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Slaughter: An Animal Rights Virtual Reality Experience

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Introduction

When I was a sophomore at Wellesley, I became obsessed with the show *Hannibal*. The TV show was a prequel to the highly lauded movie *Silence of the Lambs*, and dramatized a young Hannibal Lecter, the brilliant psychologist by day and the cannibal serial killer by night. Violent yet beautifully shot, what remains seared in my memory the most are the scenes of Hannibal preparing his freshly caught kills in his immaculate kitchen. With each meal beginning with a Rolodex containing the business card of the victim, their raw flesh, muscle, hearts, livers, and other organs would be lovingly prepared into elaborate meals by the antagonist. They would be consumed to delicate music and red wine, and sometimes Hannibal would serve his cannibalistic creations to his unwitting guests at classy dinner parties.

Watching the show began to turn me off of meat. I began to realize that raw and cooked human flesh was not so much different from animal flesh. The border between consuming human and animal flesh was, in essence, simply that of psychological and social taboo. Arguments that I had adamantly given to my vegetarian friends to justify my meat-eating habits suddenly ran hollow. Why was killing a human for food considered an indefensible, immoral act of murder while killing an animal for food regarded as humane, ethical, and sometimes even necessary? Why does the idea of drinking human milk (made for humans by humans!), dog milk, rat milk, or any other milk disgust us as adults, while drinking cow milk is considered completely acceptable? Unable to satisfactorily answer these questions and justify any answers to myself, I stopped consuming animal products cold turkey.

Since then, I have not turned back. I began to delve more deeply into animal rights and veganism and discovered the other issues related to it. As a new convert (as they say, "There is no pious like the new convert"), I zealously attempted to convert those closest to me to my new lifestyle. However, after receiving significant backlash and resistance to my efforts, I stopped preaching and realized that my newfound beliefs were of the minority, and would stay the minority.

After more than two years of veganism, I eventually decided to make my senior thesis address the issue that has been so close to my heart and affected so many of the the choices I make, the most important of them three times a day at mealtime. I had been introduced to virtual reality as a Knapp Intern and I wanted to create a unique experience with it. And thus my senior thesis, *Slaughter*, was born.

History

At first, in the first semester of my senior year, I actually began with a completely different idea. I wanted to make a virtual reality game that closely resembled games like *Diner Dash* and *Overcooked*, where the player would be responsible for constructing different kinds of foods (like burgers) for customers within a limited time frame. It would be cute, fast paced, and fun. I started by creating 3D models of different vegetables and food components that would be used in the game. However, I struggled to find any motivation, meaning or passion behind my idea and early on, my advisor Dave suggested I consider doing something that was more important to me. I went back and thought about it, and realized that animal rights was something

that was close to my heart and still really motivated me, even though I no longer actively discussed it with others (at this point, I never mentioned I was vegan to new people I met).

I knew that virtual reality, as a medium, was a powerful tool that, when leveraged properly, could create both a unique and persuasive experience for users. Virtual reality allows people to experience someone else's point of view in a completely immersive way. It is a new technology that people were not already used to using, so the novelty could also be used in a powerful way. Therefore, I thought that virtual reality was the perfect medium to convey my message, as it could be an effective tool to put users in the shoes of the animals and hopefully encourage them to think a little more about the decisions they make every day on their plates.

I began by doing research on all aspects of veganism, because I was not yet quite sure of what perspective I wanted to take. I collected data on the environmental and economic impact of the industry of animal agriculture and I researched the philosophy behind animal rights. I will go into more detail about my research in the "Research" section of this paper. After I completed my research, around halfway through the first semester, I compiled what I had found into a large powerpoint that I presented to the Art Studio faculty (as well as other classmates creating Art and MAS theses). I received helpful feedback about where to narrow my focus and begin forming a solid vision of what my finished project might actually look like.

During the second half of the semester, I went back through my research and thought long and hard about what I wanted to focus on, and what mediums and experiences I could create that would best achieve what I envisioned. At this point in time, I was really fixated on the idea of creating a game (virtual reality or 3D), with moving components, scores, and some kind of end goal. I ultimately came up with the idea of creating a suite of three mini-games that each

addressed a different aspect of both the animal agriculture industry and the animal rights movement.

The first mini-game was an endless runner game that I had created for a course, *Making and Fabrication* by Jordan Tynes, in that same fall semester. It was not a virtual reality game, but a simple 3D game. In the game, a cow escapes from a farm, running away into the forest and hoping to elude capture and make it to cow haven and escape its death. The player played as the cow and gained points through 'eating' pieces of floating grass and lost if they ran into an obstacle (such as a tree). The game emulated apps such as Temple Run or Subway Surfers. I thought it would be possible to improve the game even further and incorporate it into my thesis.

Fig 1. Screenshot of the Cow Escape game created in Unreal Engine

My second mini-game idea was a virtual reality escape the room game in a slaughterhouse truck in which the player attempts to find different clues in order to unlock the

door and escape the truck to freedom. The catch would be that, unknown to the player, it would actually impossible to solve all of the puzzles in the game and escape. No matter what happened, the player would lose and eventually arrive at the slaughterhouse to be killed.

The third mini-game idea was a virtual reality experience in which the player would be a slaughterhouse worker tasked with killing animals (as they are in real life). A conveyor belt of farm animals would begin moving past the player, and it would be the player's responsibility to kill them by pulling the trigger of a gun against each animal's head. I envisioned it as an extremely violent experience, with blood and guts all over the belt, the floor, and the player's in-game 'body' avatar. Each animal you killed would would earn you money, and you had a quota of a certain amount of animals you had to kill within a certain amount of time. The more animals you killed, the more money you earned. Each round would get harder and harder, with more animals you had to kill in a certain amount of time. Eventually, instead of the typical chickens, pigs, and cows, animals such as cats, dogs, horses, wild animals, and eventually, even humans, would begin to show up on the conveyor belt.

There was another mini-game idea that I came up with and had fleshed out quite a bit before choosing to remove it completely from my suite of games due to time constraints (I did not think it was possible to create all four games in a satisfactory way within one semester), and due to it being thematically different from the others. While the other mini-games addressed animal agriculture, this game that tackled the idea of hunting.

Two semesters ago in my junior year, I took the course "Art of Screenwriting" at Wellesley in which I wrote a short screenplay *The Hunt.* In the script, an unsuspecting customer in a small-town diner becomes a hunting target and is unceremoniously shot and killed. It is

slowly revealed that the world in which the script is set is a parallel universe in which society is cannibalistic, humans farm other humans for meat, and it is both legal and acceptable to 'hunt' humans who are simply and innocently living their everyday lives. The reception to my script from my class was overwhelmingly positive, and I subsequently wrote a full screenplay based on the short film I had written. During the presentation of my research during the mid-semester review in the first semester, a number of my classmates had also been in the screenwriting course with me and they all suggested that I use my script as the basis for my virtual reality experience. My fourth mini-game idea was born out of the desire to do just that.

