Compositing and Rotopainting in a Short Film

Jaime Mundo
Clemson University

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COMPOSITING AND ROTOPAINTING IMAGES INTO A SHORT FILM

A Thesis
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Masters of Fine Arts
Digital Production Arts

by
Jaime Mundo
August 2016

Accepted by:
Dr. Victor B. Zordan, Committee Chair
Dr. Donald House
Dr. Brian Malloy
ABSTRACT

Mundo, Jaime A. MFA., Clemson University, August 2016. Digital Compositing in Film. Professor: Victor Zordan.

The purpose of the present project was to use visual effects to enhance a film and save production finances and resources. Using visual effects, digital compositing, and rotopainting impacts the real-world challenges in the filmmaking process as it saves the company money by not having to purchase props, costumes, and hire extras on set. Also, they can film in minimum locations by employing the use of green screens. Traveling fees would be lower, and in a low budget film like this project is presenting, saving money is the most important aspect in finishing and releasing it.

FisherFilms directed two films: one a music video for a local Columbia band called Cherrycase, and the other a short film that was nominated in the Expecting Goodness film festival in Spartanburg, SC. After the brainstorming stage, the company found a story arc that fit the song message and explored a historic event in South Carolina’s long history. The project was ambitious and, in order to pull it off, they would have to attain many extras, costumes, props, and ideal locations. The company knew that this would take the low budget film over a price they could afford. Once the problems were addressed, several meetings occurred to discuss the best process to solve them. One approach was to bring in a visual effects artist or team to use technology to overcome the monetary challenges of the film.

Using Digital Composition to compose visual effects (VFX) elements into the film became the goal of the project. Rotopainting is a highly effective tool that was used in both FisherFilms projects. With the use of green screens and matte paintings, the locations of the actors and sets could be composited into
anything. An interesting trick was to duplicate the extras and props in order to fill the backgrounds of scenes.
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CHAPTER ONE: INTRODUCTION

Introduction

“A massive spacecraft hovers over New York, throwing the entire city into shadow. A pair of lizards, sitting in the middle of a swamp, discuss their favorite beer. Dinosaurs, long extinct, live and breathe again, and the Titanic, submerged for decades, sails once more” (Brinkmann, 1).

This quote explains the magic of visual effects, or more specifically, digital compositing. In order to create the magical images that capture an audience’s imagination and help tell the director’s story, technology must be employed in the background to make them come alive. In the Cherrycase music video, a variety of compositing methods were used depending on the scene. This project will discuss each method in detail and the steps in accomplishing the compositing production from what was film into the final shot, including digital or compositing elements.

The Project

The Cherrycase music video is a FisherFilms production and all of the visual effects, compositing, and rotoscoping were done by Jaime Mundo with help from Jeremiah Polk on the gunshot battle scenes and Justin Kern on the computer-generated smoke. The video is for a song called “War Song” and the plot of the video concerns the preparation and event of a battle during the American Revolutionary War. The budget for the film was limited and the solution decided upon was to use visual effects to create the realistic feeling that a project like this required. The British army needed to feel large, while
the American army’s camp needed more tents and more soldiers in the
background. As costumes would cost the filmmakers to go over budget,
creating composite replicas of the soldiers in their costumes with VFX would
be a useful tool to save money.

In a quick preview of this research, a variety of useful tools needed to
digitally composite multiple images, digital elements, and visual effects
together will be discussed, researched, and explained. Through the examples
of real-life Hollywood movies, it will be shown that the same techniques are
used to solve problems that benefit the film in an impactful way. The main
compositing techniques used in this music video project will be explained,
examined, and discussed. Rotoscope, nodes, tracking, green screen, visual
effects, and duplicating multiple images together were some of the most basic
elements and tools the project used to accomplish the finished product.

