

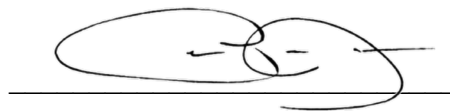
Digital Technology Art for a Car Advertising Agency

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BSc. Information Systems Science (2014)

Thesis submitted in partial satisfaction of the requirements for the degree of Master of Fine Art  
in Digital Arts in the Welch Center for Graduate and Professional Studies of Goucher College

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A handwritten signature in black ink, consisting of a large, stylized 'K' or 'B' shape with a horizontal line extending to the right, positioned above a solid horizontal line.

Advisor signature

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## Abstract

Kantanka is the first ever automobile manufacturing company in Ghana which assembles and produces made in Ghana vehicles. The company which has been around for many years now, has caught media attention that resulted in investors providing funding in the company. Simultaneously, many Ghanians and neighboring countries have patronized the Kantanka automobile products. Nonetheless, in recent years the company has experienced a decline in international and local sales due to lack of marketing. In a recent article “My Joy News” media house in Ghana, journalist Edwin Appiah states that Ghanaian car company, Kantanka, is to blame for failing to penetrate the local market following efforts by German car maker VW to set up shop in Ghana, claiming that the company has not been proactive in engaging the Ghanaian government in purchasing their cars<sup>1</sup>.

In this project, I designed a computer generated imagery (CGI) car advertising demo to enhance the potential of marketing and sales for Kantanka. Like many Ghanaian advertisements, Kantanka adverts have little to no creative attraction to motivate buyers to purchase their products. My goal will be to use CGI in modeling and animating a demo advert to show the potential of CGI in the Ghanaian advertising market and how it can help local manufacturing agencies create more dynamic scenes which meet international standards like that of Audi, BMW, and Toyota, I will also explain how digital technology and art can impact cost in advertising within the Ghanaian market.

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<sup>1</sup> Appiah, Edwin. “Blame Kantanka Automobile for Low Market Penetration - Gabby.” MyJoyOnline.com. Accessed September 15, 2019. <http://www.myjoyonline.com/news/2018/September-3rd/blame-Kantanka-automobile-for-low-market-penetration-gabby.php>.

## INTRODUCTION

Have you ever skimmed through a magazine or seen a product commercial, where the product lighting and placement looks almost too perfect? Odds are, it's a three-dimensional computer generated image. Computer Generated Imagery (CGI), has been around for quite some time and is dominant in the digital media and technology industry, where it is used in movies, games and more recently, product development and concept design. To better understand digital media and technology, I first have to define what digital media is. Digital media is digitized content that can be transmitted over the internet or computer networks, including text, audio, video, graphics, and websites or blogs. Digital media has developed over the last few years to become what we know it as today, and continues to grow<sup>2</sup>. The techniques are extensively used by mainstream media in advertising and by film-makers to produce visual effects<sup>3</sup>. Digital media art and animation technology has revolutionized the process in which art is both conceived and created, and it gives designers, creative thinkers, and artists a chance to express their imagination on a new level. Digital media technology has also created a new approach for creative outlets that can solve problems in the field of marketing, advertising, entertainment, education and art through design, enabling artists to revolutionize their art forms by serving a variety of artistic needs to push the barriers of creation and imagination by giving artists, viewers and consumers new art experiences.

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<sup>2</sup> "Definition of Digital Media ." Confluence, April 12, 2011. [https://wikispaces.psu.edu/display/IST432SP11Team14/Definition of Digital Media](https://wikispaces.psu.edu/display/IST432SP11Team14/Definition+of+Digital+Media).

<sup>3</sup> "Digital Art." Wikipedia. Wikimedia Foundation, September 9, 2019. [https://en.wikipedia.org/wiki/Digital\\_art](https://en.wikipedia.org/wiki/Digital_art).

There are several forms of digital media art, like digital painting, CGI, visual effects (VFX), sound design, and many more, which give designers, creative thinkers, and artists a tool and platform to express their creative thinking and push the boundaries of creative art. Throughout this thesis, I will discuss the fields of CGI and VFX and how they impacted my artistic process in creating my capstone project, as well as how CGI can help improve the advertising market in Ghana and West Africa.

My campaign for the appreciation of digital media art and animation as a method of marketing in Ghana first requires some framing of the discussion - a relevant history of computer generated imagery and its production processes, and an overview of the concepts applied to the art and design. CGI is the creation of still or animated visual content with three-dimensional (3D) imaging software<sup>4</sup>. CGI is used to produce images for many purposes, including visual art, advertising, anatomical modeling, architectural design, engineering, television shows, and video game art, as well as augmented reality (AR) and virtual reality (VR) applications<sup>5</sup>. Whereas VFX (Visual Effects) focuses on digital manipulation by combining multiple live-action footage created, altered, or enhanced for a film or other moving media that cannot be accomplished during live-action shooting but rather after primary image capture is complete<sup>6</sup>. It encompasses effects that were not shot directly with the camera but rather added in the post-production stage.

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<sup>4</sup> “Rouse, Margaret, and Matthew Haughn. “What Is CGI (Computer-Generated Imagery)? - Definition from WhatIs.com.” WhatIs.com. TechTarget. Accessed September 15, 2019. <https://whatis.techtarget.com/definition/CGI-computer-generated-imagery>.

<sup>5</sup> “WHY CGI?” Think Chromatic. Think Chromatic. Accessed September 13, 2019. <https://www.thinkchromatic.com/why-cgi>.

<sup>6</sup> Okun, Jeffrey A., Susan Zwerman, Kevin Rafferty, and Scott Squires. *The VES Handbook of Visual Effects Industry Standard VFX Practices and Procedures*. Seconded. Burlington, MA: Focal Press, 2015.

In terms of television and movie production, computer generated imagery is considered to be a part of the visual effects<sup>7</sup>. Computer generated imagery and visual effects were created out of the necessity to venture into new territory and make visual production jobs much easier and faster. They are utilized to transform the unreal into reality and bring objects, people and places to life. This technology has allowed advertisers to create fantastic images and scenes that would have taken longer and cost more to produce.

In the case of Kantanka's advertising and marketing strategy, the conventional photography and videography have always been the most effective and cost-efficient ways of marketing their products and services, which come with a large cost of production incurred by shipping, logistics, transportation, construction, and production shot corrections. In some cases the car may not be readily available for a location shot, but with the integration of digital media technologies like CGI and VFX the car could be placed in digitally saving a company money and time, the two most important commodities in any business or organization. Over the years, digital arts and CGI has proven to help modern cinema and advertising by opening doors to new creative expressions that conventional photography and videography, which were time-consuming and difficult to do accurately, did not allow. The initial costs of CGI production are often higher than traditional photography and videography, but once an asset is created it can be used in several production shots with minor changes at a fraction of the cost which the traditional modes of advertising used by Kantanka do not have the luxury of doing. This could help the company save up on production costs and relocate the saved funds to other sectors to help boost

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<sup>7</sup> Ravishankar , Jayaramamurthy. "What Is the Difference between VFX and CGI?" What-is-the-difference-between-VFX-and-CGI. Quora, November 11, 2015. <https://www.quora.com/What-is-the-difference-between-VFX-and-CGI>.

the quality of the product. In conventional photography and videography most setups need to be torn down and rebuilt to make room for other projects which creates the potential for inconsistency and difficulty in lighting situations, Another factor to be taken into account is what and where you are shooting, since the physical limitations of reality and gravity make it difficult, if not impossible, to photograph certain subjects the way you might want to in a CGI environment. But with CGI sets, lighting and camera placement settings remain the same, making it possible to achieve consistency that is very difficult with photography and videography. Using digital media technology I would be able to create a more compelling advertisement than what is already shown by Kantanka with more creativity and dynamism than a traditional video shoot, which would help, Kantanka achieve a more memorable and visually pleasing advert that will improve the brands credibility and target market, while maximizing its brand value and sales. On the website of the Kantanka automobile, examples of the conventional photography look poorly lit and unprofessional and the background looks unexciting, indicating poor location scouting of shot locations, lighting and editing. Using digital media technology and CGI, I can use an HDRI (high dynamic range imaging) map along with a CAD data file (a computer-aided design file) to create a photorealist replica of the shoots to help improve the still visuals on their site better than the conventional photography method used.