In the game, the player would be a person walking around a simulated city, completing mundane tasks and activities. After a few minutes, the player would be shot dead and killed by some unseen force. After a few moments, a tranquil living room scene would be presented to the player, in which the player's head would be seen sitting serenely on the wall similar to that of deer heads, and a family of four would be seen eating a wonderful meal of your body parts. The game would not be completely the same as my original script, but would essentially capture its spirit (and hopefully, the same horror that my classmates felt when reading my script).

After presenting these three minigame ideas to my MAS thesis committee at the end of the first semester in my senior year, I was given feedback to improve upon my ideas. For example, one criticism was that creating a game would devalue my message, as games are meant to be fun and enjoyable. Another advisor wondered if the violence might be too cartoonish and detract from my message. Overall, the comments were extremely helpful as I began my spring semester, where I would begin implementing my experience.

As my spring semester began, I still felt slightly uneasy and unhappy about my choice to create my mini-game suite, but I couldn't quite pinpoint why. After all, I had put quite a lot of thought, effort, and research into the process so far. I met with my advisor and with more introspection realized that creating a game was not the right way to go. The comments and criticism about how the nature of a game might cheapen my message resonated with me, as well as the advice on the gratuitous violence. I eventually decided to narrow down my project to just the slaughterhouse game, and turn it from the original idea of an escape the room game to a simple virtual reality experience in which the player sits in the position of a hog in a slaughterhouse truck, being transported with other hogs to slaughter. I will elaborate more on my general concept and idea in the 'Concept' section. My intention was less to horrify the player in the experience, than to provide a contemplative experience and environment where they are forced to sit for a few minutes, see the virtual world around them, and simply think and reflect. I originally created a monologue to be played during the experience, but after writing it and having a voice actor record it, I decided it cheapened the experience too much and scrapped it. Hence, my thesis now stands in its current form.

Inspiration

I feel lucky to have so much material to take inspiration from. In terms of technical inspiration, I was inspired by two major virtual reality projects. The first was a virtual reality simulation of an archeological dig site in Greece, the site of an archeology program I attended during the summer in Greece after my sophomore year as a Digital Eleon intern. In Greece, my fellow Knapp intern Shane and I took digital photos with a combination of digital cameras and

drones. Jack Wolfe, an employee of Wellesley working at Clapp at the time, used our photogrammetry to transform our 2D photos into an interactive 3D model of the entire dig site. Using that 3D model, he created a virtual reality experience where users could transport themselves around the site without physically being there. He then imported 3D models created by a combination of 3D scanning and photogrammetry of some discovered artifacts that allowed users to interact with the artifacts by using the virtual reality controllers. That was my first experience with virtual reality, and at the time it inspired me to create something similar in the future.

The second virtual reality project that inspired me was a recreation of the train in the Tolstoy's *Anna Karenina*, created by another fellow Knapp intern, Aubrey. They created an experience in collaboration with a Russian university that allowed players to transport themselves around the moving train and become immersed in both the story and the environment. The lighting and technical skill was so well done that it inspired me to create a similar experience.

There were also two art pieces that inspired me. *The Hunt* by Christian Jankowski is a video made in 1997, in which the artist walks around a grocery store with a bow and arrow and 'hunts' all of his food, whether it be an apple, chicken breast, or some paper towels. The message that we humans have become so disassociated with our hunter-gatherer past resonated with me. Similarly, I feel that modern humans had almost completely dissociated the visuals and concept of meat (the kind of meat that ends up on their plates, like burger patties or wings) from the fact that it once came from a living, sentient animal. It always confused me when someone would say "I love animals", or would enthusiastically share some local news article cheering on a cow

escaping from a slaughterhouse, but then turn around and eat meat. Either way, Jankowski's piece inspired me to create a VR experience that would hopefully remind people where their food actually came from - living animals.

The second art piece is one by Banksy called *Silence of the Lambs*. It was a performance art piece that was documented on video. In the video, a van similar to a slaughterhouse van drives around the streets of New York City, while adorable stuffed animals sticking out from the slats make crying, begging, and dying noises. Two puppeteers inside the van were responsible for bringing all of the stuffed animals to life. Some children ran up to the van, while adults tended to blankly stare at it as it went by. This piece is much more obvious and less subtle in its message than other art pieces (like *The Hunt*) and aligned the most closely to my own piece. It was a very big inspiration for my own piece, in which the user is themselves sitting inside the slaughterhouse truck, on their way to slaughter.

Other sources of inspiration include the TV show *Hannibal* (as mentioned above in my introduction), the game *Overcooked*, a video from *The Onion* parodying video game violence, the documentary series *Rotten*, the movie *Okja*, and the books *The China Study* and *How Not to Die.* Many of them contributed to my road to and down veganism, and I revisited many of them when I was looking for inspiration and guidance on my thesis concept.

Research

For the first semester of my senior year, much of the work I did was research. For my mid semester evaluation, I presented a powerpoint summarizing my research to my thesis

committee. I separated my research into different 'Topics of Exploration' to dig deeper into. These included:

Vegan Cooking and Food

I researched the common misconceptions that people have about vegan food. Common misconceptions and beliefs include: vegan food iss lacking in variety, inaccessible to those with low income (basically, expensive), or requires people to give up their favorite dishes (like Mac & Cheese), and that it is an unhealthy or nutrient-deficient diet.

Treatment of Pets versus Farm Animals

I discovered through my research that farm animals (such as pigs, cows, and chickens) are omitted from the Animal Welfare Act, and that 'standard' industry practices for farm animals are exempt[1]. Even when a state does have laws regarding the welfare of farm animals, compliance is rare and rarely enforced or punished[2].

Additionally, two weeks into the Trump Administration, thousands of documents detailing animal welfare violations (including that of the Animal Welfare Act) nationwide were removed from the USDA website which had been posting them publicly for decades[3]. The records have revealed numerous cases of abuse and mistreatment of animals that otherwise

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[1] "Animal Welfare Act." USDA APHIS | Research Facility Annual Summary Report,
www.aphis.usda.gov/aphis/ourfocus/animalwelfare/sa_awa/ct_awa_program_information.
[2] David N. Cassuto & Cayleigh Eckhardt, Don't Be Cruel (Anymore): A Look at the Animal Cruelty
Regimes of the United States and Brazil with A Call for A New Animal Welfare Agency, 43 B.C.
Envtl. Aff. L. Rev. 1 (2016), http://digitalcommons.pace.edu/lawfaculty/1018/.
[3] "U.S. Animal Abuse Records Deleted-What We Stand to Lose." National Geographic, National
Geographic Society, 14 Feb. 2017,
news.nationalgeographic.com/2017/02/wildlife-watch-usda-animal-welfare-trump-records/.

would have remained hidden. Now, the public and the media are no longer even aware of or have easy access to the state of animal welfare at facilities across the country.

