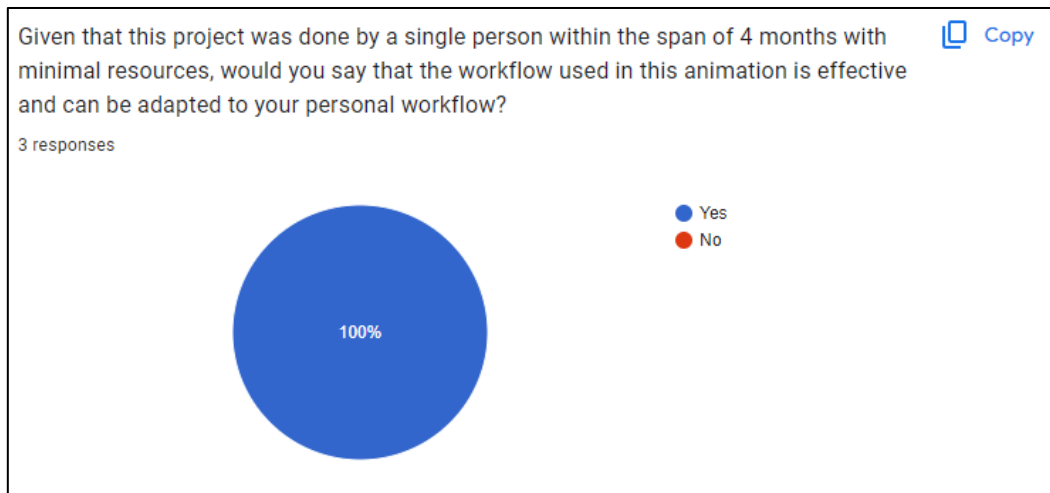


Figure 1.6 *Effectivity of the workflow*

Figure 1.6 shows that all respondents think that given the circumstances of limited budget and time, this workflow was efficient in creating an animation that is believable and that it was effective in creating realistic visuals.

Conclusion

The workflow that primarily uses photogrammetry as an alternative to the traditional method of 3D is able to produce quality and realistic CGI. Based on the survey I have conducted that was answered by 3D and VFX professionals, technology is now at a point wherein photogrammetry can be easily done and replicated by anyone with who knows about the process. This means that it can be adapted to any 3D workflow to further decrease the time of production as well as increase the quality of work. This study also proves the quality of the assets that the process of photogrammetry produces. The assets are convincible enough to pass as realistic environment design but still has room for improvement especially when viewed up close.

Here in Manila 2081 is a testament to what an optimized workflow can do and the implementation of a pre-existing technological advancement to create realistic CGI. This project took four months to create and the only resource I have spent on this project was for a few photo scanned assets I brought prior to the start of this project as well as the overall power consumption that my laptop used throughout the production. I had no help with the technical aspect of the project which further emphasizes the viability and the overall possibility of the workflow I have incorporated in doing this project.

Recommendations

Photogrammetry is still somewhat new especially to the mainstream 3D pipeline. Technology will evolve and this photogrammetry process will be refined overtime. There are still limitations on how good the quality of the assets photogrammetry produces and should be still be complimented with traditional 3D techniques such as retopology and proper UV unwrapping. This will take time, but it will make the assets a lot better and could possibly make it look convincing up close. I did not do proper retopology in most of my assets since they take too much time and most of the assets I did were only for background pieces. It defeats the purpose of being able to create realistic visuals given a shot time if I would do an additional step in the pipeline. But I could see a pipeline that could use this method if they have the time for additional steps in the pipeline.

Furthermore, when doing a more traditional method of photogrammetry where you manually take photos, setting proper camera settings such as shutter speed and exposure is crucial. Never shoot in Automatic mode, always shoot Manual. This lets you take photos faster without worrying about motion blur and some photogrammetry software might have errors if there are blurry images. This will make your assets look sharper and just better overall. For both methods, make sure to scan during overcast lighting or lighting without harsh shadows since you will be baking in the texture and the lighting when you are doing photogrammetry. This way your assets can be more flexible with 3D lighting.

The animation as well could be improved. Here in Manila 2081 did not focus on highlighting the animation of the bots and other rigged objects but the camera movement to sell realism. It mainly focused on the worldbuilding aspect built by photogrammetry assets. With that being said, some animations were stiff and unrealistic and can be improved with better rigging and giving more time to animate individual parts. These recommendations are crucial for future references in creating and optimizing a workflow to make realistic visuals.

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