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Bachelor's thesis in Music Technology
Supervisor: Trond Engum

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Abstract

Sound design in film can have an immense impact on the viewing experience. For my bachelor's thesis I have created sound design for the opening portion of a short film consisting only of self-recorded audio, the purpose of which is to document a possible creative process for sound design with the intent of making it believable and immersive from an audience perspective. I will present relevant theory behind how sound design promotes believability and immersion, as well as how it can be used as a tool for storytelling. By applying the theory in the form of a practical work being my own self-recorded sound design, I aim to document techniques and methods that can be applied to make a film more believable and immersive. Throughout this project, I combined research in the form of literature study, watching interviews and talks featuring industry professionals, and a large amount of personal experimentation. Sound design being a creative discipline means that there can never be a concrete formula to follow blindly to attain results. Therein, allow this project to be seen as a suggested potential process which aims to achieve believable and immersive self-recorded sound design.

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1 Introduction

I am a fan of puzzles. Jigsaw puzzles, sudoku, minesweeper, even a word search or two are all something that I have enjoyed since I was a child. The satisfaction of looking up to get an overview and seeing it solved, to even the piece-by-piece moments where things fit just right. My first step into the field of sound design came about during my fourth semester studying music technology. The first sound design related task I was ever given a little over a year ago was nothing more than adding sounds to a short introduction to a children's show, but whenever I would find a sound that fit the video well, I realized that something felt oddly familiar, almost like each correctly placed sound clip was a puzzle piece falling into place. Over the course of that semester my interest in sound design grew, no doubt due in part to the feeling of satisfaction I felt while working with it.

During my time working on sound design for class, I had nearly never recorded my own sounds to use on projects and opted instead for what I then viewed as the "simpler" option of using a sound library, a collection of audio intended for use in sound design. Since I saw the practical side of having easy access to high quality recordings for use in sound design via said sound libraries, I never felt compelled to do much recording of my own, but it gave me a thought: How would it be to create sound design for a film using only my own self-recorded audio? Expanding on this question led me to the conclusion that I could, in theory, record any piece of audio, put it over a film and call it sound design, but I still wanted it to sound *good*. Realizing that I had no way to valuate the *quality* of my sound design, nor did I have any real grasp on the *important role* sound design plays in filmmaking, led me to the questions "why is sound design *important*?" and "what makes it *good*?".

At its core, this text is my attempt to answer the following questions:

- What is *believable* sound design?
- How can sound design make a film more *immersive*?
- What are some ways that sound design can help tell a story?
- How and when can I incorporate these ideas into my own sound design?

The first three questions are largely theoretical, and my approach to answering them was based on the findings I made during my research, whereas I took a more practical approach to

answering my final research question. I did so through self-recording and shaping my own sound design, sharing my thoughts on when and where throughout the process I tried to bring forth *believability* and *immersion*, what parts of my sound design were aimed specifically at storytelling, and what methods and techniques I used to accomplish these things.

2 The Film

The short film that I used as a subject for this project is called *Avstand* (or *Distance* in English). The film takes place during the Covid pandemic and follows Thea, a woman reconnecting with an old friend and ex-partner named Ravn, on his last day of quarantine before he embarks on an expedition. It is understood that they used to have an intimate relationship, but the specifics as to why they are no longer together are unclear. Due to Ravn being cautious about getting sick and wanting to avoid potentially infecting others that he will be joining on his expedition, he insists that he must keep a good distance in case she could be infected and asymptomatic. Thea is clearly bothered and disappointed by this but agrees to talk with Ravn on the phone as they both walk similar hiking trails, meeting at certain points along the way, and coming to terms with their past.

3 The Sound

3.1 "Believable" sound design

A central pillar of this project is not just to create sound design from scratch, but also make it sound *good*. My answer to the question "what makes *good* sound design?" is as simple as "if I as a viewer find the sound *believable*, then the sound design is good.". To clarify what I define as "believable", *believable* sound design for film is *sound design* that both *convinces* and *immerses* a viewer in correspondence with a film's world or intended interpretation. This definition, although broad, functions well as an ethos for what I want to achieve with my own sound design. I fully acknowledge the fact that it would be virtually impossible to create sound design that is

equally believable for everyone, and I am therefore attempting to create sound design that *I* find believable first and foremost.