Through the process of collecting private data information about sales and design on the Kantanka cars and comparing with competing brands, I would be able to analyze data references on what the target goal is and how to achieve results for questions such as: What type of automotive business is being marketed? Who is the typical customer? How do I market to the targeted audience to gain their trust? In 2014, Lincoln made an advert of the Lincoln MKC with



actor Matthew McConaughey which went viral and caught the attention of many consumers. But did this advert have an influence on the sales of the Lincoln? Yes, In October 2014 Lincoln reported its highest sales which were up by 25 percent and of all 8,883 vehicles Lincoln sold that month, 2,197 were MKCs, which goes to show the impact a professional looking advert could have on a company's market sales<sup>8</sup>. TV adverts are still the most effective advertising platform when trying to capture the attention of new customers, making it relatively the most important marketing channel to invest in. Kantanka may have to invest in the services of professional digital artists such as myself, a media house that is known for making great car adverts using CGI technologies or employ an in-house digital art team service to enhance the visual appeal of their brand. Using traditional three-dimensional modeling and rigging techniques in the conventional animation production process pipeline, I would create a frame by frame camera animation with more dynamism, close and sharp cuts to enhance the detailing and capture the most detailed aspects which is difficult to accomplish with videography due to the challenging factors of lighting, reflectivity, and camera angle shots which cannot be altered, manipulated, rotated, and updated on the fly while shooting. In this write-up, I will discuss my step-by-step process and procedures in creating a demo advert to showcase the possibilities and capabilities of CGI to the Kantanka marketing team.

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<sup>8</sup> Walker, Michael. "Lincoln Sales Surge After Matthew McConaughey Ad Campaign." The Hollywood Reporter. Michael Walker, November 4, 2014. <https://www.hollywoodreporter.com/news/lincoln-sales-surge-matthew-mcconaughey-745926>.



Fig 1.0

*On the left, Image of Kantanka Car Using Traditional Photoshoot and Edit . Kantanka Automobile Website Homepage. Kantanka Automobile, July 1, 2019. <https://kantankaautomobile.com/>. On the right, “Berko, Kwasi Ofori, “Kantanka Car Commercial”, A computer generated image rendered model of the Kantanka Mensha in a HDRI environment. November 8, 2019.*

## PRODUCTION PIPELINE

Digital media technologies played a crucial role in my goal of creating a concept car advert to enhance the potential of marketing and sales for the Kantanka, using the standard animation production pipeline procedure as a step by step guide in making my animation. The production process involves all conceptualization and planning that takes place before a computer animation or effects project is produced<sup>9</sup>. Also, there are multiple styles and approaches for producing computer animation but the processes are in constant transformation based on factors like, budget, creative goals, the schedule, and resources. The production process consists of three

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<sup>9</sup>Kerlow, Isaac Victor. *The Art of 3D Computer Animation and Effects*. 4th ed. Hoboken, NJ: Wiley, 2009.

main steps: the pre-production, production and post production stages. Understanding all the elements is the first step to bringing the vision to life.

### Story:

Under the pre-production stage the idea is conceived, becoming the essence of the piece envisioned. This is the reference point for all the other elements involved in the production pipeline. In creating this animation I referenced works from other three-dimensional car advertising videos, such as the Audi "Sharper Drive" by Parasol Island studio based in Germany a CGI, live-action integration commercial directed by Philip Hansen and Danny Ruhlmann for client Audi AG<sup>10</sup>, and the Audi RS 3 Sportback and R8 titled "Birth". No actual cars appear in this advert from Audi, they turned to CGI to introduce the new line of cars to make advertisement more dynamic and interesting while cutting down production cost and increasing the product marketing value. The "Birth" advert was created entirely from 3D CAD data, which was a simple idea that was executed brilliantly to perfectly capture the communication objectives for the Audi RS 3 which task was to find a confident, bold and exciting way to tell the story that the legendary attributes of the R8 live on in all Audi Sport models. The director of this Audi R8 "Birth" project, Andrew Proctor added – His visual effects knowledge allowed him to create for himself and gave him a direct channel from his mind to the screen<sup>11</sup>.

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<sup>10</sup> Ruhlmann, Danny. YouTube. YouTube, August 14, 2012. <https://www.youtube.com/watch?v=in-ijTLgQtg>.

<sup>11</sup> West, Gillian. "Audi Turns to CGI to Introduce Latest Audi Sport Model with Cinematic Campaign." The Drum. Carnyx Group, April 30, 2015. <https://www.thedrum.com/news/2015/04/30/audi-turns-cgi-introduce-latest-audi-sport-model-cinematic-campaign>.



Fig 1.1

“Audi RS 3 Birth”, Youtube Video, 1:50, “Audi UK”, April 30, 2015. <https://www.youtube.com/watch?v=QnMxcM7Gbjo>

Another reference advert was that of the Tesla Fireflies, an all-CG auto ad by visionary director Sam O’Hare from ParachuteTV, a nimble production company. Although it wasn’t an ad contracted by Tesla but rather as a spec spot for the love of the brand which has an interesting storyline that truly explores the creativity of storytelling and CG commercial<sup>12</sup>.

These resources guided me in telling a story of who the Ghanaian people are and how they are connected to the Kantanka car. What better way to do so than the symbol of Pan-Africanism and anti-colonialism, the Black star of Ghana, a symbol used by the Kantanka automobile company as their brand and logo. The Black Star of Ghana mounted on the Black Star Gate, built by the

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<sup>12</sup> Childs, Nick. “Marketers Should Look Beyond the Dazzle of CGI and Embrace Storytelling.” Adweek. Adweek, December 14, 2015. <https://www.adweek.com/brand-marketing/story-these-2-car-ads-shows-new-creative-directions-marketers-should-explore-168567/>.

first prime minister of Ghana in 1957 was to celebrate the nation's newfound autonomy and freedom<sup>13</sup>. The representation of the freedom of the Ghanain people is a great way to tell the story of the Kantanka automobile which captures the African independence through, innovation, technology, and art .