Meat & Masculinity; Meat & Sexuality

I examined depictions in the media (such as movies, TV shows, or advertisements) relating meat with masculinity as well as sexuality. I found that it is extremely common for the media to imply and sometimes even outright state the toxic idea that 'real men eat meat' and that those who don't eat meat are hippies, losers, or feminine. On the other side of the coin, I found that it is also extremely common for the media to conflate female sexuality with meat eating. Men commonly state that they love skinny women who can 'eat a burger' and enjoy a large meaty meal, and advertising campaigns such as the one for Carl's Jr. feature half naked women writhing around in luxury locations feasting on a meaty burger[4].

Environmental Impact

I found that growing feed crops specifically for livestock consumes one third of water in the US[5]. On average, 2,500 gallons of water are needed to produce 1 pound of beef, which is equivalent to not flushing the toilet for a year & not taking a shower for six months. Additionally, 477 gallons of water are required to produce 1lb. of eggs, almost 900 gallons of water are needed for 1lb. of cheese, and 1,000 gallons of water are required to produce 1 gallon

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[4] "Carls Jr Ad Commercial - Super Bowl XLIX 2015 - The All Natural Burger." Performance by Charlotte McKinney, Carls Jr Ad Commercial - Super Bowl XLIX 2015 - The All Natural Burger, Carls Jr, 23 Jan. 2015, www.youtube.com/watch?v=WlUvQkW4B1k.

[5] "The Water Footprint of Poultry, Pork and Beef: A Comparative Study in Different Countries and Production Systems." Water Resources and Industry, Elsevier, 20 Mar. 2013, www.sciencedirect.com/science/article/pii/S2212371713000024.

of milk. Cows from industrial animal agriculture produce 150 billion gallons of methane per day[6]
. Incredibly, US methane emissions from livestock and natural gas are nearly equal.

Livestock and their byproducts account for at least 32 billion tons of CO2 per year, or
51% of all worldwide greenhouse gas emissions. Livestock and the farms required to raise
livestock covers 45% of the earth's total land -- livestock or livestock feed occupies 1/3 of the
earth's ice-free land. Animal agriculture is responsible for up to 91% of the destruction of the
Amazon forest. We are currently growing enough food to feed 10 billion people. However,
worldwide, at least 50% of grain is fed to livestock. 1.5 acres of land can produce 37,000 pounds
of plant-based food, while the same acreage can only produce 375 pounds of beef[7].

Health Impact

The World Health Organization (WHO)'s International Agency for Research on Cancer
(IARC) announced that consumption of processed meat is "carcinogenic to humans (Group I),"
and that consumption of red meat is "probably carcinogenic to humans (Group 2A)."[8] Meat
processing can lead to the formation of potentially carcinogenic chemicals. Meat also contains
heme iron, which can facilitate production of carcinogenic NOCs. Cooking – especially
high-temperature cooking including cooking meats over a flame (e.g., pan-frying, grilling,
barbecuing) – can also produce carcinogenic chemicals[9].

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[6] "Facts and Sources." COWSPIRACY, www.cowspiracy.com/facts/.
[7] "Facts and Sources." COWSPIRACY, www.cowspiracy.com/facts/.
[8] Staff, Author. "WHO Report Says Eating Processed Meat Is Carcinogenic: Understanding the Findings."
   The Nutrition Source, 20 Nov. 2017,
   www.hsph.harvard.edu/nutritionsource/2015/11/03/report-says-eating-processed-meat-is-carcino'
   genic-understanding-the-findings/.
[9] "Chemicals in Meat Cooked at High Temperatures and Cancer Risk." National Cancer Institute,
   www.cancer.gov/about-cancer/causes-prevention/risk/diet/cooked-meats-fact-sheet.

The Philosophy of Animal Rights

In Peter Singer's groundbreaking book *Animal Liberation*, he makes several arguments for animal rights. He argues that Speciesism is discrimination on the grounds that a being belongs to a certain species. He continues that all beings capable of suffering are worthy of equal consideration and that giving lesser consideration to beings based on their species is no more justified than discrimination based on skin color. He also argues that animal rights should be based on capacity to feel pain more than intelligence (because many animals show the mental capacity similar to human children and mentally challenged humans).

Comparisons to the Holocaust

I found an interesting quote by Dr. Alex Hershaft, who survived the Warsaw Ghetto and is the cofounder of the US Animal Rights movement on a Reddit Ask Me Anything Thread[10].

Question: "I have seen animal rights activists use the word 'holocaust' to describe mass animal slaughter, and I've seen other people offended by the word usage, saying it is offensive to the victims of the real Holocaust. Given the unique circumstances of your life, what's your opinion of this semantic debate?"

Answer: "The negative reaction is largely due to people's mistaken perception that the comparison values their lives equally with those of pigs and cows. Nothing could be farther from the truth. What we are doing is pointing to the commonality and pervasiveness of the oppressive mindset, which enables human beings to perpetrate unspeakable atrocities on other living beings, whether they be Jews, Bosnians, Tutsis, or animals. It's the mindset that allowed German and

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[10] "I Am an 80-Year-Old Holocaust Survivor Who Co-Founded the US Animal Rights Movement. AMA • r/IAmA." Reddit,
    www.reddit.com/r/IAmA/comments/2h8df0/i_am_an_80yearold_holocaust_survivor_who/.

Polish neighbors of extermination camps to go on with their lives, just as we continue to subsidize the oppression of animals at the supermarket checkout counter."

Business, Capitalism, and the Commodification of Life

The Milk Lobby

There is an extremely strong milk lobby that is wholeheartedly supported by the government. American farmers produce so much surplus milk and cheese that the world and the American population simply cannot consume it all quickly enough. As such, the government is forced to subsidize them to prevent a market collapse. In the 1930s and 1940s, the government spent 2 billion dollars simply purchasing all of the surplus milk and cheese and storing them in underground warehouses. However, after Nixon cut government spending on these subsidies, the dairy lobby got together with Congress to approve and launch national ad campaigns to convince Americans to drink more milk (hence, those ubiquitous "Got Milk" ads). They also partnered with other food establishments and industries to create dairy heavy menus (like Dominos' double, triple, and quadruple cheese pizzas)[11].