Believability can often be mistaken for realism. When referring to realism in sound design one might think something akin to "what you see is what you hear", and of course this is true for a good portion of sound design, but a surprising number of sounds used in sound design do not match the physical counterpart they are meant to be attached to. By "physical counterpart" I am referring to the thing (object, person, creature, etc.) that a sound is meant to be associated with. One example I found during my research was how in *All quiet on the Western Front*, sound designer Markus Stemler used a block of medical silicone to create the sound of boots treading through mud (GQ, 2023, 0:01:02). An example of this in my project is how the sound of a headset "rattling" while being pulled from a backpack was not easily replicated using any headset I could find and record (Attachment 1, 01:50). The headsets, although the same size and of the same materials as the one in the film, sounded dull and not at all believable. To fix this problem, I simply wrapped the chord of a game console controller around itself and recorded it being shaken a few times until I had enough material to work with. Although it was technically not *realistic* this resulted in a much more alive and believable headset sound that I ended up using for the finished scene. Seeing as there is no "correct" sound for any given physical counterpart in sound design, and different artistic and aesthetic choices can ultimately lead to sound design that resides outside the realm of realism while still retaining a viewer's immersion, believability can and should be determined on a case-by-case basis.

3.2 Retaining immersion

If a film can capture the attention of a viewer and fully *immerse* them in its story and world (if such was the goal), then that film is successful in that regard. Understanding that sound is invaluable to achieving this goal becomes obvious when considering how numerous directors the likes of George Lucas (*Star Wars, Indiana Jones*) (Fantel, 1992) and David Lynch (*Eraserhead, Blue Velvet*) (Pro Sound Effects, 2017, 0:00:17) value sound in film. Despite this, sound design is often overlooked by your average filmgoer. In an interview with Headliner, director Danny Boyle (*Steve Jobs, Yesterday*) had this to say about sound in filmmaking:

"It is bizarre, the bias towards the cinematographic (…) and it is wonderful I'm not denigrating that side of it, but I think when you work inside the business you realize if the sound is poor, they (the audience) will disconnect." (Headliner, 2019, 0:06:16)

This disconnect that Boyle is referencing can be seen as a break in immersion for a viewer. Things as simple as a sound that is too loud or not loud enough, sounds that are mistimed with the visuals, and even sounds that feel misplaced on whatever physical counterpart they are meant to be a part of are all possible causes of "disconnects" as Boyle would put it.

Broken immersion caused by instances of poor sound design can be jarring for a viewer, and in some cases can even make waves in popular culture. Recently (as of May 10, 2024) a scene from the film *The Divergent Series: Insurgent* has been circulating on online platforms such as TikTok because of its use of an overdubbed scream (amongst other things) (Logant167, 2023). Further analysis of the scene (Schwentke, 2015, 1:12:48-1:15:09) gives useful information on sound design's impact on immersion. In the scene, the character Tris (Shailene Woodley) is jumping from a rooftop. The scream in question comes as she leaps from the building in slow-motion, however in her run-up to the edge of the roof there is an audible transition wherein her exasperated running sound is replaced by an overdub. What makes this transition noticeable is the change in both tonality and volume of her heavy breathing. The scream itself suffers from a similar issue where, since it is dubbed over, her voice feels disjointed and not connected to the rest of the film. A few moments later in the film when Tris performs yet another dangerous leap in a similar fashion, the exact same scream overdub is used again, but this time the last part of the scream is suddenly cut off entirely with no explanation as to why, a blatant example of an audio editing mishap.

Reusing even minor, repetitive sounds can cause breaks in immersion because of the human instinct to seek out and recognize patterns. Therefore, it is important to find ways to avoid reusing the same sound too many times and keep good variation in sound material to retain immersion. To avoid this issue in *All Quiet on the Western Front* which featured a large amount of bullet impacts on metal tank armor, sound designers set up a "drumming session" where they recorded numerous hits on different metal surfaces using hammers and crowbars to create variation (GQ, 2023, 0:08:34). When a sound as distinct as a recording of a person's voice is used twice within only a few seconds of each other, it becomes extremely difficult to not notice

it, and even more difficult to stay immersed. This scene from *The Divergent Series: Insurgent* exhibits nearly all possible aspects of sound design being done poorly, at least for what is expected from a blockbuster film. However, the reactions to the scene online also serve as a reminder of how it is more common to find criticism towards sound design than it is to find praise. If when watching a film passively one is constantly taking notice of the sound design, good or bad, then it is disrupting immersion by shifting focus to technical aspects of a film instead of the story being told. This is because sound design is most immersive and believable when it goes unnoticed or as Boyle puts it "it (sound) is your umbilical cord, but it's invisible" (Headliner, 2019, 0:06:56).