#### Storyboarding:

The second part of this process is the Storyboard process, where the script is broken down into scenes and drawn into panels much like a comic, which helps to translate the story and the script into visual images. As an essential part of the pre-production and storytelling stage to me, using paper and pencil I created a rough sketch of my idea to best tell my story, I was able to depict how the camera animation would move and which layouts and backgrounds to use in each scene. I created a storyboard using Adobe Illustrator to describe each scene in a 16 x 9 image aspect ratio. The process was used to fine-tune the storytelling and the timing of my animation project. In Fig 1.2 you will see an image of my storyboard. After the Storyboard process come the animatics, a sequence of two-dimensional moving images used to visualize the timing of the final project. Animatics are matched to scratch dialog and other recorded or synthesized sound, and are assembled from digital flip books and simple live-action sequences composited digitally<sup>14</sup>.

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<sup>13</sup> Dunnell, Tony. "Black Star Square." Atlas Obscura. Atlas Obscura, October 25, 2018. <https://www.atlasobscura.com/places/black-star-square>.

<sup>14</sup> Kerlow, Isaac Victor. *The Art of 3D Computer Animation and Effects*. 4th ed. Hoboken, NJ: Wiley, 2009.

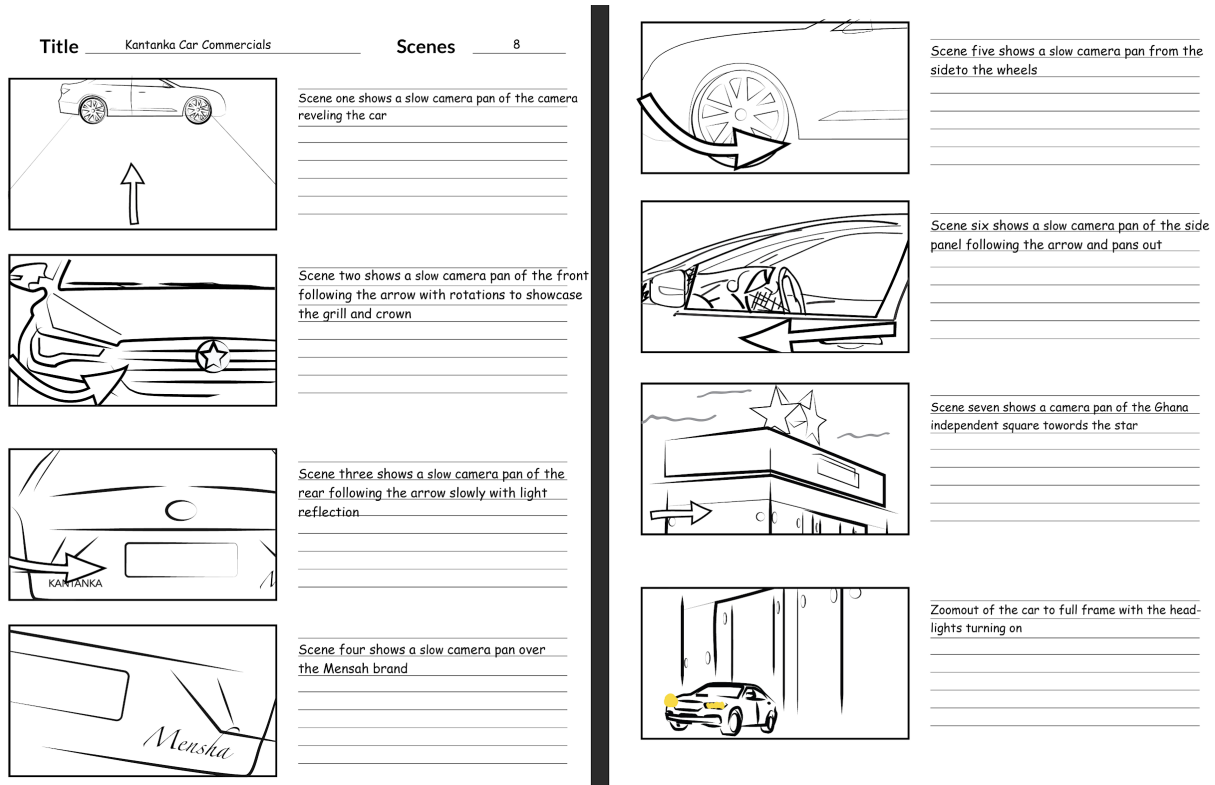


Fig 1.2

Berko Kwasi, "Kantanka Commercial visual storyboard" *A visual representation of the story translated into a storyboard.* March 4, 2019

At this stage, I created the animatic sequence using the illustrator's storyboard image made in Adobe Effects. Once the script and animatic sections were completed I created a pre-visualization, the equivalent of an animatic done with storyboards but with actual three-dimensional low-polygon props sets and cameras<sup>15</sup>. The pre-visualization gave a more clear vision of the project in its actual form, and using low-poly three-dimensional props I was able to create a project sample scene to test out the camera animation sequence and timing. The pre-production stage took me a total of two months in collecting information and references, trying

<sup>15</sup> Staff, Artella. "PRE-PRODUCTION - STEP 2: PREVIS." Artella Blog. Artella, August 26, 2019. <https://blog.artella.com/index.php/2016/04/07/142425286786/>.

out different sketches and pre-visualization iterations. After completing the first milestone, I started working on the second section which was the production stage.

## PRODUCTION

### Modeling:

The production stage involves the modeling, lighting, surfacing rigging, and troubleshooting of the animation project. This is the core of the animation project and determines how the final project looks and feels. Modeling is the process of creating a three dimensional representation of any object, from humans and animals to machines and natural environments in an animated film or commercial, where all characters, props, and sets are composed of three-dimensional models which are needed to be completed before lighting and rigging can be initiated<sup>16</sup>. Coming from an architectural visualization three-dimensional modeling background, the automobile and engineering model was a huge challenge which resulted in me having to learn new skills and conduct extensive research on how to best approach the modeling of the Kantanka automobile. Using various styles of modeling, such as subdivision modeling, which involves using poly modeling tools with subdivision surfaces modifiers to create forms in a three-dimensional environment, which is the most basic form of three-dimensional object modeling. This process uses triangles, quadrilaterals (quads) and n-gon: a polygons made up of five or more vertices to create a desired object. These three geometric modeling forms played a crucial role in how the final model turned out and behaved during the rigging, texturing, and rendering stages. For the

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<sup>16</sup> Ovrick, Jacob. "Pro Tips: 3D Modeling Best Practices." Artella Blog. Bobby Beck, August 26, 2019. <https://blog.artella.com/index.php/2017/10/18/pro-tips-3d-modeling-best-practices/>.

most part, ngons and triangles usually get a bad reputation due to the issues that arise when deforming the model for an animation or texture wrapping. Therefore many modelers re-route their geometry to create a quad geometries which is best for clean topology<sup>17</sup>. I used these various techniques, in conjunction with the spline curve drawings to enable me to create the skeletal body frame of the Kantanka Mensah.