The idea that milk is essential to a healthy diet is so widespread that most people never question it. During the 1990s and early 2000s, it was impossible to open a magazine or turn on the TV without seeing a grinning celebrity with a milk mustache asking "Got Milk?" The ads helped drive demand for dairy at a time when milk consumption was at its lowest points.[12]

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[11] Scheltens, Liz, and Gina Barton. "How Big Government Helps Big Dairy Sell Milk." Vox, Vox, 2 May 2016, www.vox.com/2016/5/2/11565698/big-government-helps-big-dairy-sell-milk.

[12] Scheltens, Liz, and Gina Barton. "How Big Government Helps Big Dairy Sell Milk." Vox, Vox, 2 May 2016, www.vox.com/2016/5/2/11565698/big-government-helps-big-dairy-sell-milk.

Those ads were an example of how, for decades, the government has helped sustained the dairy industry by convincing people to drink more milk. School lunches are almost all required to include a carton of milk. Today, the US Department of Agriculture's dietary guidelines recommend three servings of dairy a day, despite the fact that one in four Americans can't digest milk. Recent studies have also shown that drinking milk does not protect against bone fractures and may be linked to certain types of cancer. And all the touted nutritional benefits in milk — calcium, potassium, and protein — can be found in greater amounts in foods like broccoli, kale, and black beans.[13]

But these foods are at a disadvantage when it comes to competing against dairy. They don't have trade groups giving millions to members of Congress and lobbying for influence over the nation's nutrition policy. The current political forces at play are too strong, especially during the time when the recommended dietary guidelines are coming up for review.

Additionally, when it comes to competing dairy alternatives like soy and almond milk, the milk lobby has been intensely lobbying to and exerting pressure on state and federal governments. They are hoping to pass legislation (such as the Dairy Pride Act) to ban those companies from calling their products 'milk', and forcing them to call their products another name in the hopes of confusing or convincing customers to return to buying dairy milk over other alternatives[14].

[13] Scheltens, Liz, and Gina Barton. "How Big Government Helps Big Dairy Sell Milk." Vox, Vox, 2 May 2016, www.vox.com/2016/5/2/11565698/big-government-helps-big-dairy-sell-milk.

[14] O'Connor, Anahad. "Got Almond Milk? Dairy Farms Protest Milk Label on Nondairy Drinks." The New York Times, The New York Times, 13 Feb. 2017, www.nytimes.com/2017/02/13/well/eat/got-almond-milk-dairy-farms-protest-milk-label-on-nondairy-drinks.html.

The Egg Lobby

Similarly to the milk lobby, there is also an extremely strong egg lobby that spends

millions of dollars on politicians and influencing policy. A recent scandal that emerged pitting

the egg lobby and a new vegan mayo startup, Hampton's Creek, emphasizes how much influence

and resources that the egg lobby has. It was discovered that the government controlled industry

board, the American Egg Board, launched a massive PR campaign aimed at crushing the small

Silicon Valley startup. Things that the Egg Board did ranged from enlisting a high-powered

public relations firm to buying off unwitting bloggers. They also attempted to lobby to Congress

to force the startup to change its name from "Just Mayo" to something that did not involve the

world "Mayo" in the hopes that it would confuse customers away from the vegan product[15].

Additionally, despite the high cholesterol content of a single egg (the same amount as a ⅔

lb Hardee Monster Thickburger and more than a third of the recommended daily intake) and

recent studies suggesting eggs are as harmful on your cartoid arteries as smoking[16], the egg lobby

continues to advertise in a misleading way that eggs are a part of a nutritious diet. The USDA,

because it has regulations against false advertising, does not even allow the egg industry to

advertise that eggs are 'healthy', 'nutritious' (though 'nutrient-dense' is allowed), 'low calorie',

or even 'an important part to a well balanced, healthy diet' because of the high amount of

[15] Thielman, Sam. "US-Appointed Egg Lobby Paid Food Blogs and Targeted Chef to Crush Vegan Startup." The
   Guardian, Guardian News and Media, 6 Sept. 2015,
   www.theguardian.com/business/2015/sep/06/usda-american-egg-board-paid-bloggers-hampton-c
   reek.
[16] Fung, Brian. "Study: Eggs Are Nearly as Bad for Your Arteries as Cigarettes." The Atlantic, Atlantic
   Media Company, 14 Aug. 2012,
   www.theatlantic.com/health/archive/2012/08/study-eggs-are-nearly-as-bad-for-your-arteries-as-cigarettes/2
   61091/.

calories, saturated fat, and cholesterol. The USDA even banned the egg industry from using the word 'safe' because of the relatively high amount of people each year who get sick from salmonella in eggs.[17] Yet, they continue to misleadingly advertise eggs as an essential part of a healthy, American diet.

I also looked into the deceptive marketing of the egg industry targeting those concerned about animal welfare. Nowadays, terms such as cage free, free range, farm fresh, and organic eggs are common in grocery stores. Although this also applies to the milk and the meat lobby, to some degree (with the 'organic' or 'farm fresh' labels), these kinds of misleading labels are used most with eggs. The terms 'farm fresh' and 'all natural' mean nothing (they are not regulated terms), while the term 'cage free' simply means that birds live in crowded aviaries -- massive industrial barns that house thousands of birds -- where each bird has, on average, 1 square foot of space. When it comes to the term "free range", the vast majority of free-range birds in commercial egg facilities never actually go outside. Therefore, in most cases, free-range means the same thing as cage-free. There is no government oversight of the term "free range" when it comes to eggs, so companies can more or less interpret it as they see fit. Technically, the only term that actually indicates any level of animal welfare is "pasture-raised", though there is much variety and range of conditions on farms that pasture raise their chickens. [18]

The Meat Lobby

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[17] Greger, Michael. "Peeks Behind the Egg Industry Curtain." NutritionFacts.org,
    nutritionfacts.org/2015/03/26/peeks-behind-the-egg-industry-curtain/.
[18] Kelto, Anders. "Farm Fresh? Natural? Eggs Not Always What They're Cracked Up To Be." NPR, NPR,
    23 Dec. 2014,
    www.npr.org/sections/thesalt/2014/12/23/370377902/farm-fresh-natural-eggs-not-always-what-they-re-cracked-up-to-be.