3.3 Storytelling with sound

Part of my research included watching interviews with sound designers such as Ren Klyce (*Fight Club, Star Wars: The Last Jedi, The Killer*), and Richard Hymns (*Jurassic Park, Saving Private Ryan*). My hope was to gain more insight into both their thoughts on sound design and the discipline as a whole. Ren Klyce's filmography stood out to me, particularly his multiple collaborations with director David Fincher. Fincher has described sound design in filmmaking as being "beyond production value" and when speaking about his work with Ren Klyce, Fincher said he sees him as a "storyteller" rather than someone whose main focus was on the technical side of sound design (Dolby, 2021, 0:58:52).

I understood then that what Fincher saw as valuable in Klyce's work was precisely how his sound design affected the storytelling. Most of the impact sound has on storytelling comes from creating a logical balance (of volume) across all sounds within a film. When discussing sound balance, I specify a *logical* balance because of how certain sounds are prioritized above others, but it is precisely this prioritization which allows sound to properly function as a tool for storytelling (Netflix: Behind The Streams, 2023).

Sometimes the viewer's focus should be on a specific object or character, and in such cases, it is natural that their sound would stand out more than others. For instance, important objects can be given a sound even when said object would not normally make much sound at all. An example of this is from *The Lord of the Rings: Return of the King* when Sméagol (Andy Serkis) and Déagol

(Thomas Robins) find the ring of power at the bottom of a river. When first inspecting it, Déagol gently caresses the ring in the palm of his hand, a rumbling low frequency emanating from it with every touch (Jackson, 2003, 00:02:28). This not only helps us as a viewer understand the ring's importance, but its power as well, showing that giving certain objects sound can inform a viewer about an object's *nature* as well as its *value*.

Ambience (sound from surroundings, background noise), foley (sounds originating from people) and various sound effects all have different levels of prioritization in terms of volume in a film's overall sound design depending on the film or director, whereas dialogue is normally prioritized above the rest regardless of this. However, a prominent example of defying this order of priority comes with director Christopher Nolans divisive approach to sound balance in his films. His 2020 film *Tenet* will see background ambience and even sometimes music overwhelming important dialogue (Thomas Flight, 2021). Traditionally, films use dialogue to move their plot forward as it is easy to convey important information to a viewer through verbal onscreen communication such as monologues and conversations between characters. This is not to say that ambience is not a vital part of a film's storytelling capabilities as it can help a viewer understand both *where* and *when* a film takes place such as with the futuristic qualities of the sound in *Bladerunner 2049* (Soundworks Collection, 2017, 0:00:44). Nevertheless, the directness of clear and audible dialogue is rarely compromised.

4 Sound Design from Scratch

The following is my personal process for creating sound design for this project in chronological order, although I originally wanted to find some suggested steps to use as a guide. In chapter one of his book *Sound Design: The Expressive Power of Music, Voice, and Sound Effects in Cinema*, David Sonnenschein gives a highly detailed step-by-step process on how to do sound design which would "allow your greatest participation in the creative process". However, Sonnenschein continues, stating that "None of these techniques, nor the order in which they may be applied, are absolutes" and that everyone should play into their individual strengths regarding perception and imagination (Sonnenschein, D. (2001). This inspired me to create my sound design in the order which parts of the process came most naturally to me.

Something worth noting is how I chose to limit myself to only doing the sound design for the first few minutes of the film for two reasons. Firstly, the start of any film, naturally, is when a viewer becomes familiar with a film's general concept and "feel" both visually and audibly. It is in these first minutes that a film needs to immerse the viewer and keep them engrossed in its story and world, so I felt it was necessary to have a focus on these opening minutes in my project. Secondly, most of the film takes place in the same or similar environments and I felt it unnecessary to create sound design for the entire film due to it just consisting of more of the same type of sound material, while also not playing any substantial role in answering my research questions.

4.1 Structuring in DAW

Something I learned from previous sound design projects is how to use my DAW as a tool to structure my projects. While watching the film without audio, I started setting up audio tracks with labels relating to what sounds would populate said tracks. By watching and imagining what I should be hearing both on and offscreen, it made it easier for me to get an overview of what sounds I needed to record for the project, while also having tracks labeled and ready to receive the recorded audio. I made sure to watch the film multiple times and repeat the process, focusing on different aspects of the sound design each time.

4.2 Making a field-recording package

Avstand takes place outdoors on hiking trails and mountains, far away from metropolitan noise. For that reason, most of the ambience would need to come from locations resembling those in the film. Planning excursions to locations like those in the film would be crucial to record believable ambience. Initially I thought my best option was to bring my laptop and sound card with me to these locations and carefully set them up to keep them protected from the elements while still optimally capturing the audio. However, this method of field-recording would be extremely impractical, and I was reluctant to even attempt it. Thankfully I was able to borrow a portable recorder from the university, and upon learning the basics of how it functions, I decided

to use it for not just my field-recordings, but my at-home foley recordings as well. This was because its practicality proved to be nearly immeasurable. I could take it with me out on the street to record cars, the forest to record wind in the trees, or my kitchen to record coffee being poured.