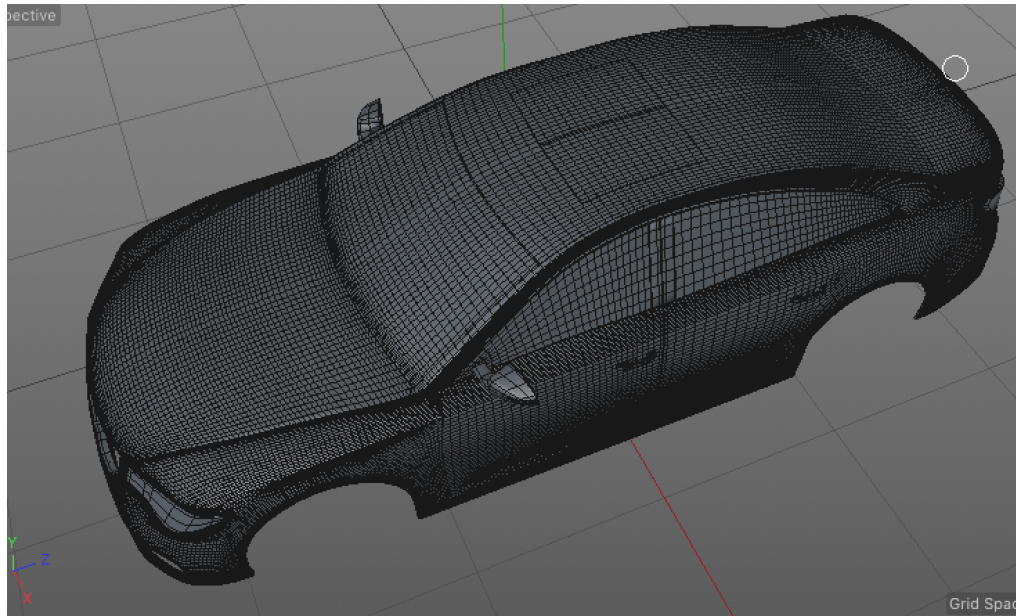


Fig 1.3

“Berko, Kwasi Ofori, “Kantanka Car Commercial”, *A wireframe modeling of the Kantanka Mensha in a 3d enviroment*. June 23, 2019.

### Rigging and Animation

After the modeling of the car and its properties came the rigging and animation stage. At this stage I focused on building and attaching a three-dimensional skeleton rig to the car object to

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<sup>17</sup> “Why Are Ngons and Triangles so Bad?” Pluralsight, October 1, 2014. <https://www.pluralsight.com/blog/film-games/ngons-triangles-bad>.



allow an easy control of the wheel rotation by moving the main car body back and forth without having to keyframe every tire rotation manually. This technique is a huge time saver when needing to animate the car. Also, I created a rig for all the camera movements using a spine object as a path and guide while using the keyframing techniques to animate its movements, zoom and rotation. Keyframe animation is a technique that creates movement by making incremental changes in a timeline by marking the beginning and end of a transition.<sup>18</sup> The timing from the animatics guided me in the keyframe animation process to getting each scene's timing right.

#### Lighting:

After rigging and animating of the objects in the scene, the next stage was the lighting phase. In this stage I focused on creating both natural and artificial lights that would illuminate the environment and scenes, which is essential to giving the project a photorealistic touch. Lighting in an animation or any production process is the foundation of how a story is told. It conveys what the story is, how the story flows and what viewers experience through the mood and color changes, thus bringing a sense of emotion and character into each scene<sup>19</sup>. It is the most important aspect of the production stage pipeline. For the lighting phase, I used a third party plugin render engine Corona render - a modern, high-performance, unbiased, photorealistic renderer that is entirely central processing unit (CPU) based with an optional graphics processing

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<sup>18</sup> Chun, Russell. "Frame-by-Frame Animation ." adobepress. Adobe Press, March 25, 2017. <http://www.adobepress.com/articles/article.asp?p=2755709&seqNum=14>.

<sup>19</sup> Fischler, Ben. "How to Think When You're Thinking about Lighting..." Artella Blog. Artella, August 26, 2019. <https://blog.artella.com/index.php/2016/04/25/143393256306/>.

unit (GPU) denoising which requires a compatible NVIDIA GPU<sup>20</sup>. The difference between CPU and GPU processors is in the way each one handles tasks. A CPU performs different calculations to process tasks, while a GPU can focus all computing abilities on a specific task. A CPU is comprised of multiple cores, up to 24, that are used for sequential serial processing making, and could outperform a GPU when it comes to computing complex tasks, since GPUs are optimized for processing large batches of data by performing the same operation quickly and repeatedly. This makes corona render a great tool for myself based on my computer systems setup which is strictly CPU based<sup>21</sup>. Also, as mentioned previously, Corona renderer is an unbiased renderer engine, meaning it is a physically accurate rendering engine that calculates the path of light as accurately as is statistically possible within the confines of current generation rendering algorithms. Any variance will manifest as noise, but given enough time an unbiased renderer will eventually converge on a mathematically "correct" result<sup>22</sup>. Regardless of these facts, a GPU is much faster and better suited for any and all CGI design works.

When lighting a scene in a three-dimensional environment, one must always reference a real-world lighting, scaling, and camera placement scenario and have good reference materials to achieve a more compelling and realistic result. My knowledge of camera settings, lighting and camera placement from the DA 560 Camera Techniques class helped guide me in setting up a three-point lighting system – a standard lighting technique for video shoots that transforms

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<sup>20</sup> “About.” Corona Renderer. Chaos Czech , 2019. <https://corona-renderer.com/getting-started>.

<sup>21</sup> Lee, Tina. “CPU vs. GPU Renderer: Which Is Better?” TDU, April 22, 2019. <https://td-u.com/cpu-vs-gpu-renderer-which-is-better/>.

<sup>22</sup> Slick, Justin. “Shining a Light on Rendering Terminology.” Lifewire. Lifewire, March 25, 2019. <https://www.lifewire.com/rendering-terminology-explained-2012>.

mostly flat boring visuals and images into something more active and interesting. The goal of this lighting technique is to create the illusion of a three-dimensional subject in a two-dimensional image<sup>23</sup> by setting up a *Key light* – which is the main light source for the subject or product, a *Fill light* – which complements the key light by filling in and softening the shadows, and a *Backlight or Hair light* - which is used to separate the subject from the background<sup>24</sup>. I added a soft light (top light) above the car model to highlight the size of the car and add a more dynamic lighting detail to the scene. The placement of a soft light above the car is a cheat used in many real-world automobile photo and video shoots to achieve dynamic lighting. In Fig 1.4, a wireframe rendering of the lighting structure is shown to detail the three-point lighting setup.

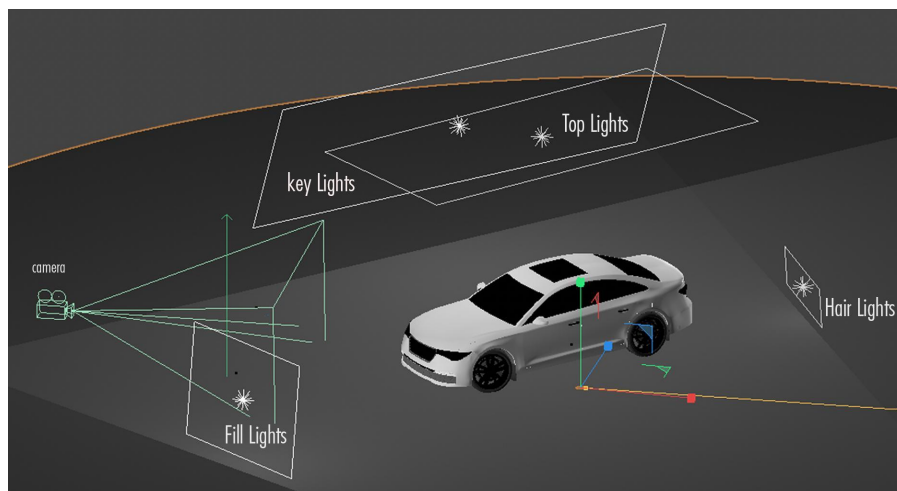


Fig 1.4

“Berko, Kwasi Ofori, “Kantanka Car Commercial”, *A wireframe modeling of the Kantanka Mensha in a 3D environment showing details of the three-point lighting setup* . September 25, 2019.

