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Hive Five

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16 May 2012

Abstract

For my thesis, I started out with the ambition of creating a game using Augmented Reality, but in the end created a game in Flash called Hive Five. I used multiple techniques and technologies in order to help accomplish this. By combining two-dimensional and three-dimensional assets, the player gets the best of both worlds. This also gives it the flexibility to be converted later into a mobile game since it is not hard on processing power. This game gave me a solid start with graphics and a strong programming skeleton that I can continue on with in the future. Through uses of modular code, dynamic movie clips and multi-dimensional arrays, the game has the chops to handle more than is thrown at it. The ability to run with the code is easy and allows for variations that are more complex. I chose to only include the simple flocking because bees fly in three dimensions so it wasn't necessary to show them avoiding each other as well as everything around them. Changing and adapting the game to a mobile device would not be hard as everything is so modular and simplistic, which would allow an easy transition. Even the concept is strong enough to allow it to be formatted to other forms of entertainment like a board or card game. This paper will explore my struggles with working in new technology, and adapting both new and old content to create a new experience that can be expanded outside the realm of just another computer game.

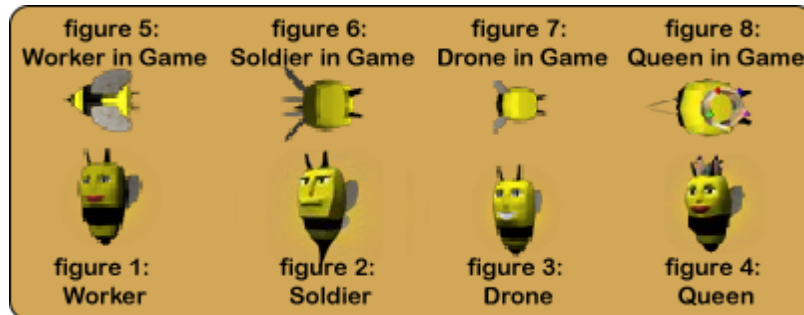
The Early Stages

I learned about Augmented Reality in Flash and I thought it would be a perfect platform to make a simple, tangible game that combined multiple technologies together. The concept is similar to the current game although it is radically different in how it was supposed to play. In the game, you would have had tiles that would act as fields that could grow different flowers. By placing different tiles together, you could grow different flowers in order to accumulate more bees. Due to the added use of a webcam, I wanted your movements to change the tiles and the flowers. If you move too fast, you could damage your flowers or by completely moving them you could change the flower's life expectancy. I wanted to create a game with multiple platforms like this, as someone can only get so much out of a game with only one layer. The added technology adds a way to get more information to the player through adding other senses changes the depth of the game.

Another reason I wanted to use Augmented Reality is that it meant I could use 3D in my project. Being a graphics major, the ability to combine multiple aspects of the field into a single project was ideal. While I knew the technology was new, the ability to even obtain Augmented Reality with simple objects was a good enough start. While 3D is not new anymore, by adding it into a project it already gives it a leg up over other applications. Furthermore, adding real time graphics that can interact with you was a huge goal for me. Sadly, the performance of Flash was not up to par with what I needed and I had to refine my project accordingly. Thankfully, all was not lost and I was able to create all of the necessary imagery for my flowers and bees. I was also able to incorporate some 3D into my thesis still. The Queen in the upper right shows the 3D position of the

Queen. She will face the appropriate direction the 2D Queen is facing. I wanted to be able to get more into the project but time was an issue.

Game Assets



I initially knew I wanted to make a game in Flash, so I had to pick a topic to build the game on. I came up with the concept of using bees as the main focus, and my game was created naturally from there. The way the honeybee lives its life was close to the way a strategy game could play out. I did some research trying to find games based around bees and I came up almost empty handed (Wasp). This gave me hope and the knowledge to have some room creatively to expand if needed. I tried to stay as close to how bees actually live as possible. However, I needed to expand, add a new bee and an array of flowers in order to add some complexity to the game.