The results will be viewed and then the pros and cons addressed with
suggested improvements or criticisms of mistakes made in the process for
any future work in this field. Hopefully, an understanding of basic digital
compositing will be understood, and the importance of using it to solve
problems in modern movies will be embraced. Being able to fix any
shortcomings in the filmmaking process through the use of compositing will
be a benefit to the final product of the film.
CHAPTER 2: BACKGROUND

Intro to Compositing

Digital Compositing is the art of creating images using images from a variety of different medias and formats. In this project, Foundry’s Nuke software was used and is described below. Nuke is one of the industry leaders in compositing software for media and entertainment such as television and film. The main leaders in visual effects studios, such as ILM, Digital Domain, MPC, Sony Pictures Imageworks, and Weta Digital, all use Nuke as their main tool for compositing and creating images for their projects. Nuke is a node-based workflow program: you start with the initial image as a single node, and then add more nodes upon it to create the nuke tree. Each node performs a very specific and simple function to act on the next node. Examples of node tasks include color correction, blur, track, rotoscope or rotopaint, zoom, crop, camera track, etc. The Cherrycase music video experiments with a few of these functions to create the magical effect of movies.

The basic task of the nodes involved in this project is transform, a task that can rotate, skew, scale, or position an image. This node is important for the process of compositing two images into one, because it can adjust the size of one image or element to the correct scale of the other. Merge is the node that actually combines both images into one. Color correction is an important series of nodes to learn as it can make an image lighter, darker, more or less saturated, or change the contrast. It is a tool that is useful to create the same color range in both images, so that they look like they belong together. If the audience is tricked into believing this, the digital effects that are added will be believable. Color correction can make or break a composite.
Tracking is a technique that is useful in compositing digital images because in film, unlike photographs, objects and people are constantly in motion. Thus the need for tracking these movements in order for one image or rotopaint to correctly react with another.

Rotopaint or rotoscope are techniques that have been used for many years. Because computers are unable to think as humans do, the need for these tools will remain. It allows the artist to outline the object or subject that needs to be extracted. In the past, the VFX artist would cut the frames by hand. However, we can now use Nuke in order to create the outline and track it frame by frame to create accuracy. In this particular project, rotoscoping was both the most important tool and the tool that was used the most in terms of hours absorbed. Rotopainting can also be animated to move along a moving object or subject in the shot. The points in the outline can also be pulled apart to reveal a dotted line that will slowly blend the outline of the extracted object with the image in another layer of the composite.

Green screen or blue screen is a concrete tool used on set during filming that the visual effects team can later on compose any elements or digital effects onto. Green screens make the compositing job much easier because the color can be removed, leaving an empty transparent layer that will reveal the second layer. In an ideal world, the need for rotopainting would be unnecessary because of green screens. However, not every shot can take full advantage of blue and green screens. Rotoscope is still an important tool in compositing images. The difference between blue and green screens concerns the location of the actual filming. In the studio, the use of green screen is much more common because you can remove green without having to worry about aspects such as skin tone or hair color. However, in an outdoor setting where there is a large amount of green vegetation that most likely should not be keyed out of the scene, a blue screen is much more useful. In the case of
this project, a green screen is what we had to work with, which created some issues for the compositing during the post-production of that scene.

**Duplicating Copies**

In films, compositing has been used to create duplicates, such as the twins in the *Parent Trap*, or a “dream or conscience” replica of the main character. In *Harry Potter and the Deathly Hallows: Part 1*, the movie has a scene where several of the main characters take a potion to transform themselves into Harry Potter. The scenes were shot at the same location and same angle, but with Daniel Radcliffe in a different costume each time. The scenes were then composited one over the other so that all of the different Radcliffes would coexist in the same scene. The challenge was that any crossovers would have to be taken into account if rotoscoping was necessary. The main challenge the VFX artist had was the transformation into Harry Potter, where a mix of animation, color correction, blur, and tracking techniques were used. Blur is especially important in using different scenes to ensure that any inconsistencies with lighting or color were blurred to become undetectable to the human eye. Color correction was used to make sure the lighting of each Harry was consistent with each other and the source light. By filming the scene with the same light, in the same set, the amount of blur and CC (color correction) was a fair minimum and a major benefit in using this technique.
Figure 2.1: The final product of the duplicate composite using seven layers of the actor.