<sup>23</sup> Jagadisha, Rohit. “Master the Art of Lighting a 3D Scene.” Creative Bloq. Creative Bloq, January 20, 2015. <https://www.creativebloq.com/3d/master-art-lighting-3d-scene-11513961>.

<sup>24</sup> Hyman, Izzy. “Www.izzyvideo.com.” *Www.izzyvideo.com* (blog). IZZY VIDEO, March 9, 2011. <https://www.izzyvideo.com/three-point-lighting/>.

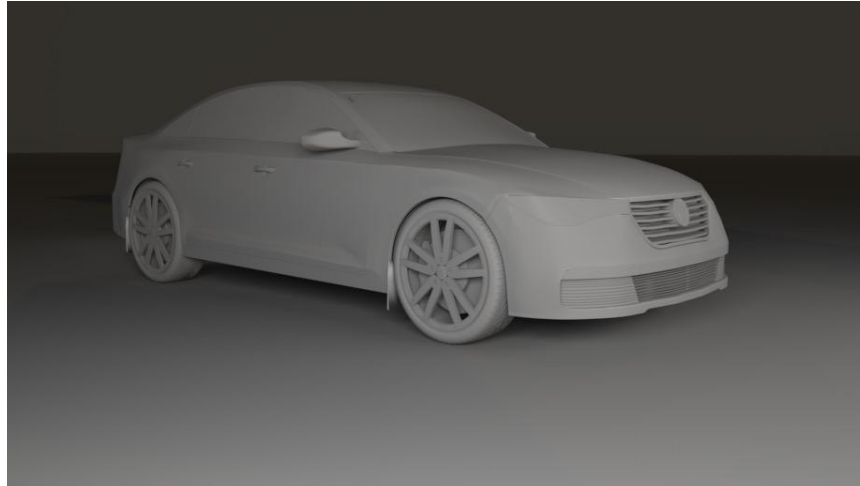


Fig 1.5

“Berko, Kwasi Ofori, “Kantanka Car Commercial”, *A Clay rendering of the Kantanka Mensha in a 3D HDRI and three-point lighting setup*. September 25, 2019.

HDRI mapping is a method used to digitally capture, store and edit the full luminosity range of a scene<sup>25</sup> and it is used to create a similar range of luminance that is experienced through the human visual system<sup>26</sup>. Using an HDRI as a base for the environment lighting, I was able to achieve a base reflection and an illumination that created a much more interesting shot with realistic reflections on the car paint. Because lighting is by far the most important factor that influences the quality of any digital art, the kind of HDRI map used is essential to achieving a realistic and convincing result. It affects the entire mood of the project and environment lighting. For my shots I used different HDRI images to capture the different moods of each shot.

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<sup>25</sup> Bloch, Christian. *The HDRI Handbook 2.0: High Dynamic Range Imaging for Photographers and CG Artists*. Erscheinungsort nicht ermittelbar: Rocky Nook, 2012.

<sup>26</sup> “High-Dynamic-Range Imaging.” Wikipedia. Wikimedia Foundation, October 10, 2019. [https://en.wikipedia.org/wiki/High-dynamic-range\\_imaging](https://en.wikipedia.org/wiki/High-dynamic-range_imaging).

## Surfacing:

The final stage in production is the surfacing stage best known as texturing. It is the generating of believable textures, and just like the lighting phase surfacing is also an important aspect in creating great CGI scenes as it defines the look of the scene in its entirety.

At this phase of the production pipeline I created various textures and materials for all objects in the scene by mimicking how it would look, feel and react to light in real life. Accurate surfacing adds depth and richness into a story, making a three-dimensional world seem more believable and realistic<sup>27</sup>.

The first task in the surfacing phase was to gather photo realistic reference images that would guide the understanding of how each component is to look and react to light. I referenced images of car adverts shot in a studio space and studied how car paint coating is applied to achieve a glossy effect while paying attention to details like dirt, smudge, rust, scratches and how they portray a sense of realism in selling the story. When surfacing, it is important to consider subtle details that provide the audience with information about the age of the object and where it has been, and the addition of details like dirt, dust in the atmosphere and on the object help create a sense of imperfection. Perfection is overrated, nothing in the real world is ever perfectly clean, shiny or symmetrical. By research and close observation of reference images, I was able to determine where exactly details like dirt, dust and smudges should be applied. These details strongly rely on texture maps like the bump and displacement maps which simulate the effects of details on geometry without adding geometry by creating virtual bumps on an object surface, the

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<sup>27</sup> Beck, Bobby. "Pro Tips: Surfacing Best Practices." Artella Blog. Michelle Wibowo, October 27, 2017. <https://blog.artella.com/index.php/2017/10/27/pro-tips-surfacing-best-practices/>.

alpha channel, an 8-bit channel with levels of gray ranging from 0 (black) to 255 (white), where the white acts as the visible area while black acts as a transparent area with the level of gray in between determining the level of visibility<sup>28</sup>, and the reflective maps – an efficient image-based lighting technique for approximating the appearance of a reflective surface through a precomputed texture image to create a convincing and realistic looking result<sup>29</sup>. The reflective map in other words helps control the glossiness of the image by how light reacts and bounce off the textured surface. For most of the textures used in my project, I used already existing material assets I purchased or downloaded and used Adobe's Photoshop CC editing tools to generate normal, bump maps and seamless textures.

## POST PRODUCTION

The last step is polishing the animation renders using sound design, compositing, editing, and color grading tools, all of which makes up the post-production. Post-production is a crucial step for making sure an animation or footage looks perfect<sup>30</sup> and production ready. In this stage I used multipass elements such as z-depth, shadow, transparencies, caustics, global lighting, lighting, reflection, object selection and refraction to control color correction. These elements are

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<sup>28</sup> “Www.axialis.com.” *Www.axialis.com* (blog). axialis, n.d. <https://www.axialis.com/tutorials/tutorial-misc001.html>.

<sup>29</sup> “Reflection Mapping.” Wikipedia. Wikimedia Foundation, September 6, 2019. [https://en.wikipedia.org/wiki/Reflection\\_mapping](https://en.wikipedia.org/wiki/Reflection_mapping).