In addition, I changed the way a drone bee lives in my game. The size of a drone is the smallest in the game because I wanted them to be present but not overly unique in order to emphasize the aspect of a swarm (fig.3). By making them smaller and giving them a slight wing flap, it allowed me to be able to explore other shapes and sizes for the other bees, thus making it easier to differentiate between the different characters. I wanted to be able to tell them apart but I did not want any one bee to be too prevalent besides the Queen. In nature, the Worker bees, who are females, collect resources, build, and defend the hive (Mason). I switched roles in this case because it plays on the societal stereotype that males are always the ones to have to harvest the goods, feed the family and defend their family. In addition to the drone, I added another bee named Soldier to take over the roll as defense of the hive (fig.2). This allowed the Drone to commit solely to being a pollen liaison, which was a simple enough task. Another important role of a Drone is spreading pollen from flower to flower, which allows other flowers to grow and bloom. While done differently in nature (Mason), the Drone in the game travels to flowers collecting pollen from each. Flowers produce the same amount of pollen, just at different rates. This is the main resource in the game and it ultimately allows you to create new bees and flowers. The idea for this, was modeled off of other video games that I have played, such as *StarCraft (StarCraft)*. Like *StarCraft*, the first units you get are to help build your empire, and are resource gatherers. You need a lot of them to help grow your empire and conquer others. There is little violence in *Hive Five*, unlike *StarCraft*, but the drones do provide some defense for the Queen. Each time the bird strikes the Queen a drone is killed in her place. If there are no drones in your swarm and if you are hit by the bird then you lose the game (fig.13). I really wanted

the drones to be the lifeblood of the colony and I felt this was the best way to demonstrate that. Again, them being males also fits the traditional sense of the role of the warriors and defense of the family. The flower associated with the Drone is the simplified colored daisy (Rohrer) (fig.11). I really wanted something uniform that would look good in multiples and rotated well. This flower was a good start, but the way I set up the flower system required more bees.

The need for more bees led to the creation of the Worker bee. In nature, worker bees do all the collecting of resources, maintenance and defense of the hive (Mason) (fig.1). I felt that this was a more stereotypical female role of tending to the young and turning the raw materials into nectar. Additionally, turning pollen into nectar is a refinement process, which I felt suited the traditional term of “worker” more accurately. Since the main character, Queen Beatrice, is such a headstrong character, I wanted her workers and fellow sisters, to be just as useful as her (fig.4). I feel I accomplished this by allowing the bees to refine and help replenish the hive. It felt like a natural fit to have the females tend to the young as well. By switching the roll of the drone and worker, I felt that the workers needed to be displayed as precious assets to the hive and therefore, invulnerable. The very simple combat in this game excludes workers from being killed, as there really was not any purpose in the game. If the workers are dying, the hive is also dead. The workers are so important to the hive, that I modeled them after Queen Beatrice. The biggest problem I had when figuring out was how the bees were to be displayed, including the proper angle and size of each. To fix this, I made the worker fly on her stomach. This added some color and a change to the way the wings flap. Additionally, the worker is also one of the slower bees in the swarm. In order to

demonstrate the femininity of the worker flower, I chose one of my favorite flowers, the Cala Lily (Townrow), to represent them (fig.10). I felt this was a graceful more feminine flower, without being too cliché. The differences in the flowers were crucial, as it makes it easier to differentiate between the three different bee types.

The next bee I chose to add was the Soldier (fig.2). While the Soldier archetype does not exist in nature, I felt that adding this class of bee would add depth. Furthermore, it challenged me and gave me better familiarity with coding and controlling multiple classes in Flash. In the game, I modeled the Soldier larger than any other bee except the Queen. It also moves slower until it is ready to strike the bird. While similar to the drone in both shape and color, the size is to represent the warrior nature of these bees. I also added another set of wings to give these behemoths some flight stability while also adding some more differentiation between the different bee types. The Soldier flower is a cactus (fig.9). I wanted to reiterate the feeling of defense and pain that these bees bring. Having a flower and plant was still colorful yet the cactus needles imitated the soldier bees being able to sting. Since the soldier bees were meant to attack the bird and protect the queen, deadly was the main goal. The sole purpose of the soldier is to ward off the enemy bird that flies around. These bees are your defense from losing your flowers so it is a good idea to get a few of them.