Intro to Rotoscope

The science behind rotoscoping and rotopaint was first introduced in early animations of Mickey Mouse and Snow White and the Seven Dwarfs. The animators would adapt this skill in order to speed the animation process and save the studio production time. In an animation, every frame per second has to be drawn out with 30 to 40 frames per second, a long and tedious process. The rotoscoping technique began by filming live actors performing the scene using the mannerisms, facial expressions, and body movements of the character. The next step was to trace out the animated characters by using the actor’s movements and facial expressions, though artist liberties would be applied. Throughout the years, the rotoscope technique continued to evolve and soon became an important tool in live-action films. Alfred Hitchcock’s The Birds and Walt Disney’s Mary Poppins began using the technique in order to remove wires and strings from props and actors to create the appearance of flight. The VFX team would use rotoscoping on each frame to manually remove the wire on the main actor’s body. In one frame, the goal was to remove the wire without removing anything else of importance in the scene. The actors filmed in front of a blue screen, so that when the wire was removed, only the blue screen would be affected by the removal process. The next step was to project the background elements onto the blue screen, thus
creating the appearance of Mary Poppins flying. Even though the rotoscope technique is longstanding, it has never been dated because it has been adapted to create new effects and constantly impressed the audience and captured the imagination of the director’s vision. The lightsaber in the *Star Wars* series is a testament to that statement. In filming, the lightsaber was no more than a simple stick that was used to film the fight scenes. The stick was removed by rotoscoping and the artists were then able to give the “stick” an added glow and color.

![Figure 2.2: A side-by-side image of the live-action scene used to trace the animation scene.](image)
Figure 2.3: The animation layer overlaying the live-action layer used to trace.
Figure 2.4 & 2.5: the picture on the left shows after blue screen and removal of wires, while the right shows poses of Mary Poppins hanging on her harness.
Using green and blue screens, filmmakers have been able to travel across the globe, to the far reaches of space, and to different time periods without having to leave their Los Angeles film studios. Green screen allows the filmmakers to project any matte paintings or visual effects onto the background of a scene. Mary Poppins can exist in a cartoon dream world, or an ancient building that no longer exists can be brought back to life without any physical construction, saving studios manual labor, construction cost, and time. The benefits also include the fact that you can take liberties with the background at any time such as making a building larger or smaller, rotating it, changing the color, or tweaking the overall style.

In Disney’s new live-action adaptation of The Jungle Book, blue screen was so heavily used that in some scenes only the character Mowgli and the prop he is standing on are real. With the challenge of creating a live-action movie, you have many options to choose from as the studio could travel to the jungle and film on location. If filming on site, you have to work with what is available, and the artistic liberties are limited. With a story as magical as the Disney original, filming in the real-life jungle would remove those elements,
and the magic of Disney might not be as pronounced to the audience. Jon Favreau, the director, made the following statement: “The idea of going out to the jungle and shooting this just felt like it wouldn’t have the magic [the original] had. There was a dreamlike quality to it…and so I wanted to make sure we preserved that” (gizmodo). Because the film heavily relied on digital elements, the storyboarding and layout were very important. Cutting scenes in a production using this technique would end up costing more. However, the filming process is many times simpler: only one actor was required to show up on filming days. Even with the cons, the film was able to capture the dreamlike quality of the original by adding digital elements to the background and making the jungle feel almost magical to the audience.

To avoid the fake look of movies that rely mostly on digital elements, the studio built slices of sets, mostly whenever Mowgli needed to physically touch or interact with something. The Computer Graphics (CG) came first, then the small sets or slices were built once they knew how much was needed. Blue screen was also used instead of the traditional green screen because of the amount of green plants that would be added to the set.
Figure 2.7: The main actor on a completely blue screen set where he is the only real element.

Figure 2.8: Slices of set were used to blend the real elements with the digital ones.
A valuable technique in the industry that was used in this project is compositing visual effects into live action. Visual physical effects include smoke, fire, and water, and it is necessary to blur, blend, and color correct in order to composite these into a shot. Rotoscopying and green screen may also be used. In the film *The Avengers*, many of the explosions are CGI and the filmmaker had to composite them into live action in order to appear realistic and make the viewer feel like the effects physically existed within the scene. In live-action movies, the believability of the film relies heavily on the compositing of the effects into the background and how the effects react to the characters or object in the scene. The filmmakers in modern superhero blockbusters are able to mix real-life practical effects and use the visual effects to enhance it. In the movie *Inception*, effects were integrated into the practical effects of what was filmed on site. The audience’s eye cannot detect what is real and what is not, leading them to believe that everything within that world is real. Thus, the technique is successful and the filmmakers have achieved what they set out to do.
Figure 2.9: Before and after in compositing and blending effects into The Avengers.