<sup>30</sup> “CGI Animation & Visual Effects: Post Production.” REWIND. rewind. Accessed October 19, 2019. <https://rewind.co/services/post-production/>.

rendered in addition to the beauty-pass, a full-color rendering of the subject<sup>31</sup>. They are calculated separately and superimposed on the basic textures in a precise blending mode, to give us the image that we consider final, in which all the effects are assembled together and delivered to us by Cinema 4D, already "packaged" in a unique and indivisible realistic image<sup>32</sup>. Each effect can be manually superimposed to achieve the same final render with the advantage of having a more flexible control of each individual channel during the post-production phase. The most important channels are that of the object and material selection which allows for easy selection and editing like the change of color, brightness, contrast, and saturation on a single render object. Using photo and video editing tools like Adobe Photoshop and DaVinci resolve, great compositing can make a good rendering look outstanding. Once I completed the compositing stage, I moved to the editing phase, where sections of all my rendered animation footage were manipulated and rearranged to create a video and audio sync that transitions between clips to create a final animation video ready for media consumption.

## NEW TECHNOLOGIES AND HOW THEY COULD AFFECT CHANGE

The automobile commercial is a growing market in the CGI and digital art creative industry and the technologies used in creating these automobile commercials keep advancing in how customers interact with products. Many automobile manufacturing companies have already switched from a traditional video location shooting to full CGI adverts or a mix of both to drive

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<sup>31</sup> Birn, Jeremy. *Digital Lighting & Rendering*. 2nd ed. Berkeley, CA: New Riders, 2006.

<sup>32</sup> "Angelo Ferretti." Angelo Ferretti (blog). Angelo Ferretti, 2014. <https://angeloferretti.blogspot.com/2014/05/tutorial-multipass-vray-cinema4d.html>.

down the costs of production since the automobile CGI offers significant time and money saving solutions. New technologies such as real-time raytracing rendering technology which allows for faster iteration and a broader range of experience throughout the design process. The Unreal real-time raytracing rendering technology uses a method of determining the color of each pixel in a final render by tracing the path of light from the camera as it bounces around a scene, collecting and depositing color as it goes. The technology mimics the physical behavior of light, details in shadows and reflections from off-screen objects to deliver a much more photorealistic result than rasterization render which is a rendering method traditionally used in-game engines before the advent of real-time ray tracing. The real-time ray tracing rendering technology was used in a project collaboration with Epic Games, NVIDIA, and Porsche to launch the speed of light, Porsche 911speedster concept<sup>33</sup>. This technology can help make real time changes while rendering to save an immense amount of production and rendering time for automobile advertising.

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<sup>33</sup> Cañada, Juan. "Real-Time Ray Tracing in Unreal Engine: Part 1 - the Evolution." Unreal Engine, September 5, 2019. <https://www.unrealengine.com/en-US/blog/real-time-ray-tracing-in-unreal-engine-part-1---the-evolution>.





Fig 1.6

Cañada, Juan. The Speed of Light Showed off Ray-Traced Translucent and Clear Coat Shading Models. Unrealengine.com. unreal engine, September 5, 2019. <https://www.unrealengine.com/en-US/blog/real-time-ray-tracing-in-unreal-engine-part-1---the-evolution>.

Digital technology is reaching an exciting crossroads, where modern technology and innovation are ushering in big changes for those who build and sell automobile vehicles. Augmented reality and virtual reality are some of the technologies that create a new means by which automobile manufacturers convey their products to clients through new experiences. They enhance the presentation and design process through real-time technologies that incorporate remote collaboration of 3D visualization and on-the-fly built-in customization which allows clients and customers to have an immersive experience in a synthetic environment. Augmented reality is defined as any system that combines the real and virtual worlds where a user immerses inside a virtual environment that enriches a digital experience<sup>34</sup>. Virtual Reality (VR) is defined as the use of computer technology to create a simulated environment. Unlike traditional user interfaces, VR

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<sup>34</sup> Azuma, Ronald T. "A Survey of Augmented Reality." *Presence: Teleoperators and Virtual Environments* 6, no. 4 (1997): 355–85. <https://doi.org/10.1162/pres.1997.6.4.355>.

places the user inside an experience instead of viewing a screen in front of them, users are immersed and able to interact with 3D worlds<sup>35</sup>. Engineers could use augmented and virtual reality as a visualization and training aid tool that helps in developing automobile vehicles easier and faster, which allows for easy customization by clients saving time and money.

In an article by automobilemag.com, Ford announced that its designers were using the HoloLens, an augmented reality device by Microsoft to help them quickly change the size, shape, and texture of different design elements without the need to spend weeks or even months working up a new clay model. Ford designers use the augmented reality technology which appears as a hologram and allows a team to scroll through various design changes to see how they look from different angles. By strapping on a wireless headset, designers can see, edit and interact with vehicle elements in a virtual world using a real vehicle as a backdrop<sup>36</sup>. Also, the automobile manufacturing company Genesis, which took the owner's manual out of the glovebox and into an interactive smartphone app, allowing its drivers to use virtual reality tracking technology to give drivers information about many parts of their vehicle by generating a 360-degree virtual reality experience of the car's interior, allowing the user to move his or her smartphone around the interior to learn more information about different components<sup>37</sup>.

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<sup>35</sup> Bardi, Joe. "What Is Virtual Reality? VR Definition and Examples." Marxent. marxentlabs, July 3, 2019. <https://www.marxentlabs.com/what-is-virtual-reality/>.

<sup>36</sup> Woodard, Collin. "Ford Now Using Holograms to Design New Models." Automobile, September 21, 2017. <https://www.automobilemag.com/news/ford-now-uses-holograms-to-design-cars/>.

<sup>37</sup> Pleskot, Kelly. "Genesis Virtual Guide Brings Augmented Reality to the Owner's Manual." Automobile, August 7, 2017. <https://www.automobilemag.com/news/genesis-virtual-guide-augmented-reality-owners-manual>.

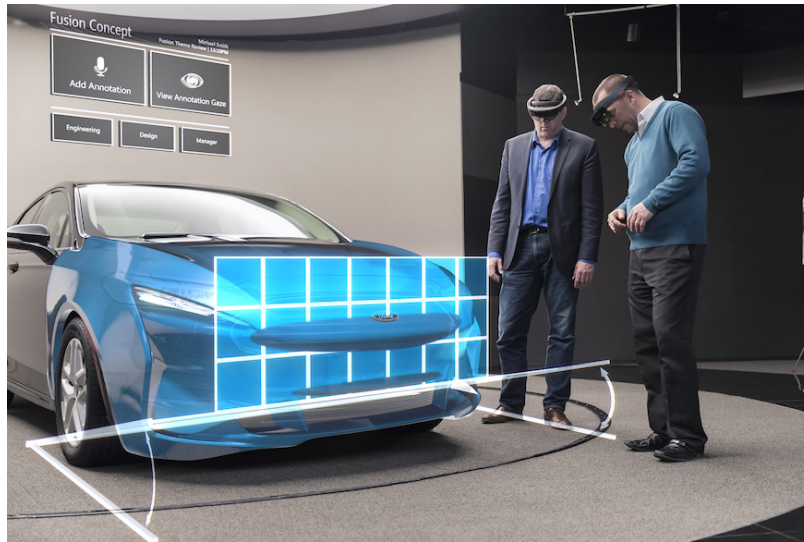


Fig 1.7

Woodard, Collin. *Ford Hologram Design Augmented Reality*. *Www.automobilemag.com*. automobilemag, September 21, 2017. <https://www.automobilemag.com/news/ford-now-uses-holograms-to-design-cars/>.