When it comes to the meat industry and lobby, something I found extremely interesting was its ag-gag laws, which are state laws in the US that forbid the act of undercover filming or photography of their activity on slaughterhouses and farms without the consent of their owner, particularly targeting whistleblowers of animal rights abuses at the facilities. While not all states have these laws, eight of them currently have them in place.[19] Additionally, thirteen states in the US have 'food libel' laws, which makes it easier for food producers to sue their critics for libel. Basically, the laws establish different standards of proof than those that are used in traditional American libel lawsuits, including the practice of placing the burden of proof on the party being sued.[20]

A famous example of this is when Oprah Winfrey was involved in a lawsuit (the Amarillo Texas beef trial) in which she made a comment on air on her show about never wanting to eat beef again after hearing about mad cow disease from a guest star. In response to this, cattle futures dropped 10% and beef prices fell by 7 cents per pound. The costly lawsuit dragged on for years, and even though the lawsuit was eventually dropped by the jury, it is just an illustrative example of how the meat industry is using a combination of lobbying, laws and litigation to silence and persecute both animal rights activists and anybody who might speak negatively of their products.[21]

Of course, on the federal level, the meat industry spends millions of dollars lobbying. For example, since 1977, under pressure from meat producers, federal dietary advice has evolved

[19] "What Is Ag-Gag Legislation?" ASPCA,
www.aspca.org/animal-protection/public-policy/what-ag-gag-legislation.
[20] Duignan, Brian. "A Brief History of Food-Libel Laws." Encyclopædia Britannica, Encyclopædia Britannica, Inc., www.britannica.com/story/a-brief-history-of-food-libel-laws.
[21] Duignan, Brian. "A Brief History of Food-Libel Laws." Encyclopædia Britannica, Encyclopædia Britannica, Inc., www.britannica.com/story/a-brief-history-of-food-libel-laws.

from "decrease consumption of meat" to "have two or three daily servings." It highlights the inherent conflict of interest in the Department of Agriculture's dual mandates to promote U.S. agricultural products and to advise the public about healthy food choices. The industry also spends millions of dollars in advertising trying to convince consumers to eat more meat. [22]

- Veganism Beyond Food: Clothing and Cosmetics

Something that was important for me to note in my research, though was not my focus, is the avoidance of animal products in commercial products beyond meat. For example, leather is widely used to make different products, like wallets, shoes, and belts. Fur coats usually are made from fur farms, where animals such as minks, chinchillas, etc are killed and skinned. Additionally, winter coats (such as the infamous Canada Goose brand) and other products like pillows or comforters will sometimes contain feathers plucked from live birds. Wool and silk are two examples of materials used in clothing that is animal derived, and some cosmetics include animal derived substances such as honey, lanolin (wax secreted by sheep), and carmine (crushed beetles).

Concept

The concept for my virtual reality experience is as follows. The user is welcomed and led into a small, dark room with a chair in the middle of the room. Also inside the room will be a virtual reality headset with headphones, a computer (for running the program), and a fan. An attendant (presumably me, the artist), will usher the user onto the chair, and place the virtual

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[22] Zaraska, Marta. "This Is Why You Crave Beef: Inside Secrets of Big Meat's Billion-Dollar Ad and
    Lobbying Campaigns." Salon, Salon.com, 4 Apr. 2016,
    www.salon.com/2016/04/03/this_is_why_you_crave_beef_inside_secrets_of_big_meats_billion_dollar_ad
    _and_lobbying_campaigns/.

reality headset and headphones over their head. Then, the attendant will begin the simulation and turn on the fan so that it produces an air flow that will replicate a soft spring breeze.

The user will be introduced to a virtual reality simulation in which they are a pig stuck in a pig pen along with other pigs, in a truck taking them to the slaughterhouse. The headphones will broadcast a soundscape with sounds of pigs grunting and groaning, as well as the rumble of the moving truck and ambient sounds of the outside world.

On their right side is the wooden slats of the truck, from which the user will be able to see a glimpse of the outside world as they drive by - a faraway farm in a sunny meadow, a lush forest, and eventually, a desolate landscape that indicates to them that they have reached their final destination - the slaughterhouse. The entire experience will last for about 5 minutes. Hopefully, the experience will encourage users to take the time to contemplate the message and purpose of my work, and to think about what it would be like to be heading toward certain death without any chance of escape. Originally, I planned for a monologue to play a voice spoken by the pig the user is standing in for, but after writing, recording, and inserting it into the experience, I found it too distracting and decided to remove it from the experience.

Once the slaughterhouse truck reaches its final destination, the user will only see a desolate landscape of dirt and rocks and just the tiniest glimpse of the smoky factories in the distance. It will not be as sunny as the other landscape, it will be darker and murkier. The soundscape will crescendo, in which the pigs become more and more agitated. The truck will stop moving for a few moments before it fades out and the experience ends.

Equipment and Programs

Unreal Engine

Unreal Engine 4 is a cross-platform game engine that has been under development by Epic Games since 1998, when it was first showcased in the first person shooter game *Unreal*. Although it was primarily developed for creating first person shooter games, it has successfully been used to develop a variety of other genres of video games. The coding language it primarily uses is written in C++, and it is a tool used by many professional indie game developers to this day.

Because Unreal Engine is portable and cross-platform, it was ideal for creating experiences compatible with VR headsets as well as Mac and Windows OSs. Additionally, Unreal Engine supports a wide variety of 3D modeling extensions for importing, which made it easier for me to create models from scratch in Blender (which is a software that will be addressed shortly), but also import models downloaded and purchased online that came in a variety of different file formats. I used Unreal Engine version 4.18 in the spring semester of my thesis in order to create the virtual reality experience.

Though Unreal Engine supports scripting in C++ as mentioned above, the most important reason I chose Unreal over another game engine such as Unity was its Blueprints mode. Because I wanted to focus more on the artistic side of my project and worry less about the nitty gritty of coding in C++, I wanted a game engine that would allow me to do so. Blueprints in Unreal was perfect for that. The Blueprints Editor is an in-game editor that allows the game developer to prototype their game using a node-based coding system in which coding concepts such as

functions and variables are represented by labeled and color coded nodes and are connected

together by lines with arrows on them. Inside the nodes, there are related parameters that can be

edited with the keyboard.

Fig 2. An example of the Blueprints Editor's node-based coding system in Unreal

HTC Vive Headset

The HTC Vive is a virtual reality (VR) headset developed by the HTC and Vive

Corporation first released in 2016. The Vive runs Unreal builds using the Steam VR package.

While there were other headsets available when I was creating my project, such as the Oculus

Rift, the Vive simply had more infrastructure and resources available and accessible in the

Knapp Center. Only halfway through the year did the Knapp Center even set up a station for the

Oculus Rift that was open to all, while the Vive had been available for the past two years. Additionally, both of the virtual projects mentioned above as inspirations were created with the Vive headsets, so I was just simply more familiar with the headset over other alternatives as a Knapp intern.