**Intro to “War Song”**

The company FisherFilms based in Columbia, SC began to explore more ambitious projects with their films, whether it was filling up a soccer stadium full of fans in one of their award-winning films or creating VFX gunshots and smoke in a family drama short. The project that started their adventure into the world of visual effects was a music video for a popular local band, Cherrycase. After recording “War Song,” the band and the studio wrote down the concept of a Revolutionary War piece to capture the setting of romantic elements. The music video would feature plantations, exterior and interior locations, fireplaces, a campfire, and battle scenes, and the lead singer
and band members would travel to the different locations. The plantations and mansions needed to feel as if they belonged in eighteenth-century America, and the battle scenes required gunshots, bloody wounds, and even smoke in the background. The biggest challenge was making the army feel huge with limited resources (costumes, tents, extras). The two most challenging scenes involved campfires and different sections of the campground, with one scene consisting of only a few tents on set.

Starting with the campground scene, the scene has one tent and a campfire, along with a moving bucket. The director desired more tents and extras to exist in the set to make the army appear larger. Using Nuke, other scenes that were filmed were composited into the background and given a blur to create the appearance of distance. During filming, no green screen was used to project background scenes, so rotopaint was employed in order to cut out the foreground elements to reveal the background scene. The main challenge that will be explained later in detail was that, during the scene, the actor bumps into a bucket, creating movement. This means that the rotopaint design could not be used for every frame and the rotooning needed to track into individual frames due to the reaction.

Another scene in the film included a different section of the campground with the campfire as the foreground element and an empty background. The army did not appear as large as the filmmaker desired. Challenges included adding other scenes and rotating and zooming in order to make it appear there were many different tents. Rotoscoping was used to cut out the foreground elements, and this scene ended up carrying the most layers in the music video as each tent was on a different layer, creating problems that required blur and color and lighting correction in order to achieve the illusion that this scene existed in the real world. The main challenge in this scene, and the music video in general, was the director’s decision to use real smoke and not CGI smoke. The young company believed that using real smoke would be
a benefit during filming and in the final look of the product. In the compositing stage, however, it created a huge dilemma with the multiple layers and rotopaint grids being used. The smoke would completely disappear in some areas as if they were going behind an invisible wall that the audience could not see. The solution was to add CGI smoke along with the real smoke and use technique to blend the smoke together. With color correct, animation tracking, and blurring, the final product was able to produce the movie magic of real smoke.
CHAPTER 3: IMPLEMENTATION

Battleline Scene

In the initial British army shot, the army marches from behind a hill to reveal many soldiers before they slowly proceed to march down the hill. The filming was done using a tripod to steady the camera position in the same angle and view. Ten shots were filmed with the five actors rearranging themselves. In order to track or note the soldiers’ locations, a branch was used and constantly moved down the frame. In each shot, the actors changed order and began where the branch was positioned. The branch was then moved to the last actor in the lineup in order to set up the next shot.

Figure 3.1: One layer of one frame of the army battle line scene.

After the filmmakers solved the problems on the set of the film, the rest of the issues were fixed in the studio. Using Nuke, each shot was laid on top of
each other and adjusted slightly to match up. Several problems arose after the first step. The first issue was that some soldiers overlapped others, and the chosen solution was to rotoscope those particular soldiers completely out of the scene. Problem number two occurred when a particularly long piece of grass in the foreground blew slowly in the wind behind layers of shots. In order to solve this issue, the layer where the grass created the least amount of problems was used to solve some of the difficulty of blending. Problem number three occurred when some of the background sky did not appear to match up along the horizon: sharp lines could be found, giving the appearance of a fake or digital world. In rotopaint, the ability to slowly blend the variety of layers and frames is a tool. By pressing the key lock of the rotopaint grid, a dotted line reveals that the image is becoming more transparent and blended. By using this technique, the layers in each frame were blended perfectly into each other, thus revealing the day sky that the audience would expect.