In today's environment, VR and AR might be seen as the white knight in this age of advertising tools and technology, but a new form of advanced technology device merged with motion capture tech is breaking grounds in the digital car advertisement industry which allows for car advertisements to be shot on location without the actual car. This device is called “The Blackbird”, a battery-powered automobile rig with a fully adjustable wheelbase, track width, and suspension setup to mirror any car. The Blackbird was created by the Mill, a London based visual effects company known for making some of the world’s best commercials. The most critical aspects for making a CGI car look real are the vehicle’s driving sequences and wheel movement, but with the Blackbird, both are malleable, with it adjustable features of up to four feet in height and width up to ten inches. The blackbird rig basically becomes any cars physical footprint that can interact with the road and environment the same way a real car would with its dynamic steering, wheel rotation and shadows. From there, it’s much easier to throw in a CGI

body of the desired advertised car. Also, the Blackbird has a large hookup of stabilized cameras that captures a full view of everything around it to create a 360-degree digital map that can be used in the 3D environment<sup>38</sup>. Thompson Alistair, the international executive vice president for the Mill, stated in a Newsweek magazine blog post - "The Blackbird can be used to create a virtual reality showroom where viewers can see how a car handles on an actual location but would also have the ability to switch the colors and other details inside and out, which is a new level of interactivity that will change the process of buying a car"<sup>39</sup>. The Blackbird recently was used in the 2018 Chevrolet Equinox car advertisement that was produced by the Mill visual effects company.

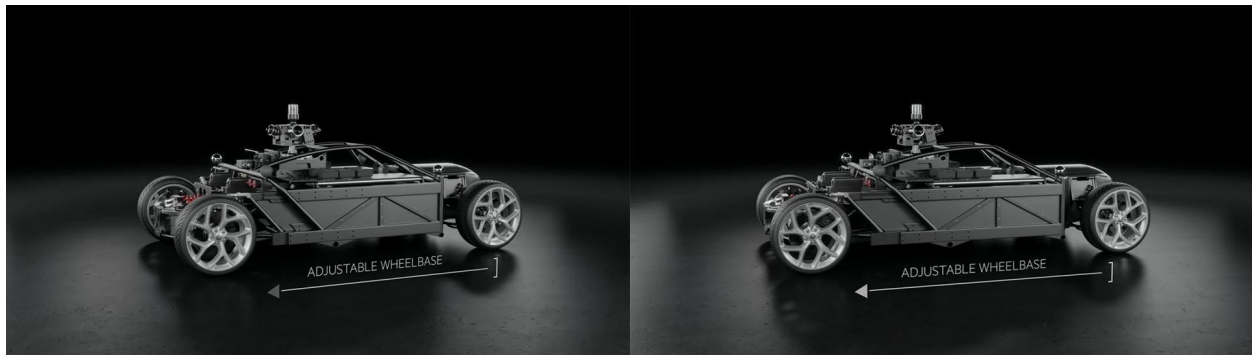


Fig 1.8

*A Rendering of How the Wheelbase Extends. Jalopnik.com. The Mill, September 7, 2016. <https://jalopnik.com/the-secrets-of-the-rig-that-can-transform-into-any-car-1786339083>.*

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<sup>38</sup> Orlove, Raphael. "The Secrets Of The Rig That Can Transform Into Any Car." Jalopnik. Jalopnik, September 7, 2016. <https://jalopnik.com/the-secrets-of-the-rig-that-can-transform-into-any-car-1786339083>.

<sup>39</sup> Miller, Stuart. "The Blackbird Can Be Any Car It Wants to Be." Newsweek. Newsweek, February 12, 2017. <https://www.newsweek.com/2017/02/17/blackbird-can-be-any-car-it-wants-be-553295.html>.

These new forms of technologies will create greater opportunities for marketing the Kantanka cars by reshaping and impacting how their commercial adverts can be made more versatile to boost sales by appealing to different consumer markets.

Although digital technology is helping improve the quality of advertising around the world, it is however growing at a snail's pace due to the lack of recognition from digital art corporations and the mindset of many Africans in recognizing the importance of quality art and advertisements in general. Many African businesses don't see the importance or worth of investing in a quality digital art advert that can compete with advertisements from international brands. Although the younger generations in Ghana have now embraced the digital art culture and are keen on creating quality art that competes on the international platform, their progress is hindered because there's not enough exposure and support from these digital art and technology corporations to help promote young talents from Ghana and other African countries in obtaining recognition and gaining access to fully licensed software with its after-sales services from developers. This is as a result of the absence of vendors or retail locations for the various design software corporations. Also, a major issue affecting the growth of digital arts communities in Ghana is the absence of a giant digital art and technology software corporation like Adobe, Autodesk, Maxon and others, sponsoring in digital art hosted events and workshops like the MESH Confab, a digital art platform that highlights the creative and innovative ideas and the people behind those ideas, and serving as a portal for discovery, networking and a source of inspiration also<sup>40</sup>, conferences like SIGGRAPH, International broadcasting convention (IBC) shows, electronic entertainment expo E3, National Association of Broadcasters (NBA), FMX

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<sup>40</sup> "About." MESH Creative, September 15, 2014. <https://meshgh.com/about/>.

conference, GV Expo, Adobe Max, 3d design plus motion tour and others, if introduced to Ghana and other African countries will go a long way to promote the importance of digital art, ensure it's steady growth and interest to corporate market and be a source of networking and inspiration for many young talents.

## CONCLUSION

Through my journey in creating this project, I was faced with an immense number of challenges, from the three-dimensional modeling of the car to final post production phase. The three-dimensional modeling proved very difficult for me due to the mere fact that I couldn't acquire the original blueprint of the Kantanka Mensah model, which forced me to resort to eyeball modeling using still images of the car I found online, which made my workflow challenging and resulted in creating several iterations and having to undergo long hours of vehicle modeling training and researching. Another challenge I faced was the bureaucracy in setting up a meeting with the CEO of Kantanka communicating back and forth with the marketing department. This meeting was necessary because nothing is approved unless it goes through the CEO of Kantanka, but it proved fatal after several tries to reach out to him. Also, by understanding the animation production workflow, I was able to prioritize my workflow and know my weaknesses and strengths in creating a three-dimensional work and animation. I discovered the importance of having a team with each member having a unique skill in developing the CGI production animation. Furthermore, I have grown as a creator and an artist by pushing myself and design

abilities to newer heights by taking on this daunting task to create a better and more dynamically appealing advert and also by learning how best to research and relate the CGI creating process to real-life problem solving.

In summary, I strongly advocate for the inclusion of CGI in the commercial marketing sector of developing countries like Ghana to help push its local brands and products to the international markets with an appealing and memorable visualization to improve the credibility of made in Africa brands and value goods. This in turn will help create more job opportunities and help stabilize growth in the economy solving one of Africa's biggest problems.

