

Our First Music Video

6.837 Final Project Report (Team 19)

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Abstract

The purpose of our project, *Our First Music Video*, is to explore the methods of combining 3D graphics animation with a particular piece of music ("Particle Man," by They Might Be Giants), hence creating a music video. We experimented with various techniques to express the rhythm, mood, and theme of the song through movements of our characters, and also to enhance the visual effects of the video. We placed emphasis mainly on the animation, rather than the modelling of the characters.

Introduction

Computer graphics has become a very powerful and popular tool in the music and entertainment industry. CG rendering can achieve special effects otherwise unattainable with real people and objects. It is a powerful medium for creativity. More specifically, we believe computer graphics can be used to introduce the making of music videos to the general public. The result of our project is a music video that is fun and entertaining to watch, which can encourage others to express their own interpretation of music through computer graphics.

We used Alias as our animation tool, since it is the most powerful tool available to us on Athena, and also a widely used tool in the field of computer animation. We used techniques such as inverse kinematics, keyframing, animation of a single camera, switching between different cameras, and spotlight animation.

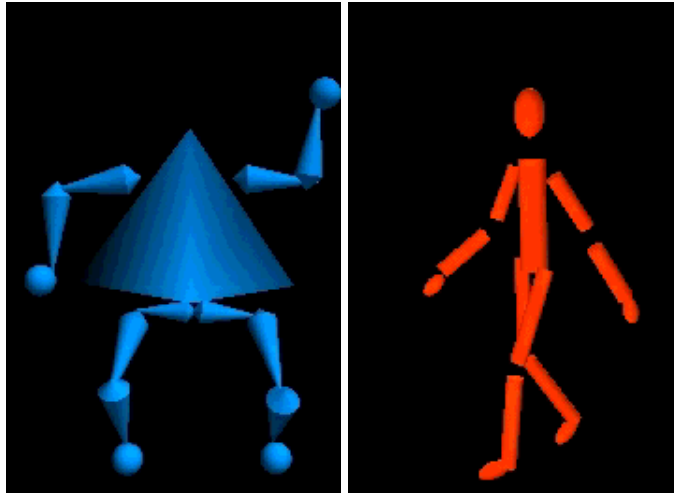
We used Adobe Premiere to combine and synchronize the images (in tiff format) generated from Alias with the music (in wav format) and create the final movie. We also used CoolEdit Pro to modify the original song to fit our needs, including the addition of an entire "Macarena" segment.

Goals

One of our primary goals was to capture the essence of both dance and music. This problem has been approached in many different ways in the past, but many of the solutions that exist involve modeling an actual human dancer. Often, sensors are used to record movement, or cameras to capture facial expressions. We decided that our medium would be completely computer-generated, with virtual characters who were programmed

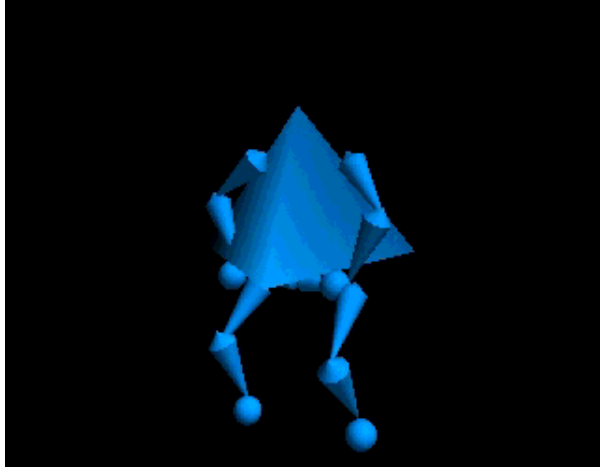
manually.

This decision also gave us the freedom to experiment with different forms, both abstract and humanoid. Thus, our first character is little more than a symbol, although he dances in a human fashion. The next character is slightly more anthropomorphic, with an abstract body, but human arms and legs, and the final character is almost entirely humanoid. This approach also required that the majority of our efforts went into animation, as opposed to modeling-- thus, we were looking for a Person man who moved in an interesting way, rather than one who might be mistaken for an actual person.