Fig 3. HTC Vive Headset

Blender

Blender is a professional, free, open source 3D computer graphics software that can be run on Windows, macOS, and Linux. It was first developed in 1995 by a the Dutch animation studio NeoGeo as an in house application, before the company was dissolved. However, in 1998 Not a Number Technologies (NaN) was founded to further develop Blender, distributing it as shareware until it went bankrupt in 2002. In 2002, the founder of NaN started the "Free Blender"

campaign, a crowdfunding campaign that aimed for the open sourcing of Blender created from funds collected from the community. They met their goal and released the Blender source code. It is still free and open source today, with its software mostly developed by the community alongside two full time and two part time employees employed by the Blender Institute.

I chose Blender over other 3D modeling software like Autodesk Maya or Solidworks mostly because of its versatility and also because I had previous experience using the software. I used it for different purposes. For example, one way I used the software was to convert certain file extensions incompatible with Unreal into extensions that could be read by Unreal. I also used the software to custom model the slaughterhouse truck, the pigs, and components of the eventual environment in the simulation such as trees and houses. These models were then imported to Unreal, as both Blender exports (like .fbx files) and Blender files (.blend files) could be imported into Unreal with ease. Lastly, I also used it to modify and edit any 3D modeling files purchased or downloaded from the internet to customize it into something perfectly suited for my needs. For example, some models needed modified textures and materials, and Blender allowed me to easily add these.

Adobe Photoshop

Adobe Photoshop is a photo-editing (raster graphics) software that is supported by both Mac and Windows, developed by Adobe Systems since 1988. The versatility of the software allowed me to work on both Windows and Mac machines around campus and on my personal computer. The wide variety of supported file formats allowed me to import highly specialized

image formats, edit them, and then export in ubiquitous file formats like .jpg and .png. Primarily, I used Photoshop to edit textures and materials used on the 3D models.

Adobe Audition

Adobe Audition is a digital audio workstation software that is supported by both Mac and Windows, developed by Adobe Systems as part of the Creative Cloud Suite (along with Photoshop) since 2003. The versatility of the software allowed me to work on both Windows and Mac machines around campus and on my personal computer. I mostly used this to create my soundscape to accompany my experience, in which I layered and edited many different, separate noises together to create a unique soundscape that I could then import into Unreal Engine and automatically play when I began the game or when the level changed. Adobe Audition was the best choice simply because it is both extremely powerful and the audio editing software that I am the most familiar with as a Knapp Intern.

Process

The following section is an overview of the steps I took trying to create my virtual reality experience with the tools and programs that I used.

Building the Assets

The first step after nailing down the concept was to start building the individual components of the user experience. I first made a list of assets I would need to create in order to populate the environment I was envisioning. The most important asset was the slaughterhouse

truck. Inside the truck there would be pigs, lined up in a grid formation and enclosed by a

wooden pen. The truck itself would be made of a solid floor and ceiling, with wooden slats on

the sides. Then, to create the outside environments, I needed to model trees, a barn, a farmhouse,

horses, a windmill, a road, rocks, and a factory. To get these assets, I created some of them from

scratch and I downloaded some of them from online.

I began by constructing the slaughterhouse truck. I downloaded a 3D model of a pig from

online and added a texture in Blender.

Fig 4. The 3D model of the pig in Blender

Then, I created a separate file and model where I built the truck from scratch in Blender.

After creating the 'bones' of the truck with the floor, ceiling, and slats of wood for the side, I

found a wood texture online and UV wrapped it onto the model, making it look as if it were made of wood.

After creating the outline, I then imported the pigs into this new file and put them inside of the truck, in a tight grid pattern. Then, I created individual small wooden pens to enclose each pig so that each pig was in a pen.

Fig 5. The 3D model of the slaughterhouse truck in Blender

Then it was time to create some trees. There needed to be some variety of trees in a forest, so I created five different types of trees in Blender with different colors and textures as the

leaves. To start, I created a tree trunk and gave it a wooden texture. And then, I created the

leaves as flat planes in Bblender which had leaf textures on it.

Fig 5. The 3D models of the different trees in Blender

I had already created a barn previously for my cow escape game, so I simply made use of

the existing file for my game. For the farmhouse, windmill, road, rocks, and factory, I created

them in Blender and added textures / materials to them. Some of these textures were just simple

colors while others were images (such as the road). Since the farmhouse, windmill, rocks, and

factories were meant to be far away from the viewer, there was less detail needed for their textures. For the tiny horses grazing in the distance, I downloaded a 3D model online of a horse and added textures to it in Blender.

Building the Terrain

I initially tried to build my terrain in Blender rather than in Unreal. I modeled a group of grass blades into a 'bundle' of grass in Blender and then created 'patches' of them in squares that I added to a large plane. Then, I added the section of road I had created through the center and copied it until it ran from one end to the other end of the plan. I imported the slaughterhouse truck to make sure I was creating the terrain in the correct scale. I began adding trees and more terrain in order to make it more realistic.

However, I was having a lot of problems with this method. I realized too late that the textures for the grass and the textures for the trees had been created with two completely different render engines - one was made with Blender Render, while the other was made with Cycles Render. There can only be one active render engines running at one time and there was no quick or easy way to convert to the other render engine, so no matter what, one type of asset would not have a texture. This was extremely problematic. Therefore, I had to get rid of my work on this front completely and start over in Unreal Engine.

The biggest problem I encountered was the computer's processing power. The computer began to lag heavily, and sometimes the entire file would crash. It became impossible to add or modify anything because it would just freeze and crash. I was already using the most powerful computer in the Knapp Center (the one made specifically for virtual reality, in which it is

powerful enough to run two simulations at once, one for each eye). Therefore, I was forced to abandon all of my hard work and try a different approach.

I went into Unreal Engine and decided to learn how to create my own terrain in the game engine itself, rather than importing it. First, I created a flat terrain plane and then created little dips and valleys to give it a little texture (since land in real life isn't completely flat, it usually has some irregular elevation). I gave the surface a dark brown color (as dirt) and then it was time to add the grass. I downloaded a free Unreal Asset package released from Epic Games that had different environmental assets like rocks, trees, etc. I selected the grass from the package I had downloaded and used the terrain 'paint' tool in Unreal to paint the landscape with grass. What was really interesting about this method was that when zoomed in closely, the grass would wave softly back and forth as if there were wind blowing through it.

Fig 6. The grassy terrain in Unreal

Importing Assets

I had to import all of the assets I had created or modified in Blender in order to 'decorate' my different environments in a believable way for the eventual user. When exporting all of my assets from Blender, I exported to the .fbx file format because it retained not only the 3D model itself but also the textures and materials that were attached to it. Then, I imported these files into Unreal Engine and added them to my project folders. Finally, I began dragging them into the scene and adjusting them as appropriate.