## BIBLIOGRAPHY

- “About.” Corona Renderer. Chaos Czech , 2019. <https://corona-renderer.com/getting-started>.
- “About.” MESH Creative, September 15, 2014. <https://meshgh.com/about/>.
- “Angelo Ferretti.” Angelo Ferretti (blog). Angelo Ferretti, 2014. <https://angeloferretti.blogspot.com/2014/05/tutorial-multipass-vray-cinema4d.html>.
- Appiah, Edwin. “Blame Kantanka Automobile for Low Market Penetration - Gabby.” MyJoyOnline.com. Accessed September 15, 2019. <http://www.myjoyonline.com/news/2018/September-3rd/blame-Kantanka-automobile-for-low-market-penetration-gabby.php>
- Azuma, Ronald T. “A Survey of Augmented Reality.” Presence: Teleoperators and Virtual Environments 6, no. 4 (1997): 355–85. <https://doi.org/10.1162/pres.1997.6.4.355>.
- Bardi, Joe. “What Is Virtual Reality? VR Definition and Examples.” Marxent. marxentlabs, July 3, 2019. <https://www.marxentlabs.com/what-is-virtual-reality/>.
- Beck, Bobby. “Pro Tips: Surfacing Best Practices.” Artella Blog. Michelle Wibowo, October 27, 2017. <https://blog.artella.com/index.php/2017/10/27/pro-tips-surfacing-best-practices/>.
- Birn, Jeremy. *Digital Lighting & Rendering*. 2nd ed. Berkeley, CA: New Riders, 2006.
- Bloch, Christian. *The HDRI Handbook 2.0: High Dynamic Range Imaging for Photographers and CG Artists*. Erscheinungsort nicht ermittelbar: Rocky Nook, 2012.
- Cañada, Juan. “Real-Time Ray Tracing in Unreal Engine: Part 1 - the Evolution.” Unreal Engine, September 5, 2019. <https://www.unrealengine.com/en-US/blog/real-time-ray-tracing-in-unreal-engine-part-1---the-evolution>.
- “CGI Animation & Visual Effects: Post Production.” REWIND. rewind. Accessed October 19, 2019. <https://rewind.co/services/post-production/>.
- Childs, Nick. “Marketers Should Look Beyond the Dazzle of CGI and Embrace Storytelling.” Adweek. Adweek, December 14, 2015. <https://www.adweek.com/brand-marketing/story-these-2-car-ads-shows-new-creative-directions-marketers-should-explore-168567/>.
- Chun, Russell. “Frame-by-Frame Animation .” adobepress. Adobe Press, March 25, 2017. <http://www.adobepress.com/articles/article.asp?p=2755709&seqNum=14>.



- “Definition of Digital Media .” Confluence, April 12, 2011.  
[https://wikispaces.psu.edu/display/IST432SP11Team14/Definition of Digital Media](https://wikispaces.psu.edu/display/IST432SP11Team14/Definition+of+Digital+Media).
- Dunnell, Tony. “Black Star Square.” Atlas Obscura. Atlas Obscura, October 25, 2018.  
<https://www.atlasobscura.com/places/black-star-square>.
- Fischler, Ben. “How to Think When You're Thinking about Lighting...” Artella Blog. Artella, August 26, 2019. <https://blog.artella.com/index.php/2016/04/25/143393256306/>.
- “High-Dynamic-Range Imaging.” Wikipedia. Wikimedia Foundation, October 10, 2019.  
[https://en.wikipedia.org/wiki/High-dynamic-range\\_imaging](https://en.wikipedia.org/wiki/High-dynamic-range_imaging).
- Hyman, Izzy. “Www.izzyvideo.com.” *Www.izzyvideo.com* (blog). IZZY VIDEO, March 9, 2011.  
<https://www.izzyvideo.com/three-point-lighting/>.
- Jagadisha, Rohit. “Master the Art of Lighting a 3D Scene.” Creative Bloq. Creative Bloq, January 20, 2015. <https://www.creativebloq.com/3d/master-art-lighting-3d-scene-11513961>.
- Kerlow, Isaac Victor. *The Art of 3D Computer Animation and Effects*. 4th ed. Hoboken, NJ: Wiley, 2009.
- Lee, Tina. “CPU vs. GPU Renderer: Which Is Better?” TDU, April 22, 2019. <https://td-u.com/cpu-vs-gpu-renderer-which-is-better/>.
- Miller, Stuart. “The Blackbird Can Be Any Car It Wants to Be.” Newsweek. Newsweek, February 12, 2017. <https://www.newsweek.com/2017/02/17/blackbird-can-be-any-car-it-wants-be-553295.html>.
- Okun, Jeffrey A., Susan Zwerman, Kevin Rafferty, and Scott Squires. *The VES Handbook of Visual Effects Industry Standard VFX Practices and Procedures*. Seconded. Burlington, MA: Focal Press, 2015.
- Orlove, Raphael. “The Secrets Of The Rig That Can Transform Into Any Car.” Jalopnik. Jalopnik, September 7, 2016. <https://jalopnik.com/the-secrets-of-the-rig-that-can-transform-into-any-car-1786339083>.
- Ovrick, Jacob. “Pro Tips: 3D Modeling Best Practices.” Artella Blog. Bobby Beck, August 26, 2019. <https://blog.artella.com/index.php/2017/10/18/pro-tips-3d-modeling-best-practices/>.
- Pleskot, Kelly. “Genesis Virtual Guide Brings Augmented Reality to the Owner's Manual.” Automobile, August 7, 2017. <https://www.automobilemag.com/news/genesis-virtual-guide-augmented-reality-owners-manual>.

Ravishankar , Jayaramamurthy. “What Is the Difference between VFX and CGI?” What-is-the-difference-between-VFX-and-CGI. Quora, November 11, 2015.<https://www.quora.com/What-is-the-difference-between-VFX-and-CGI>.

“Reflection Mapping.” Wikipedia. Wikimedia Foundation, September 6, 2019. [https://en.wikipedia.org/wiki/Reflection\\_mapping](https://en.wikipedia.org/wiki/Reflection_mapping)

Ruhlmann, Danny. YouTube. YouTube, August 14, 2012. <https://www.youtube.com/watch?v=in-ijTLgQtg>.

Staff, Artella. “PRE-PRODUCTION - STEP 2: PREVIS.” Artella Blog. Artella, August 26, 2019. <https://blog.artella.com/index.php/2016/04/07/142425286786/>.

Slick, Justin. “Shining a Light on Rendering Terminology.” Lifewire. Lifewire, March 25, 2019. <https://www.lifewire.com/rendering-terminology-explained-2012>.

West, Gillian. “Audi Turns to CGI to Introduce Latest Audi Sport Model with Cinematic Campaign.” The Drum. Carnyx Group, April 30, 2015. <https://www.thedrum.com/news/2015/04/30/audi-turns-cgi-introduce-latest-audi-sport-model-cinematic-campaign>.

“Why Are Ngons and Triangles so Bad?” Pluralsight, October 1, 2014. <https://www.pluralsight.com/blog/film-games/ngons-triangles-bad>.

“WHY CGI?” Think Chromatic. Think Chromatic. Accessed September 13, 2019. <https://www.thinkchromatic.com/why-cgi>.

Woodard, Collin. “Ford Now Using Holograms to Design New Models.” Automobile, September 21, 2017.<https://www.automobilemag.com/news/ford-now-uses-holograms-to-design-cars/>.

“Www.axialis.com.” *Www.axialis.com* (blog). axialis, n.d. <https://www.axialis.com/tutorials/tutorial-misc001.html>.