Both Triangle man and Person man are anthropomorphic, but the latter is almost entirely human, whereas the former has a more primitive shape.

Finally, and perhaps most importantly, we wanted an exciting final product. Music itself is both both beautiful and entertaining, so it was crucial that our animation meet the same standards. For this reason, we included both dance and narrative elements, so that the video would be interesting to watch. We also included a few humorous scenes to add to the entertainment value of the piece. Unlike a project which focuses on one aspect of computer modeling, an animation is judged first and foremost on the impression it leaves with its audience. In short, we decided that, since we were creating an animation (and particularly a music video), our project would be a failure if it did not entertain.



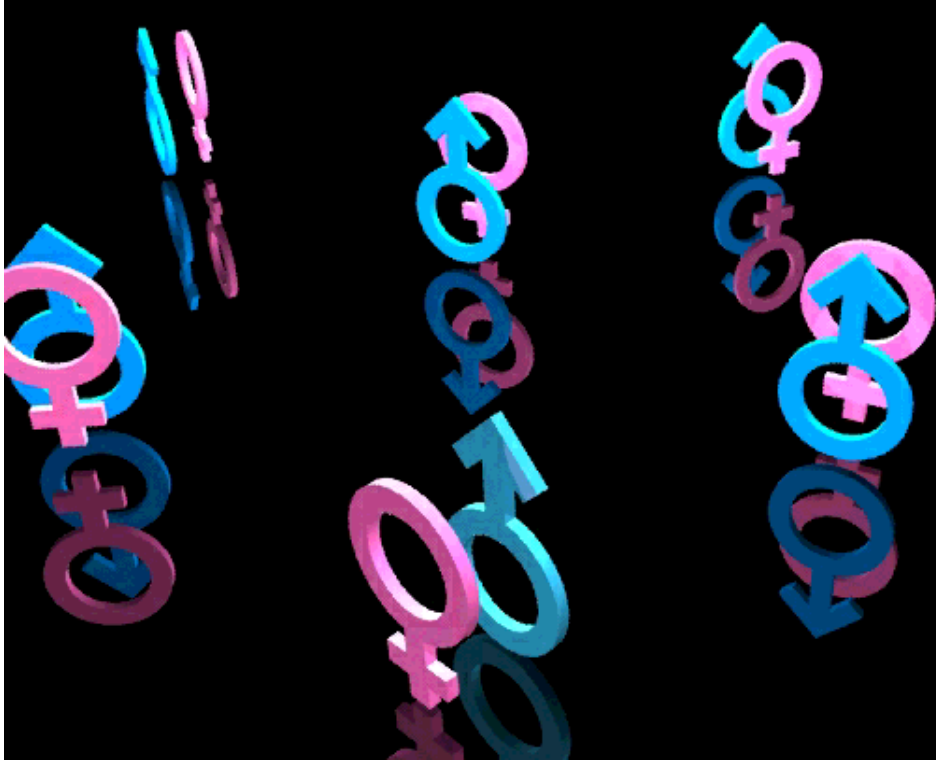
The "Macarena" scene is one of the humorous episodes in the video. By injecting fun into the project, we hoped to capture some of the whimsy inspired by song and dance.

It also bears mentioning that our goals changed slightly since the project's inception. In our project proposal, for example, we considered including a scene which was a combination of computer-generated and real-life elements. After discussion and consultation, we came to the conclusion that this was an unrealistic goal, given our time constraint, and that our efforts were better spent in making an exciting video sequence.

Achievements

The most important standard by which we can judge our success is by the final product itself. In this respect, we believe that we were wildly successful. Our video is interesting yet attractive, with scenes that are intended to inspire, and others that intended to amuse. We also did a fairly good job in balancing the dance and narrative scenes, as well as the abstract and the mundane, while still creating a video that is a cohesive whole. Considering that the song "Particle Man" is itself fairly discontinuous, this was quite an accomplishment.