Finally, the Queen bee was the easiest bee to design (fig.4). Nature did all my work for me. In nature, the Queen sends out pheromones to help control and tell the other bees important information (Mason). In this instance, I made the Queen into a mobile hive, giving orders on the fly, which is actually a bigger presence than she would normally have in nature. I wanted all of the bees to be similar looking since they really all come

from the same bee, the honeybee. I gave the Queen a crown and made her bigger than most of the other bees in order to help make her stand out among the swarm of bees around her. Keeping her always in the center of the radial menu helps the player keep track of her position as well. Designing the Queen's flower was easy (fig.12). The crown has been a symbol of power and wealth for as long as people have worn them and so what better to use as a flower. Since this flower obviously does not exist in nature, the sky was the limit in terms of what is acceptable for flower design. I modeled the crown flower around the rose as it not only was the closest looking to the crown flower but it also has a feel of sophistication to it.

Terrain



The way the Hive Five works, prevents any sort of angled views on objects. If any small rotation occurred on the object, it would look very strange and unnatural. The only way to fix this was to add small subtle shadows to objects. This faked a lighting source and added a sense of depth to the game. Most of the assets in game do not move, so adding a shadow at a slight angle really helped sell the appearance of depth (fig.15). In addition, being able to change scale also helps sell this effect. When the Queen takes

off, she gets bigger while the shadow gets smaller. The enemy bird was tough because it is supposed to be far away from the ground and needed a dynamic shadow underneath it. This became a fun process but also a necessary one. Anything that stood out would break the illusion of depth. Adding this small sense of realism helped in other ways too. For example, I was able to use lifelike images of grass and rocks because of this. While the bees are cartoony, the rest of the assets seem real enough to sell the nature aspect of the game. Testing and participation feedback required the bees to be cartoony, because it is too hard to concentrate on the bees since they are constantly in motion and in turn difficult to inspect.

Another way to help sell some realism is the use of hiding (fig.16). This mechanic is in there to not only give some more depth to the Bird interactions, but to also show that the flowers are bigger than you are. While I had to have scale help in determining size and relativity, it did not always do the best job showing how far away the Queen is from the ground. When she is flying, she could be any amount of distance off the ground. This is not a huge factor to the game, but being able to hide within the flowers keeps her grounded and makes the distances she can fly seem smaller and more realistic. A simple alpha change on her still made her visible enough to be seen by the player. Another addition to hiding is the inability to use the radial menu. I wanted it to seem like you are actually hiding. The Bird is something to be afraid of and doing something would give away your position. By eliminating all of the abilities from being able to be used while hiding, allowed me to ignore some really complex coding situations that arose. For instance, trying to escape the Bird while simultaneously moving bees around ended up causing errors, this led to immediate death. It was also incredibly easy to win

by never having to leave the safety of a field. The flowers are your safe haven, but everyone must leave in order to get the whole advantage of the terrain. I did not want a player using the hiding as a crutch and winning without any effort. Hiding was another reason for me to add a change in the field graphic. I originally had the field be much more similar to the actual grass. This was to mimic how in real life plants can grow on almost anything, and not just a specified patch of grass like in the game. This worked fine but I wanted the player to know that a cluster of flowers is here and it can provide more benefits if the flowers are grouped. In these early stages of the games, the close flowers do not do much besides lend cover form the Bird (fig.16).

