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Crowd Pleaser: Carnival of Delights

Resource Manual

Cycle 2 Fall 2001
ACKNOWLEDGEMENTS

The Crowd Pleaser team would like to thank the many people who helped us stumble through the project step-by-step. Much ado to Ben Buchwald for Yoo-hoo! for helping to set up the software environment; Jon, Ray, Todd, Elan, Dan, and Shawn for LithTech wisdom; Mike, Steve, Philo, Jazz, Russ and Lentz for endless 3D Studio/DeepPaint guruship; and of course Brenda Harger, our advisor, for helping us etch out our concept and checking over our work. Last, but not least, we would like to thank Janeen, Don, and Randy for helping with administrata.

-- The Crowd Pleaser Project Group
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1. INTERACTIVE AUDIENCE PARTICIPATION

1.1. What is Crowd Pleaser?

Our goal is to provide a multi-user interactive entertainment experience in which guests play in an augmented virtual space. Using computer vision techniques and multi-sensory stimulation, Crowd Pleaser builds rich, interactive games for large-scale participation in a variety of venues.

1.2. The Experience Concept

The purpose of Crowd Pleaser is to provide a venue where guests may play together in large groups assisted only with small, simple input devices. Lush, graphics, lively sound, and amusing characterizations come together allowing large groups to be entertained together, whether in a large auditorium, or a smaller open venue.

1.3. What is the Carnival of Delights?

The Carnival of Delights is the pilot effort by the Crowd Pleaser team to create an engaging, large-scale interactive entertainment experience. Our concept is an unexpected yet strangely alluring carnival set at twilight and inspired by similar experiences staged around the early to mid-twentieth century. Guests are invited to participate in a lively, colorful carnival filled with animated characters and competitive game play.

1.3.1. Douse-a-Clown

Rules

The audience will be divided into groups of 5-10 players. Each group is assigned to a clown with the corresponding laser pointer color. The team’s objective is to concentrate their laser pointers in the clown’s mouth, projecting streams of water until he’s full. The clown that tops off first wins the match.

The game also works for a single player-to-clown ratio.

But be careful, it’s not as easy as it sounds. These are special clowns, they have attitudes as clowns do. Watch your clown carefully and work as a team.
Objective

- Fill your clown with water as quickly as possible

Clown Actions

- Reacting to being hit in the mouth
- Blocking the flow of water
- Dodging, weaving and bobbing to avoid being hit
- Celebratory dance when the game is over
2. OUTSIDE RESOURCES

2.1. Dan Maynes-Aminzade, Ben Buchwald

Dan Maynes-Aminzade (aka Monzy) developed a set of audience-interaction techniques using computer vision for his senior thesis at CMU. The primary forms of interaction included laser pointers, guest-leaning algorithms, and shadow-to-screen occlusion. All of these experiences were implemented and executed in McConomy auditorium at the University Center. His legacy code is available on the random audience share (and the Crowd Pleaser archival CDs).

Ben Buchwald continued Monzy’s work by developing several new experiences and a new leaning algorithm. He provided the Crowd Pleaser team with hardware and software support at key points in the cycle.

2.2. A/V Club, SDC, UC Reservations

The CMU A/V Club presents movies in McConomy for the student body on Thursday, Friday, and Sunday nights. The Student Dormitory Council performs a similar service on Saturday evenings. If the experience requires user testing in McConomy, the respective heads of these organizations should be contacted to ask permission to poll the audience for a short period before the films.

In addition to the A/V Club and SDC, UC Reservations must be contacted not only to secure permission to use McConomy, but also to obtain the necessary hardware to link your system to the house. For starters, a power strip, extension cord, and headphone to mic adapter (DI box) will be needed. See the chapter on the Communications/Resources committee for more detailed information on this.