Another way that we were successful was in meeting our other primary goal, the modeling of dance and music. This was quite an undertaking for a mere two minutes of animation, yet we are pleased with the result. Our video shows both the elegance of dance, in the opening ballroom scene, as well as its fun element, as in the Macarena transition. It tells a brief story, for music and dance are both often narrative, without losing its rhythm or grace. In essence, it is what music videos are intended to be: a compromise between music and film.



Some of the scenes capture the essence of dance more directly. In this scene, the Particle men and women glide along the dance floor, before becoming part of Triangle man.

There were certain obstacles that we encountered, however, that prevented us from making the animation as great as we might have. The greatest of these was the learning curve involved with using Alias. Many, many hours were spent dealing with trivial aspects of modeling, and grappling with an unfamiliar and sometimes counter-intuitive interface, hours that would have better been spent in animation and design. A few times, files or objects were mysteriously erased, and Alice even had her entire Alias directory deleted, destroying an entire days work. In the end, we were pleased to have mastered the software, but the road there was often frustrating and tedious.

A second, perhaps related, obstacle was the time restraint. A single month is a short time for a project of this magnitude, particularly when the tools at one's disposal are unfamiliar. We countered this obstacle with planning and teamwork, deciding early on what our priorities were, and setting a realistic schedule for ourselves. Still, more time would have allowed us to experiment with more complicated characters, or to create more stunning backgrounds for the scenes. This project was definitely a valuable lesson in assigning the limited resources of time.

One final, relatively minor, obstacle was the division of labor. We wanted to have a final project that was cohesive, rather than something that was choppy or incomplete. So we spent a lot of time working on transitions that would make our individual scenes work together. We also chose a song that had three main characters-- Particle man, Triangle man, and Person man-- so that each of us could concentrate on one of them. Still, the

nature of our project required a great deal of cooperation and communication.

Overall, despite any negative aspects, we are pleased with what we achieved. Our product is the result of our cooperative effort, and addresses the issues that we were interested in. Aspects that one might have expected to engender disagreements, such as the selection of the song or the assignment of the scenes, were actually met with little or no tension. And any frustration we experienced only added to our solidarity, and encouraged us to work harder; and that is an accomplishment in itself.

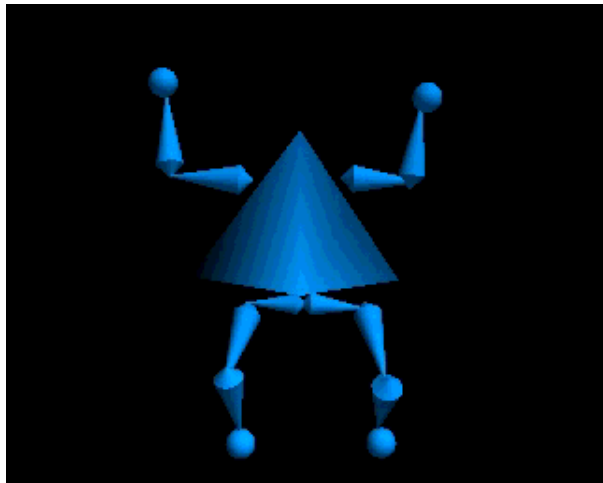
Individual Contributions

The first aspect of the project was largely cooperative. This included the song selection, and the decision to edit it, as well as the initial character design and storyboards. We also had to plan a schedule and write a proposal as a group. All of these were done cooperatively, while individually we were experimenting with Alias. Then the actual rendering began, which was divided according to character.