Navigation and Menus



One of the most iconic symbols related to bees is the honeycomb (Thane). Because of this, I tried to use the hexagonal shape wherever I could. From the beginning, the buttons are shaped as honeycombs and many of the menus and assets are represented by the hexagon (fig.20). In order to change it up slightly, for design purposes, I did not always use the exact same hexagon. For movement, I wanted to keep the six-sided feeling going but add in an aerial feel to it. The movement of the

yellow box coming together feels like a helicopter pad to me and I felt it suited the feeling of taking off and landing (fig.19). The radial menu also takes advantage of the hexagon (fig.17). With the proper amount of abilities, the hexagon was again used to help sell the honeycomb. Giving it a slight twisting movement gave it a feeling of unwinding. I toyed around with other movement patterns but none of them felt right. It was either too plain or the movement was too much. I found a happy medium with the transparency and only half of a rotation.

In addition, I also included the hexagon as a timer (fig.21). This was a fun solution to the everyday counter. I knew that I wanted to have both a fancy timer and a simpler one. The simple one would be used for harvesting resources since it would have to be seen on multiple flowers and bees at once. Having a large hexagon hid too many of the assets on the stage and thus became too cumbersome in the design. Using it for growing flowers however was not too much since there would only be a certain amount of flowers a player would want to grow in the tutorial stages of the game (fig.18). It was also a lot more challenging to design and program a timer that was more circular in shape than just a straight bar. I had to use some complex masks and frame-by-frame animations in order to get the bar to move smoothly enough at different rates (AS3). It was tough to find a happy medium between time taken to create the timer and the amount of time the timer would actually be playing. The smaller harvest timer was easier to make, as I only really had to scale the X-dimension of the inner box (Flash). Once that hit its maximum width, the timer would end. This made it easy to reproduce this dynamically and change the rate at which it moves. This gave me a great idea to use a variable counter dependent on the number of bees using the ability. The more

bees either harvesting or converting, the faster it would go. The other style of timer really prevented me from being able to do this effectively. It worked out in the end as two variations of timers would encompass all of my needs.

Colors were a simple thing in this project. I took colors from bees and nature. Most of them are yellows and blacks. Looking at pictures of honeycombs (Thane) and pollen I drew in some of the oranges and browns already common in nature. I wanted to stick to the more earthy tones since I associate bees more with dirt and grit.

Audience

The Audience for the game is pretty much everyone. While it is mainly built for the younger generation the mild violence may not be fitting for very young kids, but there is no blood or obscene gore, which means some parents may be okay with them playing. Additionally, those of the older generation who are computer savvy would also be able to the game pretty easily.

Usability Testing

When having people test the game, many of the observations I was given were similar. Some really good ones really helped shape the way the game was built. For instance, I had a long chat with James Buhlman, a previous work mentor, who really helped set me up with the idea for the levels. He was very confused and overwhelmed with the free play mode and told me to set up some sort of tutorial. Setting up the game in levels help

keep me on track, allowed for all the game play I wanted and kept things easier for the player. I had my wife, some friends and a couple nephews and nieces to help test things. The very young kids were not able to play the game as it was too complicated but were very engaged when watching others play. Other helpful suggestions were to add things like, pop up tips within each level, a more in-depth coverage of the objectives, and sound effects. All of these would be included but time restraints have prevented me from adding them at this time. So far, no one has had too much of a tough time completing the game and if they did lose at the end, it only took one retry and they completed it. Some people even said they were still thinking about it hours after they had finished playing, seeing the swarms swim around in their minds. This alone makes me feel the game is a success.

Conclusion

This thesis has been an invaluable learning experience. I have learned what to do and not to do in order to succeed with a deadline. I also have become a master of Flash and code problem solving and finding out where a problem lies and finding solutions on how to fix it. Being able to explore a passion helps me learn more about my field and give me the desire to continue learning and growing. I learned how to program arrays, classes and complex physics and geometry. The skills I learned also helped me program more modularly and allow for changes to some in the future. It also allows for the code to be adapted into other forms as well like for mobile or web. There are many things I would love to add on to the game. Among them include, a free play mode with

maps and different areas to explore and unlock new flowers and nectars. I also wanted to add weather in order to affect not only the flight pathing but the life spans of the flowers as well. This would add another dimension of difficulty and depth to the game if the flowers could live and die. Weather could help flowers grow, or also drown them and kill them. It would also be interesting to add new kinds of terrain like water, forested areas, volcanic soil, caverns and more. Adding water would also allow me to add fish, which could add more uses to the flocking code I already have in place. The fish could follow each other and swim around a simple path.