Setting up the Scene

The first and most important asset to set up in the scene was the slaughterhouse truck. I dragged the model into the scene on top of the terrain, and had to scale it down a little to match the terrain. It couldn't be too large, but it couldn't be too small either. I did have a small problem where if I made my terrain too large, then the engine would struggle to render the grass and it would end up showing an ugly white space where the grass should be. I played around with the scale of both the truck and the terrain, because I wanted the terrain to be small enough to render properly but still wanted to give the effect to the viewer sitting inside the truck that the terrain lasted forever, extending into the horizon. I also had it hover over the terrain rather than be sitting on top of the terrain to emulate the effect of a truck on wheels (therefore, elevated to the viewer) during the simulation.

Once I had successfully imported my truck, I moved it to the edge of the terrain (because I intended for it to move slowly forward across the terrain), and then imported the road asset I had created. Once it was in the library, I dragged it into the project, copied it five times, and laid them end to end to create a long road that stretched across the terrain. I scaled the size of the road so that the slaughterhouse truck fit inside of it, and moved it underneath the truck. Those two things were the basic assets that would be present in every single terrain.

I decided to create three terrains - the countryside, the forest, and the desolate, industrial wasteland. With the countryside terrain, I decided to just keep the grassy terrain I had created and just add some trees at the end of one of the edges (to hide that the terrain stopped there). I then added the farmhouse, two horses, the windmill, and a small cluster of trees at the end farthest away from the truck, so that it would look very tiny and far away from the viewer (and in general make the terrain look vaster).

Fig 7. The completed countryside terrain in Unreal (not the user perspective)

For the forest terrain, I populated the entire terrain with trees (on top of the grass), except for a small clearing next to the road. I made sure most of them were far enough away that their branches would not run into the truck as it went by. However, I did create a section of road where I put the trees closer to the road for that effect.

Fig 8. The completed forest terrain in Unreal (not the user perspective)

For the industrial terrain, I wanted less rather than more. So I erased the grass (I wanted it to be barren) and gave the terrain a brown, dirt texture. I added a few small rocks scattered around the area, and I added different industrial - looking buildings and factories at the far end of the terrain, so that the viewer can only glimpse the ominous structures ahead when the truck (and subsequently the experience) stops and that it implies what it is (the slaughterhouse) rather than truly showing itself.

Fig 9. The completed industrial terrain in Unreal (not the user perspective)

After creating the three different terrains, I had to create the appropriate lighting. I added two point lights, cranked up their intensity, and positioned them next to each side of the slaughterhouse truck (with the wooden slats) to recreate the look of the sun streaming in. Then, I added a 'sun' so that the environment would act similar to if there was an actual sun, such as the trees creating shadows in the truck because they are blocking the sunlight. I originally put a dim light inside of the truck itself near the ceiling, but I received feedback saying it was unnatural, as a real slaughterhouse truck would not have a similar light, so I removed it from the final experience.

Next, I had to add a skybox. For the beginning of the experience, I wanted a blue sky with white, fluffy clouds, so I imported and created a skybox with just that. However, for the

industrial terrain, I wanted a skybox that was a little less pleasant and happy and a little more moody, so I created a skybox that was a night sky full of stars.

Setting up Controllers & Cameras

After creating my different environments, it was time to set up my controllers and cameras. This would be how the player connected and interacted with the virtual world I had created. I began by placing a 'Playerstart' onto the spot where I wanted the player to be whenever the game started (which was in the empty pen in my slaughterhouse truck, next to the side of the truck with slats). This worked well for a few days, before I encountered a problem. For an unknown reason (as I did not edit or change anything significant about my "Playerstart" between that time), the 'Playerstart' stopped working and instead would transport the player to (0,0,0) every time instead of the place I wanted it to start. After extensive troubleshooting, I could not fix the problem and instead decided to move the entire terrain so that (0,0,0) was the starting location in the correct place (in the truck). It was an awkward, inelegant fix, but it got the job done.

Then, it was time to set up the camera and perspective. I created a new camera and placed it where I wanted the player to sit inside the truck. I adjusted it and angled it and, with some testing, found the perfect position to place it. This would be what the user would see when they put on the headset.

I also added a "BoxTrigger" in each level, which is a box invisible to the player, so that when the slaughterhouse collided with it, it would open up the next 'terrain'. On the last terrain,

colliding with the "BoxTrigger" would stop the truck and end the experience. The code that I used to make this happen will be discussed in the next section.

Coding

For the technical aspect, I coded using the Blueprints Editor. Luckily, only four different items needed any sort of code attached to them - the truck, and the three BoxTriggers. For the truck, my goal was for it to move forward smoothly at a slow, constant speed, taking the user with it, similar to a person riding a car. To achieve this, I began with the default node *Event BeginPla*y. This node is called upon every time the simulation or game begins. The first thing to do when the simulation begins is to set a timer. This was achieved using the node *Set Timer by Function Name*, where I made the Function Name the name of my custom event *MoveTimerFired* (which I created and which I will address later), setting the Time to 0.1 (which is the increment in which the timer counted - 0.1 seconds), and allowing the timer to loop continuously until the simulation ended.

The *MoveTimerFired* event node I created from scratch. My goal was to have the truck move in the forward direction by a certain amount every second (or whatever time frame I selected). Technically, the only actual node function inside of my custom event was the node *SetActorLocation,* but I needed to tell the node where the new location of the truck should be. Therefore, I took the nodes *GetActorLocation* and *Get Actor Forward Vector,* which both return location values, and added them together to get the new location of the truck. I did allow for the *Get Actor Forward Vector* node to be multiplied by an entered factor because I didn't want the experience to be jerky, but a smooth forward movement, so I had to be able to adjust the speed

for the optimal experience. I found that multiplying by the factor of 4 provided the best smooth

experience that wasn't too fast (and therefore might make the viewer sick) but also wasn't too

slow and jerky.

At first, I did have some trouble getting the user to move along with the truck (the truck

would move forward, leaving the user behind in the same spot, but adjusting some settings like

nesting the camera under the truck in the properties settings fixed that problem.

Fig 10. The blueprints editor code for the slaughterhouse truck

For the box triggers, what I needed them to do was trigger the next level the load so that

the truck could continue moving forward in a new terrain. I started out by adding a collision

capsule the shape of a large rectangle onto the end of my slaughterhouse truck so that it would

trigger a collision event in anything that it collided into. Basically, when the slaughterhouse truck

collided with the BoxTrigger, it would trigger the new level to start. Therefore, the code for

BoxTrigger 1 and BoxTrigger 2 were exactly the same. I actually had some confusion over how

to achieve my goal, because I tried at first to attach the code to the slaughterhouse truck itself.