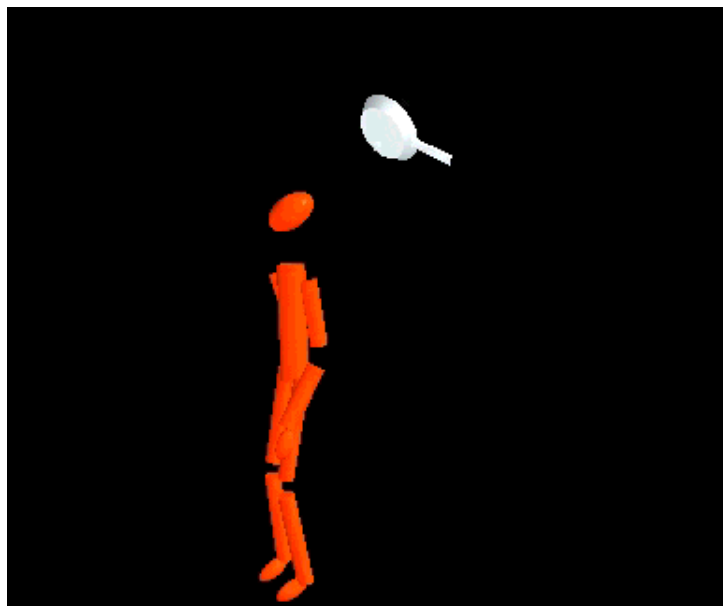


The first scene, involving Particle man, was rendered and animated by Jack. This scene was the shortest, but also the most dynamic, in that it involved multiple characters, tricky lighting and movements, and constantly moving camera angles. Jack was also responsible for the audio aspect of the project, which involved decoding the song "Particle Man" from

CD, and editing in an extra instrumental at the beginning as well as a "Macarena" transition (mixed in from a separate song) in the middle. Finally, he accomplished the actual video editing, including timing the sequences to the audio track, creating various transition effects such as fades and zooms, and recording the entire product both in digital and VHS format.

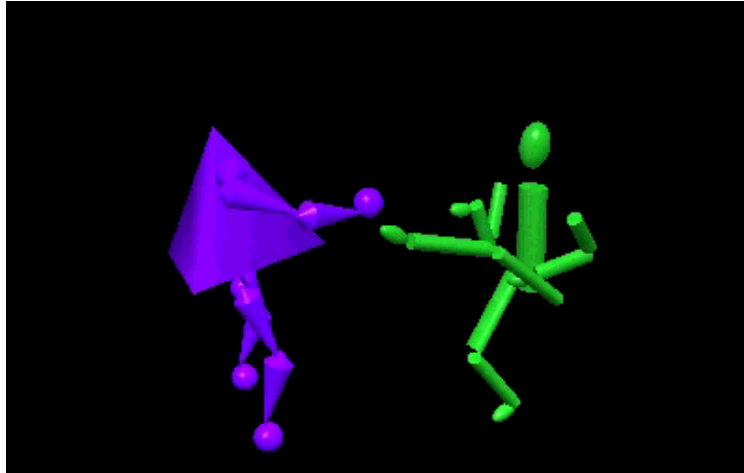


The second character, Triangle man, was Lei's responsibility. These scenes were not only of significant duration, they were also extremely important to the video as a whole, since Triangle man is the star. Lei used inverse kinematics to attack the difficult task of assigning human actions-- posing and dancing-- to an abstract concept, the triangle. It is also worth pointing out that this particular song was originally her suggestion, making the rest of the project possible.



The final character, Person man, was rendered and animated by Alice. Like Triangle man,

Person man occupies the bulk of the video. Furthermore, his surroundings are the most dynamic, ranging from a psychiatrist's couch to a garbage can. The interaction with these environments, as well as the frying pan that strikes him made Person man a unique challenge.



On the other hand, ne noteworthy example of teamwork involved the fight scene between Person man and Triangle man. Clearly, since this scene involved two of the characters, it could not be assigned as easily as the others. In fact, Alice choreographed Person man's movements, then handed the scene to Lei, who animated Triangle so that he would react believably. Both then worked on details of timing and camera placement so that the result would be as gratifying as it is.

Lessons Learned

In a practical sense, the members of our group learned a great deal about animation in general and Alias in particular. Though often this was the most frustrating aspect of the project, it was also one of the most satisfying. Also, while many of the principles and techniques we learned during the semester helped in modelling, we learned that animation involves many other considerations, such as timing, transition, and camera movement.