This game has also helped me expand the idea into other game forms as well. Using the concept of the game, I am designing a card game that takes the sense of exploration and makes it possible. By having terrain cards you place them down creating a map and allowing places for flowers to be grown and resources to be collected. More resources allow you to get more bees and soon enough you have a large enough hive to win. Being able to have multiple avenues to follow makes this project successful while never getting boring or irrelevant. It also opens up the path to eventually create an Augmented Reality component when I have strong enough computer and program platforms in order to do so. Overall, this has been a huge learning experience and I look forward to continuing on with it in my free time.

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Thesis Proposal

Abstract:

I will be creating a game that will transcend normal traditional card games and enter a new dimension through the addition of Augmented Reality. I believe it is possible to hybridize traditional games by having digital media added to them in order to create new avenues for future game designers and developers. Furthermore, smaller media, like business cards, can be enhanced by adding in a character that can add that little extra interest. With cell phones now becoming more powerful and equipped with webcams, they could be a successful future avenue for Augmented Reality. The game that I create will allow the players to explore a completely ever-changing and modular world. Players will be able to change the world as they see fit, which will make the experience different for the player every time. Since I am working with a 3D character designer, I will be able to have rich characters and environments to help the success of the game. To help increase the interactivity, when a card is placed next to another, they will interact digitally depending on the type of card. This way, players are able to have full rich interactions without the need to carry around bulky game props or pieces. Even if a player doesn't have access to a computer or webcam the game will be able to be played without the added content.

Problem Statement:

America is on the brink of change. Cars must change for instance, with the need for new fuel sources, which has led to the creation of hybrids. Currently, games of all kinds

are separated between traditional games like board games and card games, and digital games like computer games and virtual reality. I would like to create a hybrid multiplayer game that is interactive and fun on multiple levels and incorporates traditional tangible cards or tiles and computer graphics to augment the reality of the game. Augmented Reality uses a webcam and adds computer graphics on top of the projection or screen. Doing this will add a new perspective to games and allow more customization and modularization while keeping them small, simple and entertaining. There are a few potential problems when working with this subject. Since I have never used Augmented Reality with Papervision in Flash, I don't know the limitations, skill level needed, what languages I may need to know besides Actionscript, and if objects can even interact with each other using Augmented Reality. Another problem is I do not know how to get animated characters into Papervision. Additionally, I need to figure out how multiple adjacent tiles or cards will interact with each other. Another problem could be the game is too complicated or not entertaining for the player. I believe that a hybridized game like mine will be entertaining because traditional games can only tell so much of a story, but when each card can have a character or object that can interact with the other cards, a whole new level of play is achieved. A game that adds visuals, sound and interaction will make a much more successful game. Due to the ambition of this project, I will be enlisting the help of Patrick Clarke to help in creating the graphics and characters for the game. I will help create some of the smaller and potentially numerous random objects needed for the different tiles and cards for the game, but I will mainly be programming and compiling the game.

Approach/Project Description:

Design – There are many things that need to be designed in this project, from the characters, to the buildings and interactive digital objects, the actual design of the game and game play, as well as the navigation, digital presentation and the design of each card or tile.

Subjects and Participants – The game will be based for any ages although meant mainly for kids from young to teenage and even college age. If the game ends up being simple enough I would like to test it out with some elementary level kids. I have a few friends who are student teaching and may be interested in a game using child interactions. The game will be mainly tested on campus in the labs and around my friends, ages ranging from 20-30. I would also like to post videos online of people play testing the game and get anonymous feedback.