Figure 3.2: A rotopaint shot of adding the layers together with a small blend.
Campground Scene

In both the campground scene and the following campfire scene, only a few tents were available for filming. Therefore, only four tents were filmed in the actually scene. The main actors and the campfire with the bucket were also filmed in the shot. The filmmakers had a limited budget for props and costumes, so compositing the tents into the scene and adding extra actors into the background was the ideal solution to the problem.

![Unaltered frame from the campground scene. Empty space behind the bucket needed tents and soldiers. Actor in center moves towards the empty space and needed tracking rotoscoping.](image)

In the shot of the campgrounds, only the right side felt as if it was full of tents, soldiers, and equipment. The final film needed to have more tents and soldiers in the left side as well. The problem needed a compositing solution, so another scene that was filmed was added into the empty left side. Color correction was added to grain the saturation, the lighting was adjusted to match, and the layer was given a blur to give the illusion of distance. Once
the two layers were blended together, the next step was to rotoscope the foreground elements in the shot. In the scene, the bucket—and more importantly the pieces of metal that hold the bucket up—cut right through the newly added layer of the composition. The solution was to rotoscope each piece out. The details of the rotopaint became the first priority. The closer and more accurate the rotopaint became, the more believable the scene was. Once the rotopainting was perfected, an added edge blur was used to blend the foreground elements into the second layer composited.

![Figure 3.4: A rotopaint map of the foreground elements that were cut out of the scene and added background elements such as the tents and soldiers.](image)

After the rotoscoping was complete, the issue of the moving soldier needed to be tackled. The moving soldier starts on the right side of the frame and slowly walks over the new layer on the left before turning back. The character’s layer was pinpointed to be between the foreground elements and the second layer, and, since he is included in the filmed shot, he remains behind the foreground elements, therefore needing no work done there.
However, similarly to the foreground element, the character needed to be cut out using the previous rotoscoping technique. Since the character is moving, the rotoscope needed to follow him along through out the shot. The solution was to key point the beginning, middle, and end, then the middle of those sections, and so on. Once the majority of the rotopaint points followed the character, the artist had a much easier time adjusting the points to make a smooth rotoscope template throughout the scene. Once the character makes it to the other side of the scene, he runs into the bucket, creating reactive movements of the three handles. The handles’ rotoscope outlines needed adjustment to fit with the new movement. Without green screen, this scene took many more hours, hard work, and rotoscoping. The problems were all solved by rotoscoping but could have been benefitted by the use of a green or blue screen to project the composited scene onto.

Figure 3.5: This frame shows the movement of the character and how the rotoscope map needed to track and adjust to follow his outline.
Green Screen Scene

While the majority of the video was filmed in colonial Camden, South Carolina, there was a particular scene that required a plantation style front driveway, which the main character and his father would walk down. The filmmakers had a small green screen on set and were able to have crew members hold it while filming the actor walking. This was all that was filmed and it would eventually lead to many problems in post-production.

Figure 3.6: Small green screen could only fit one actor at a time.
This scene was first addressed and filmed separately by keying the green screen out and rotopainting the rest of the scene that was no longer needed. On the bottom of the frame for both shots, the actors’ legs were not covered up in front by the green screen, so the use of rotopaint was needed. Similarly to the campground scene, the rotopaint points followed along the legs and rifle of the actors. Once the points were found, the tracking began on each frame, beginning with the first and last points, then the middle, before dividing those points into smaller sections, and so on. The frame played out in a smooth motion that did not reveal any mistakes.

The two frames were composited together and, using Nuke, the characters were both moved, so that one was to the left and the other to the right. The aim was to achieve the illusion that they were walking side by side. The stock photograph was composited into the background and color correction was used to combine the actors with the image. A blur effect was used, and some other
techniques such as hue and white point. Edge effect once again blurred the edges to smoothly blend the rest of the scene.