Other considerations may appear in static rendering, but take on a new dimension in the dynamic world of animation. For example, lighting is definitely important in classic modelling, but we had to learn to create lighting that worked well from multiple camera angles, and on moving subjects. Similarly, issues of shading and reflectivity were magnified as objects interacted with each other. In fact, an entire physical system had to be created, in order to answer questions such as how fast an object would fall, or how far it would bounce. These avenues of thought were new and exciting, and improved our appreciation of the nature of computer graphics.



We discovered that subtleties of lighting and camera position are very important in animation. Here, the reflection reinforces the illusion of a ballroom dance floor, even though Particle man is suspended in space.

We also gained a new understanding of some of the basic problems all animators must address. Sometimes, those aspects of a scene which seemed the most complicated turned out to be the easiest to model, once an IK skeleton was in place, whereas subtleties like timing and camera placement plagued us at all times. In much the same way, the simplest movement, such as the angle of a head or turn of a wrist, could make a scene seem artificial or contrived if done incorrectly; these were often much harder to model than less modest movements like a step or a kick.

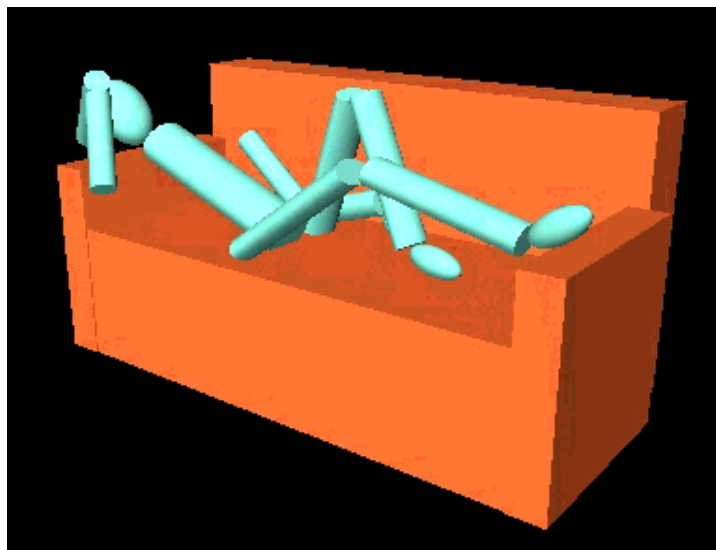


The tapping of Person man's foot in the trashcan scene is subtle, but the entire scene would seem awkward if it did not move in rhythm with the music.

A less tangible aspect of the learning experience involved the process of transforming ideas into concrete form. Creating the animation engendered a mode of thinking that was novel to us, since we not only had to imagine interesting scenes, but had to create

interesting ways for them to tie together. For example, it was not enough to simply imagine a scene in which Triangle man is struck by a frying pan, for we had to consider every detail: where the pan should fall from, how long it should take to fall, whether it should bounce off screen. By the end of the project, such questions were routine, and we found ourselves thinking like animators.

Finally, we had to learn to work as a production team. Each of us had been involved in team projects before, but never on so grand a scale with such limited time. We had to come to a consensus as to what our priorities truly were, and schedule accordingly. The suggestion of incorporating real video into a scene was discarded early on, but other compromises, such as simplifying some of the scenes, had to met on a day-to-day business. Considering how often we felt frustrated or rushed, and how important this project was, it would have been easy for tension to develop. We learned to focus on the final product at all times, however, and it was this focus that allowed us to achieve our goals.



Originally, we considered creating the psychiatrist's office from a real-life set. Time considerations convinced us to render this virtual couch instead.

Acknowledgements

We are obviously indebted to They Might be Giants for their song, "Particle Man." This song is from their 1990 album, Flood. We have taken considerable liberties with it in the remix, however, adding a short instrumental to the beginning, and editing in a section of "Macarena." "Macarena" was composed and released by Los Del Rio in 1993; the version we used is known as the Bayside Boys Mix.

Finally, certain portions of our video bear a striking resemblance to scenes from the 1999 movie, "The Matrix," which was written and directed by Larry and Andy Wachowski.

These references, as well as our interpretation of the aforementioned songs, are made purely in the spirit of fun.

We are extremely grateful to all these artists for both their inspiration and their understanding.