Computer Graphics – My thesis will include almost every type of computer graphics. The main test bed will be built in Flash using Papervision as a base. The characters and 3D content will be made in Maya and exported out into papervision. There will be a combination of static objects and animated avatars.

Procedure – First, I plan to learn how to add fully textured and animated characters into papervision. I next plan on learning how to use different animations to allow the character to be able to interact simply but convincingly with other characters. The actual design of the cards will be simple; a title, small description, image and the AR marker icon. Next, I would like to add the character interactivity to the cards, as you move them closer to other characters, they will engage each other or with the space

they are moved onto. Once interaction is made, the basic navigation and game layout will be finalized and implemented. After this, it is on to play testing and fixing and tweaking unforeseen problems.

Technology – I will be using Maya, Augmented Reality Platform made for Papervision.

Papervision is used with Adobe Flash. I will be using a webcam and both Mac and PC platforms as well as both desktops and laptops.

Implications of the Research:

This is an exciting new technology that really adds a new dimension to regular objects. It can enhance things like business cards to full-fledged games. By developing games like mine it adds a new avenue for other to create new and exciting games. It will also be big in cell phones with the easy access to flash applications and a built in webcam, it seems as if Augmented Reality may be built perfectly for the phone. It is also a way to make covert and fun games; who would think twice at a bunch of boring marker icons? There are a few limitations such as Flash as an engine. From my initial research Flash doesn't seem to be the best platform but given limited programming and time, Flash will be fine. I have also noticed that the markers are very sensitive and can easily break the image connection just by changing the angle just a little. If I am unable to get proper character and object interactions the whole project may need to be revised.

Budget:

Purchasing materials to make the cards will cost money. I would like to either purchase thicker cardboard paper for each card or very thin plastic tiles. Ink will need to be purchased for all of the printing needed to create the cards. I will also need to purchase a mobile webcam and mini-tripod to use in the project. The majority of my time will be spent getting the characters moving and interacting with each other. Basic game programming will take a while as well, but I would like to handle some of the major game mechanics via communicating with the other game players. Some things won't require programming and can be handled in the traditional game way. I will also be spending a good deal of time talking with Patrick as he creates and manages the characters. The more time I can spend in Flash the better even though I want to work some in 3D. Aspirin will be an essential for all the headaches flash will cause in the making of this game.

Marketing Plan:

I would love to actually sell this game once it's completed. Until then, I would like to have it displayed in the Strong Museum of Play in their interactive section. I would also be placing videos on YouTube and blogs about the game and trailers. I would also enter it into any competition that supports its medium. I would also like to set up a display or exhibition somewhere to have people test out my game. If it is cheap enough to produce, I would like to sell them or give out free copies around campus.

Literature Review:

*ARhrrrr - An Augmented Reality shooter

Kimberly Spreen, Blair MacIntyre, David Cochard, Tony Tseng

2009

Georgia Tech Augmented Environments Lab and the Savannah College of Art and Design

<http://www.youtube.com/watch?v=cNu4CluFOcw&feature=related>

This is an amazing video. It is inspirational in so many ways. Augmented Reality is like born to be on mobile devices. Everything will be on mobile devices. I really love the idea of making the viewer as a part of the game and the perspective makes it great for a helicopter like view. I would like to make it more subtle in a way. Something that wouldn't require so much movement or could be played in a small area.

*Art of Defense (AoD)

Augmented Environments Lab, Duy Nguyen

2009

Georgia Institute of Technology

<http://www.augmentedenvironments.org/lab/>

This game is one I have been dreaming about since I heard about Augmented Reality. While I am ecstatic someone was able to create it, I'm mad it wasn't me. It doesn't mean however I'm done, cards could also be a way to go too or different scenes and objectives. Exploration games have many genres, I think I may take this route more in depth if I can. Video of game at:

<http://www.youtube.com/watch?v=hSUuvgklsZw&feature=related>

Augmented Reality

University of Washington

Hitlab

<http://www.hitl.washington.edu/home>

The UofW website had a lot of cool information on different projects. Not all really had much to do with what I want to do but they did have a lot of user interaction kiosks and events that were great research opportunities. I got to see a lot of different ways to set up projectors to different kinds of physical computing. There is some cool work done in AR, a video done for the science channel can be found at

http://www.youtube.com/watch?v=ZKw_Mp5YkaE&NR=1.