2.3. Previous Crowd Pleaser Team Members

Probably the most important technical resource to your team will be previous Crowd Pleaser team members. They have the scars and experience of working with every aspect of an audience participation project and are quite likely to be of help. As a handy reference, a list of previous Crowd Pleaser team members is listed as an appendix to this document.
3. WHAT YOU’LL NEED (INVENTORY)

3.1. A Stock List for Fun

This chapter is an example of the materials required for *Douse-a-Clown*. You’ll probably want to print it out and carry it around in your pocket, crossing off items as you procure them. There are of course alternatives to the name brand components listed below, but with the name comes the peace of mind of knowing it’s worked before, and ideally, will work again. Required materials will vary greatly based on the scope and venue of the experience, especially if extra emphasis is placed on interaction outside of the virtual world.

Several of the input pieces will need to be custom ordered from retailers on the internet. Because of this, and problems with finding components in stock, it is *highly* recommended that all needed materials are obtained in the first week and shipped next-day delivery. Your advisor is your one stop source for purchasing, so be sure to visit her early.

3.2. Douse-a-Clown Components

3.2.1. Computer Hardware

- Intel D850 motherboard
- 1.4ghz Intel P4 processor
- 2x 256MB PC800 Samsung RAM
- 40GB 7200 RPM Western Digital HD
- Visiontek GeForce 3
- 300W midtower case and fan
- 52x Mitsumi CD-ROM
- Standard PS/2 keyboard
- Standard PS/2 mouse
- SB Audigy Platinum sound card
- ImageNation PXC200AL video capture card
3.2.2. Computer Software
   - Windows 2000 Professional
   - Microsoft Visual Studio 6.0
   - WinCVS (or Visual Source Safe)
   - LithTech distribution 3.1
   - ImageNation card drivers

3.2.3. Content Creation Tools
   - 3DS Max R4 (available for distribution from the Technical Coordinator)
   - DeepPaint v6 (available for distribution from the Technical Coordinator)
   - Cakewalk Pro Audio 9 (available on the PCs in the recording studio)

3.2.4. Video Hardware
   - Sony TRV230 Digital Video Camera
   - Video cables (S-VHS)

3.2.5. Audio Hardware
   - Speakers for demo
   - Audio cables

3.2.6. Sensory Materials
   - PRIZES - 2 doz. ea of Sunflower (feet)
   - FOOD - popcorn, brown paper bags
   - BEVERAGES - Carbonated soda, crushed ice, paper cups
   - SCENTS - humidifier, four oscillating fans, incense and burners, matches, scented oils
   - TEXTURES - hay, red/yellow/blue Vinyl
4. COMMITTEE STRUCTURE

4.1. Committee Structure

Initially the Douse-a-Clown experience was viewed as a theatre for a large-scale, augmented space. Since the audience would be interacting in each of three realms, committees were formed to manage the experience construction for the virtual world, the physical or “real” world, and the people world.

4.2. The Virtual World

The virtual world is the space that is rendered digitally and presented to the guest with 3D graphics and sound. The modeling/painting/animation (MPA) committee formed all of the intangible visual artifacts for the game. The sound/music (SND) committee compiled the necessary list of effects and sequences that were to be used in the game. Lastly, programming (PRO) would implement the artists’ vision with the LithTech rendering engine, and some simple computer vision algorithms.

4.3. The Real World

Since the space the guests would enter was not only virtual but physical as well, the “real world” had to be managed both in assembly and presentation. Electronics Hardware would handle the construction and servicing of all the computers, cameras, projectors, and audio equipment. Stage and Sensory had the novel task of creating a lush and diverse physical space that stimulated the senses, and transitioned gradually into the virtual.

4.4. The People World

Lastly, the human factor had to be addressed, since the fusion of the experience and the transitioning of it to the outside world were such a daunting task. Communications/Resources would handle the management of all information flow and materials acquisitions. Documentation would of course oversee the compilation of all the artifacts and knowledge base, and user testing would envelope the guest polling and revision of the experience.
5. COMMITTEE NOTES