![Figure 3.8: The stock photograph that was used by the filmmakers.](image)

Problems remained, however, as this particular scene did not flow with the rest of the music video in its style, look, and color arrangement. Because of the stillness of the matte photograph, the background gave an emotionless feeling, which the filmmaker believed would destroy the intended illusion of the music and story of the video.
Campfire Scene

In the campfire scene, two major problems arose: the composite of adding in many more tents and the real-life smoke that revealed the trick behind the visual effects magic. In the shot, the only area without tents is directly behind the campfire, so this exact scene was inverted to be composited into the scene. A few more inverted uses of this scene created the illusion of many tents and a larger American army. To create the realistic combination of all these scenes, basic compositing techniques were used: color correction, blur, and edge blur were all added to enhance the piece. However, because all of these new scenes were directly behind the campfire and many metal pieces made up the foreground elements, rotoscope technique was needed to create the correct distance and realistic appearance. The rotoscope was not as complicated as the previous shot because none of the concrete foreground elements moved in any way during the duration of the shot. Therefore, once the metal pieces and the smaller pieces beside the tents were rotopainted out
of the shot to reveal the new layers, it was completed. Details were once again the most important priority in this scene.

Figure 3.10: Rotoscope layout of the original frame shot including all foreground elements that needed to be cut out and visible to the audience.

After the initial rotoscope was completed, a visible problem became apparent in the shot. Because of the use of real-life smoke during filming, the smoke would flow upwards and disappear in the template of the new composite scene, revealing sharp unnatural lines. CGI smoke was thus needed to blend with the real smoke.
Visual artist Justin Kern developed the smoke effect to be used in this scene in order to blend the smoke together. Blur effect and color desaturation were used to blend the CGI smoke with the real smoke to cover the composite errors in the shots. Animation keys were added to the digital smoke to follow along the movement of the real-life smoke, which gave a realistic appearance to the scene.

Throughout the rest of the music video, a variety of other shots were also composited, but nothing as challenging as the previous scenes. The gunshots and small explosions were added, composited, color corrected, blurred, and sometimes rotopainted. The smoke in the background was added to create the appearance of a fire taking place a few miles away. These scenes are very short two-second cuts and were made to look as if a battle took place in the video. There was nothing exceptionally problematic; mostly quick, simple solutions to solve the task.
CHAPTER 4: RESULTS

Figure 4.1: The nuke tree for the battle line scene. Each scene is merged together, and then the rotopaint is merge stenciled with the file.
Figure 4.2: Results of the British army’s battle line.

Ten frame shots were composited together to create the finished product. With the use of Nuke, the shots were blended together with rotopaint. One suggested change that should be noted is the use of the foreground character in every version. Next time, the filmmakers should shoot the actors once and then the next nine versions could be composited. This would overall be a simple shot and only require minimum compositing technique to accomplish.
Figure 4.3: Nuke tree of campground scene. Three scenes merged over each other. A grade, edge blur, and rotopaint using merge stencil were used. Blur and transform were used to manipulate the size of the image. Color correct was used as a node also.
Figure 4.4: Final composite of the campground scene with 2 layers, rotopainted and blended in. Tracking was also used.

The results of this shot show that the American army was slightly larger and busier. The rotopaint created a smooth transition between the two layers, and therefore looked as if it was all filmed on set. Improvement could have been made during filming by using a blue screen on set. With a blue screen, the key color range could be deleted and the second scene composited into it. With that technique, the amount of rotopainting needed would decrease. The result would also slightly improve the accuracy, though not by a significant amount as the rotopainting in this scene was done while being aware of the smallest of details.
Figure 4.5: Many nodes for color correcting the green screen and rotopainting on both actors’ shots.
The results of the poorly shot green screen came out much better than anticipated but was cut from the final edit. The style did not match up with most of the realistic feel of the film, so there is much left to desire and improve on this particular shot. The pros of the scene include the fact that the color correction and grain match well. Also, as the characters walk forward, the blur slightly increases, making it feel more believable and realistic.

The scene contains some errors that could be improved with time. Aside from improving the green screen, the scene would be improved by added details. The trees could blow slightly with the wind as a shot that lasts a few seconds with completely still trees alerts the audience’s eye that something is fake. Adding some animated CGI leaves and compositing them throughout the scene could make it work better. Alternatively, the scene could have been filmed similarly to previous scenes in the film.