*Augmented Reality and Information Visualization

Prototype MVC-RA

2007

<http://www.youtube.com/watch?v=z-aBUyrhcj0&feature=related>

This was one of the best videos. I love the different use that AR is used for. It also shows some of the range too. I like how the user has like a controller to help flip through the information. A controller would be fun and got me thinking of different ways the user can interact without having to use a mouse or other input.

Augmented Reality Racing Game

Ohan Oda, Levi Lister, Sean White, Steven Feiner

2008

Columbia University

http://www.youtube.com/watch?v=c_LrVql6StY&feature=related

I love this video. The guys who worked on this really had a great idea in incorporating a mechanism that reflects movement. The “joystick” must move to turn the car and drive. It may not be the most accurate but it looks like a lot of fun. They were able to incorporate a fully functional world. The ability to have a game on a rotating moving platform is also another way idea I want in my project.

Augmented Reality Technology (ART) of War

Daniel Broten, Graham Bury, David Johnson

2007

University of Waterloo

<http://www.youtube.com/watch?v=86jXGT71LrE&feature=related>

This video I think is way out of my league in what I will be able to produce for my thesis. It is another fun look at how the interaction works. With all of those symbols on the mat it is distracting. I have some good things to look out for and design issues that need to be overcome in order to produce something fun and entertaining that isn't distracting. The information tab was informative as to how it plays and a little of the behind the scenes work.

Beyond Reality

2009

<http://www.augmented-reality-games.com>

This site is also full with a wealth of knowledge. It has 2 amazing games that were really helpful in their ideas and game play. I was looking to do something

very similar to the PIT Strategy game and I hope I can. It really lays down the ground work and shows games like board games can now become hybridized into interactive digital media.

CellaGames.com, mobile Augmented Reality

Sergey Ten

2008

<http://cellagames.com>

This is a great little site. Sergey is a freelance programmer and artist. He was able to make a few different cell games using Augmented Reality which I think is a great use for AR. It also makes me think what platform I want to put this onto. Mobile phones may actually be the future of AR and the rest may fade away. Good to look into where this technology is heading before I jump in.

*Endemol Virtual

2007

<http://www.endemolvirtual.com>

This is a great company with a lot of great endeavors. Their website is also a great use of papervision. The idea they had for the game is a great idea. I was thinking AR on business cards and other sorts of things but a matching game on the invitation was brilliant. I wanted to do something like that for my job. A video at: <http://www.youtube.com/watch?v=Ps0TyUXuwv8&feature=related>.

FLARVision: Augmented Reality and Papervision

Jesse Freeman

2009

InsideRIA

<http://www.insideria.com/2009/05/flashvision-augmented-reality-a.html>

Looks like a great tutorial and exactly what I need to get started. Provides a very in-depth look into creating classes and encapsulating the files to work better for you. The author has also very generously provided a sample file. It will definitely be some upper level programming. I hope it isn't too far above my knowledge.

For Nerds Only: Custom FLAR Markers Explained

Squidder.com

2009

<http://www.squidder.com/2009/03/05/for-nerds-only-custom-flar-markers-explained>

This is a great tutorial explaining what and how markers work in flash. With a free download and an easy to use program it seems to be pretty easy to make new markers. This will be essential for a game or anything really. Thankfully, the code doesn't seem too heavy.