5.1. Electronics Hardware

When it was decided that a 3D implementation would be used in the virtual world, the requirements of the project were changed significantly. A high-end computer was needed not only for the rendering of the LithTech world, but the computer vision algorithms as well. A custom computer was built by the electronics hardware team to ensure all the special requirements of the experience would be met. The ImageNation vision card was an analog model, partially because the digital was twice as expensive, and partially because the company promised that the necessary throughput could be achieved with the lower end card. The camera used to track the laser data was digital, and supported firewire output, but unfortunately the vision card did not, so ultimately a simple S-VHS connection was used. This turned out to work just fine, however. The high level of fidelity in the camera’s brightness adjustment and zoom made the collection of the laser point data quite simple, and little calibration was needed to get the game functioning properly. Sound was easily serviced in both the McConomy and Doherty Hall user tests by direct output from the Sound Blaster Audigy’s micro line out. Special converters are needed to rout the sound through the house system in McConomy, but these can be borrowed from the room technical staff. Laser pointers were in short supply in the Pittsburgh area, but approximately fifty were purchased from various retailers to help scale the experience to a larger group than previously had been tested with that form of interaction.

5.2. Stage and Sensory

The initial vision was to build an entire experience, touching on all of the senses while letting the audience interact with both the games and the room. The main theme that we felt could prevail this vision would be a carnival-based experience. When the audience member arrived, a carnival tent or canal exterior would be prevalent. Tickets would be available for purchase from a ticket booth accompanied by a “barker” describing all the shows available inside. The barker’s job is to entice, belittle, make fun of, laugh and cry out to the potential audience. With the sounds of carnival music, excited audiences, sideshow attractions, and carnival accompaniment would be emitting form the interior. The audience would see the sights; hear the sounds, smell and
experience of Midway sideshow carnival attractions. Entering through a turn-style, the audience member would immediately see pictures and murals of more traditional carnival sideshows than that of modern day carnivals. Smells of cotton candy, roasted peanuts, popcorn, and soda along with any or all prevalent smells connected to a carnival experience would fill the air to help set the atmosphere. Other scents would be that of old tarps and tent canvas that had been through years of storage and travel, various pungent animal smells, grease and possibly smoldering fires or ash from the Fire Spitting Man. The ground would be covered in sand, soil, and straw hay to add to the atmosphere. These elements are vital elements for the atmosphere and experience. Sensory recognition and connection is an important element to the entire immerses experience.

It was important to create this atmosphere to give a true theatrical presentation. As that of a theatre production, every attempt is made to bring actual if not representation of the actual atmosphere to the audience. The carnival experience is both an experience and presentation.

**5.3. Communications/Resources**

Project coordination is a vital part of this and many projects. With a group compiled of different backgrounds and different work styles, it was important to keep everyone in the same frame of mind, with the same goal in view and communicating the individual and committee objectives for the day, week, and set deadlines. A bi-weekly meeting time was set for the group to meet both with one another and the faculty advisor. This meeting was a standing meeting time and was always met by every group member. It was vitally important to have these meetings so each committee and each individual of the group was given an update of the past, present, and future objectives and task of each committee and individual. Schedules along with future meetings were compiled along with updates. During these meetings it was vital to cover the bases, along with leaving time for open discussion and problem solving time for any unforeseen issues. As the Project Coordinator or Project Lead, it is vital to have a distinctive outline of topics for the meeting and to have the answers to the questions in your head before the meeting. A good technique to practice is to have the meeting in your head prior to the meeting to see if you can predict any obstacles or any unanswerable questions before the meeting actually happens.
Locating buyers and distributors for the materials needed was easy. Using the internet, Yellow Pages, and of course word of mouth from members of the E.T.C. as reference material for locating the easiest and most economical supplier for certain materials in the project. The first major task was compiling a list of materials, including but not restricted to: hardware, software, consumables, and general dispensable items. Next as locating the corresponding supplier to the material item needed. While compiling this list it is important to always have a running budget sheet, proposal sheet, and current acquisitions sheet.

5.4. Documentation

Documentation needed to be comprehensive, but also to the point. Audience participation is largely a new realm as far as ETC projects are concerned. There is an extraordinarily broad range of projects that can grow from the core technology that the computer vision provides.