However, it created a problem where all contact with Box Colliders would cause it to do the

same thing, and I wasn't able to customize what would happen if the truck collided into a

different BoxTrigger. After some troubleshooting, I was able to figure out that I had to attach the

code to the BoxTriggers, not to the truck.

To achieve this, I began by ignoring both of the default nodes *Event BeginPlay* and *Event

Tick* because there wasn't anything specific that I wanted to set or do when the simulation first

began, nor was there anything I needed it to do over time during the simulation. Therefore, I

added the event node *Event ActorBeginOverlap*, which basically only happens is something /

anything collides with the trigger box. If something collided with the box, I had a quick

animation play of it fading to black (hence the *Create Level Sequence Player* node - the

animation I created separately), a short delay to allow that to happen (the *Delay* node), and then

it would trigger the next level with the *Open Level* node.

Fig 11. The blueprints editor code for BoxTriggers 1 and 2

      The last BoxTrigger has a different purpose from the first two - to end the game /
experience. The way I achieved this was quite simple - I did the same thing as the above code for
BoxTrigger 1 and 2, but instead of loading a new level, I had game quit with the node *Quit*
Game.

Fig 12. The blueprints editor code for BoxTrigger 3

Creating the Soundscape

As for audio, I originally intended for a monologue to be played for the player to hear while they were riding along in the virtual world. I spent a few days thinking and drawing on my research before writing a melodramatic monologue that I hired a male voice actor to read. Though I was satisfied with the read, when I added it to my project, it felt out of place and simply didn't fit. So instead, I created a simple soundscape to immerse the viewer even deeper into the virtual world.

For my soundscape, I found videos and sound clips of different environmental sounds to layer on top of each other. The sounds included the grunting and screaming of pigs, the sound of the wind through the grass and trees, the sound of birds chirping outside, and the mechanical

sound of the truck being driven. I downloaded these sound and video clips and imported them into Adobe Audition, edited and cropped them, and then dragged each clip onto a different track so that I could mix them up to my liking. I created two different soundscapes - one for the farm and forest terrains which were a little calmer, and one for the industrial terrain, in which I added more intense squealing. I also removed the sounds of birds and wind through the grass and replaced it with night noises like crickets chirping in the industrial terrain soundscape.

Fig 13. The multi-level soundscape track in Adobe Audition

Once I finished creating the soundscapes, I exported them as .wav files and imported them into Unreal, where I dragged them into the appropriate levels so that they would play automatically when the levels started. I also changed the settings of each so that they would loop over and over again until the next level loaded.

Testing & Troubleshooting

Now it was time to actually test and troubleshoot my experience. I began by borrowing the Vive VR headset from Jordan's office and setting up Steam VR. To set up the Vive through Steam VR, I needed to plug in the base stations so that they power on as well as connect the headset wires to the computer. Once they are in, I needed to turn on the controllers and wait for Steam VR to indicate that each component is on, detected, and running. Once that is done, it was time to run Room Setup. Basically, room setup allows for the computer and the Vive to measure your space so that it can place the virtual world in a way that fits into the existing space that you are in (so that you aren't running into walls). There are two options - Standing and Room - and what you choose varies on whether you are creating a standing VR experience where the user cannot move around with their body, or whether you are creating a VR experience where the user can move around with their body. Since my experience is mostly a sitting one, I usually set up a standing VR experience, though I have tried doing both and it does not noticeably alter the final experience.

Once the Room Setup has successfully been done, the option to test something in VR becomes available in Unreal. Up until then, the option for VR testing was greyed out, and any testing I did was in a 3D space within the game engine. The first thing I had to figure out was

where in the physical space was the correct spot corresponding to the correct spot in the virtual world. Basically, if the user sat too low to the ground then they would only see the road and the truck moving above them. If the user sat too high, they would see all of the pigs and wouldn't be at the correct vantage point. If they were standing too off to the left or right, then they would either be floating above the grass or sitting inside of another pig. Frustratingly, since the testing space is different every time, this is something I have to troubleshoot every time I run my program. There is no universal fix or answer since everything is related to the space that is available to the user.

Fig 14. Screenshots from each terrain from the user's perspective when the headset is on

I continually tested and troubleshot the experience as I changed things, no matter how small. Around the second half of my spring semester, I had my advising committee members come and test out the experience one by one. Unfortunately, there was some technical difficulties

with the headset and Steam VR and they would not connect. Jordan had to install a completely new gaming package on to the computer to make it work. As such, it is always important to remember that technology can be fickle, and sometimes they can choose to work and sometimes they don't work for sometimes unknown reasons. Usually, they tend not to work when you most need it to work. Afterwards, my committee gave feedback and comments about things I could improve. Up until the very end, I was testing and troubleshooting to ensure the perfect experience.

Potential Improvements

Upon reflection, some potential improvements I could make are that if I had some more time and advanced skills, I could attempt to animate the pigs in a lifelike way to move around to immerse the user even further. Currently, they just stand completely still and it does take away from the realism of the scene a little. Additionally, I could add even more and a wide variety of terrains and make the experience even longer and more unique. I could also add better transitions between the scenes and terrains, such as a fade in effects effect, or a 'blinking eye' effect (as if you just nodded off and just woke up from a short nap).

I could also improve the sensory experience in the physical world had I had more time - I could try to create a 'smellscape' of sort of a mixture of both wood and realistic pig smells (which wouldn't smell very good but would really immerse the user even further). I could create a weight designed to be draped over the shoulders to be worn by the user during the experience, so that when they take off the headset and the weight, both a literal and figurative weight has

been taken off their shoulders (which is them returning to their life of freedom rather than impending death).

It would be interesting to think about how I could add and improve onto the experience if I had created an interactive component involving the controllers. I am not sure if it would be possible with this experience specifically, but creating mechanisms for the user to interact (not just passively experience) with their virtual environment brings with it a new set of challenges could be a new step for me to take and explore.

Conclusion & Personal Reflections

Now that I am at the end of this year long process, I realize how far I have come. I took so many twist and turns on the path to creating my thesis, and it honestly did not end up anything like I originally thought or intended. After pouring so much work, thought, and time into it, so many things still went wrong or felt wrong. I had to take detours, turn around, and abandon existing work in order to go down a new and better path. However, throughout this entire experience, I have learned so much. This was my first virtual reality experience I have ever created and I am extremely proud of both my project and myself. I managed to teach myself Unreal Engine with little institutional support (beyond that of the Internet). There were no instructions to follow, no deadlines laid out for me, and I had to figure out what to do and how to do it every step of the way. The project has made me think of game development and virtual reality in a completely different way than before. In the end, I am extremely proud of how my project turned out and how people have reacted to it so far. I will continue my activism and creating art in different digital mediums, even after I graduate.

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