Genesis Project

Bernhard Schmidt, Christian Schafleitner, Markus Klopff, Birgit Hajek, Fritz-Michael

Gschwanter

2005/2006

Upper Austria University of Applied Sciences Hagenberg

<http://www.youtube.com/watch?v=P9mrmBTBj74&feature=related>

This is a great project and probably something similar to what I would like to make. It is a real time strategy based game where you have to make a world and play god. The game progresses and you have to react as well. I love how they used an overhead projector, which really gives me some good ideas and changes the general scope of originally how I thought to play. The description was also very informative, really gave a great overview of the project. They had a whole team developing this though, as did many.

*Gizmondo Augmented Reality Game - Catapult

2006

<http://www.youtube.com/watch?v=Lfp8id6bpDU&feature=related>

What I like about this video is the use of a great navigation system within the game. This game however was never finished or released because Gizmondo went out of business. I wanted to create a tower defense style game and I think the markers would make a great tower. This movie shows promise to my ideas. Having a controller may be a difficult work around than having a mouse which may be too bulky to use.

Interactive Cards

Joao Ferreira, Pedro Carrico

2007

YDreams

http://www.youtube.com/watch?v=bFRYosXO6_Y&feature=related

These guys made a great little game here. I am a huge fan of Magic: The Gathering and I was thinking how I could make a game that follows similar

conventions but add a new dimension to the game. This is a very simple game but I wouldn't have enough time to make all of that. I would like to take aspects of both genres and create something new. This shows it is definitely possible although I have never used those programs before.

*Introduction to Augmented Reality

Lee Brimelow

2008

The Flash Blog

<http://gotoandlearn.com/play?id=105>

This is an amazing video tutorial which separates it from a lot of the others. It provides a detailed step by step of what to do. This is everything I could need to start doing amazing things. Thank you Lee Brimelow.

Natural Human – Machine Interaction

jmarco2000

2008

Giga Group in Zaragiza University.

http://www.youtube.com/watch?v=wag-B_IHqPs&feature=related

This video had a great idea going for them. They are using children and e-learning to help kids understand and learn things in a fun interactive way. While I think it is a bit clunky, the style is great and I love how the card didn't look like a typical Augmented Reality symbol. The reaction of the interaction was a little slow. I hope I can get it to register faster.

Neon Racer – Augmented Gaming Everywhere

2005

Arts Electronica Center

<http://www.youtube.com/watch?v=Vtlopu0UgXE&feature=related>

This was a great video. It was informative as well as entertaining. Its main purpose was as an ad for the game. The video showed the viewer how it was made as well as a little bit on how it functions. As a designer this was great it gave me some hints and cool directions or avenues I could try. While this isn't Augmented Reality, the choice of game play and the objects gives me a wealth of options and ideas.

Plug into the smart grid

2009

General Electric Company

http://ge.ecomagination.com/smartgrid/#/landing_page

Amazing website. I love everything about it and I love the style. I could learn something from it and adapt a style that will enhance my own. Those pieces look like they could belong on an AR marker. Not exactly related to what I am doing but it was inspiring to see good design at work. It is clean and simple.

*Total Immersion

Bruno Uzzan and Valentin Lefevre

1999

<http://www.t-immersion.com/>

This company is not only amazing but revolutionary in Augmented Reality. While I may have different plans for the overall product they have paved the way in what is possible. It would be great in so many other things besides just games but advertising and learning too. This company proves interaction can be fun and be used by anyone.

Using Augmented Reality FLARToolKit and Papervision to create a unique 3D experience

2009

<http://papervision2.com/source-using-flartoolkit-and-papervision-to-create-a-unique-3d-experience>

Provided a segment of code which looks to be promising. I haven't tried it out yet. Also provided is a nice set of links for other downloads and applications. May not have much use from this site, but more may be added later.

Committee Sign-off

Professor Marla Schweppe

Computer Graphics Design | Chair – 3D Digital Graphics

Committee Chair: _____

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Graduate Program Director | Computer Graphics Design

Committee Member: _____

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Committee Member: _____

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