The green screen scene was cut in the final film because it did not fit in with the look of the rest of the film. The filmmakers provided the stock
photograph that was to be used and issued the task of making it work with the actors. With keying and rotopainting, the characters could be made to look like they were walking on the road. As the characters moved further down the road, the blurring became heavier and as a result; the characters looked as if they were at a greater distance to the camera. Additionally, shadows were added to track the actors, which created the realistic effect of sunlight. With all of these touches, the image still looked wrong and off; the filmmakers decided the scene was insignificant in the film and was cut from the final product.

After the film had been released I created a new scene in order to explain how a scene similar could be saved in the future. By first observing what was the main problem in the scene that made it not work in the film. One was the natural background; trees, grass, sky, gave an overall color that did not match with the other scenes filmed in Camden, South Carolina. The filmmaker did not take into account where the photograph was taken, I ended up finding a nice southern driveway in Spartanburg, South Carolina and took a photograph of it. Using Nuke, I was able to quickly put together a scene using color correction to blend in the actors with the background. The actors looked much better in the new scene because it appeared to be one image. The background also fit better with the rest of the film because the natural elements looked similar in a number of shots.

The second problem I discovered was the lack of interaction between the two actors. Because the two actors were filmed separately, their walk did not interact with each other. In theory, the characters’ body language and position would be different if there was someone walking beside them. However, this was not the case and no matter how much better the background or compositing is in the new scene; the lack of interaction exposes the composite illusion. I removed the second character entirely and the scene works much better. In the future, the actors should be filmed
together with a green screen and maybe even filmed along with a few foreground elements as well. Overall, implementing these changes into the scene could have saved it from the cutting room floor.

Figure 4.7: New photograph for green screen scene instead of stock internet footage. Second actor removed altogether.
Figure 4.8: Nuke tree of campfire scene. Five tent scenes were used to merge and then the smoke was made with two files merged.
The results of this challenging scene worked out fairly well as the rotoscope cutout looked perfect and the tents and campground matched. Minor complaints would be that the tents lined up too perfectly. If the scene were edited and improved now, then the tents would be slightly more out of sync with each other. The perfection does not make it realistic, especially for the American army. The smoke was by far the most challenging part of this scene given the fact that the CGI smoke needed to be blended to appear not only realistic but also match well with the real-life smoke. Animation was also used in the smoke shot and the end result worked very well with the smoke flowing up together. In the end, the shot should have been filmed without any smoke and only used the CGI smoke to create fewer problems during compositing.
CHAPTER 5: CONCLUSION AND FUTURE WORK

In conclusion, digital compositing has been a tool since the early years of film and will continue to be one for as long as the medium of film is relevant. Compositing carries the necessary skills of adding multiple scenes together and projecting the audience into unknown worlds. With compositing, Hogwarts can come alive, lightsabers are believable weapons, and the Revolutionary War is experienced once again. Rotopainting, while a tedious skill, is necessary in order to composite a shot with efficient detail and accurately cut out elements in a frame. Green screens and blue screens are heavily used in modern day movies for their ability to project digital landscapes and creatures and make a different world come alive in the eyes of the audience.

In the Cherrycase music video, for example, the most valuable compositing skills were used and displayed on film, from green screen and rotopaint to color correction and tracking. It shows a large variety of what compositing can accomplish and that anything can be added into a scene, whether it is digital or realistic. In romance films, the walls of a building could be composited in order to give a more romantic brick setting or flowers added to enhance the beauty of the scenery. Compositing can achieve simple tasks such as making a house look old or brand new, changing its color, enlarging it, or making it smaller. It is almost as if a filmmaker can now live in their own wonderland and create the world they wish to be in on film, which in the past could only be done in animation films.

CGI smoke is also easier to add without the use of real smoke, so in future projects it should be noted that it would make the post-production job easier in the studio. More green or blue screen and more awareness of what can and cannot be done in post should be noted. The storyboarding process will be
even more important because the filmmaker would not want to waste effects by cutting a scene.

The challenges of rotopainting will help me pursue a full time career in compositing. Using these skills, I will be able to achieve the experience needed in an entry-level position in the film industry, as rotopaint artists are usually an entry-level position, while compositors are senior level positions. After this project and a few others with FisherFilms, I have spent hours practicing rotopainting technique and hope that I will be able to improve on a variety of other compositing skills and tools in the future. In the world of film, rotopainting and compositing will always be needed, even more so now than ever before.
REFERENCES