This document, coupled with the doxygen source material and the Crowd Pleaser website, should give a pretty concrete picture of what went into the first project on interactive audience participation. Through the deliverable Douse-a-Clown, and the postmortem included in this paper, the artifacts of the cycle are available on randon and the archival CD-ROM.
## APPENDIX A: PREVIOUS CROWD PLEASER TEAM MEMBERS

<table>
<thead>
<tr>
<th>Project/Cycle</th>
<th>Name</th>
<th>Committees</th>
<th>Email (cmu.edu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carnival of Delights Fall '01-2</td>
<td>Ying-Tzu Lin</td>
<td>MPA, TEST, COMRES</td>
<td>yingtzl@andrew.</td>
</tr>
<tr>
<td>Carnival of Delights Fall '01-2</td>
<td>Dave Ventura</td>
<td>SND, PRO, DOC, STG/SNS</td>
<td>dventura@</td>
</tr>
<tr>
<td>Carnival of Delights Fall '01-2</td>
<td>Timothy Price</td>
<td>COMRES, STG/SNS, TEST, SND</td>
<td>tprice@andrew.</td>
</tr>
<tr>
<td>Carnival of Delights Fall '01-2</td>
<td>Gabrielle Luft</td>
<td>MPA, SND, HW, COMRES, STG/SNS</td>
<td>gluft@andrew.</td>
</tr>
<tr>
<td>Carnival of Delights Fall '01-2</td>
<td>Ken Strickland</td>
<td>PRO, MPA, HW, DOC</td>
<td>kenneths@andrew.</td>
</tr>
<tr>
<td>Carnival of Delights Fall '01-2</td>
<td>Brenda Harger</td>
<td>ADVISOR</td>
<td>bharger@andrew.</td>
</tr>
</tbody>
</table>
APPENDIX B: TROUBLESHOOTING

3D Studio MAX

- **Problem:** Why is the applied bitmap not at the right angle, and not on the right face of the object?

  **Solution:** First, after assigning the texture to the object, make sure that you check the “Show Map in the ViewPort” button in the “Material Editor” to show you the object with texture in your 3D max window. Then, apply the “UVW Mapping” under “Modify” manual to the selected object.

- **Problem:** When I apply a bitmap in 3D max and check the “UVW Mapping”, why still can’t I make the texture image of the right size and fit the object surface?

  **Solution:** After you applied the UVW Mapping function to the object, click on the “+” sign of it. That will unfold its sub-function “Gizmo”. It will turn yellow when you click on, then you can apply any transformation, like uniform scale, un-uniform scale, or squash, to the bitmap.

LithTech Content Creation Applications

- **Problem:** Why can’t I see my model when I run the world, even though the icon exists visibly in DEdit?

  **Solution:** Your model may be way too large. Shrink it down by an order of magnitude and try again.

- **Problem:** Why do I see a black screen instead of a texture?

  **Solution:** Make sure your text list (.txt) is properly set up and assigned to the model in DEdit.

- **Problem:** Why are my models so dark?

  **Solution:** Try editing the COMMAND STRING in Model Edit to reflect more ambient light. If that doesn’t work use directional lights on the model of brightness 2. Make sure FAST LIGHTING is turned off for the models.

- **Problem:** The Samples Launcher says “error in InitRenderer()”, is there something wrong with me.
Solution: Your autoexec.cfg may be corrupt. Replace with a similar file from one of the other folders. Also be sure your monitor is in 16-bit colour mode.

General Laser Tracking Problems

- **Problem:** My application thinks there is laser data all over the place when there isn’t!
  
  **Solution:** Turn the contrast/brightness way down on the camera.

Monzy’s/Ben’s Code

- **Problem:** Error: Could not allocate FG
  
  **Solution:** Make sure you aren’t running any other applications that use the image card.

- **Problem:** The demos don’t show up on the screen, but they do on the taskbar.
  
  **Solution:** The code is written for dualhead graphics cards, the application is being projected off screen. Either right-click the taskbar application and choose ‘maximize’, or modify the program source not to write to another viewport.