With the portable recorder being the centerpiece of my field-recording package, I selected one cardioid dynamic microphone and one omnidirectional condenser microphone, along with an XLR cable, a headset for monitoring, and a small microphone stand. The two microphones gave me some flexibility while recording. The omnidirectional microphone was used for recording ambience as it would capture sound not only in front of it but on all sides as well, while the cardioid microphone was best suited for foley sounds as these only required the microphone to be pointed directly at a sound source. Notably, my choice of microphones was limited to those I already own. Lastly, the microphone stand was useful for times when I would be recording long stretches of audio, or when both of my hands were occupied with foley.

4.3 Planning and going on excursions

Going on excursions to record audio for a film was completely new to me. Recording quality audio outdoors was something I had no experience with, and which came with a great deal of learning. Checking Google maps for places with a larger density of trees and fewer potential sounds from people and vehicles, as well as how to get to those places was an aspect of creating one's own sound design that had not occurred to me before. Unfortunately, google maps can be unreliable on certain things like how easy it is to access some places. Since I know very little about areas outside of Trondheim city center, asking others who have more knowledge of this was particularly helpful. Such was the case when I was looking for a source of running water to record for part of the film's ambience. I was recommended to check out Ilabekken due to it having easy access close to the water, in addition to a good variety of different intensities depending on how far up the river one would travel. A potential location and its specific attributes play a part in how useful it ultimately will be for recording purposes. Information about these attributes, such as accessibility in the case of Ilabekken, can often be difficult to obtain from visual maps alone. Getting information from people who are more familiar with

certain areas can potentially help avoid unnecessary excursions to suboptimal locations which would end in poor quality recordings.

Another important factor when planning excursions to record audio was the weather, checking forecasts for rain and wind specifically. None of the scenes I would be creating sound design for had rain in them, and any sort of protection I would use from the elements (such as an umbrella) would affect the content and quality of a recording. Because of this, a good portion of my sound design ambitions were put on hold due to periods of intense winds and rainfall. Having no other choice but to wait for a change in weather conditions gave me the opportunity to focus on other recordings for my project, but it also gave me a new perspective on what I can accomplish with my own sound design during different times of the year. For example, if I needed rainfall, but it was the middle of winter, and the cold air would turn any possible rain into snow, I would have to simulate my own rain sound or use a sound library with pre-recorded rain ambience.

4.4 Recording and organizing the audio

Ambience and foley were the only sounds I needed to record for this project. For foley recordings, I set up a microphone on my kitchen counter directed at the object or objects that I wanted to record and adjusted input levels on my portable recorder accordingly. I cleared away as many things as possible from my countertop, as sound reflecting off said objects could impact the recordings. There are several methods of recording foley sounds, the original being by watching the film as you record the sounds to synchronize the audio and video in real time (NMPost Alliance, 2015, 0:15:35). Attempting this myself I realized that this method of recording foley requires both coordination and practice to accurately replicate onscreen movements. Regardless of this, both the sound of the plastic bag and mask (Attachment 1, 00:23) were done using this method, while all other foley recordings were recorded using a method in which I would record numerous takes of a certain sound and match the sound to its physical counterpart in post.

Audio files on my portable recorder were labeled automatically by date and time in a long string of numbers that I would need to organize before being able to use them on the film. This was also a conscious decision to save recordings for future use. With proper organization and

labeling of recordings I began what I can only describe as my own personal sound library. By organizing my sound library, I could easily reuse any of my recordings in future projects without the need for listening through each individual sound file. As for how I labeled my recordings, I kept to a naming structure similar to what one would find in Soundly, a sound library which I have used in earlier projects.

The structure is as follows:

Material → *Action* → *Size* → *Force/Speed* → *Number* (if applicable)

Example:

Water → Flow → Medium → Gentle → 02

The water example is how I labeled the river sound I used in *Avstand* from 01:14. This structure, albeit simplified in comparison to the one found in Soundly, was adequate for a small-scale or beginning of a sound library.

4.5 Implementation

Having longer recordings with multiple takes of each sound or type of ambience made it easy for me to pick and choose. Putting a minute and a half long recording of one particular sound into my project and moving the audio along the track to time different individual sounds with the film allowed me to find a sound that fit its intended physical counterpart. This method was partly inspired by my previous time spent working with sound libraries, where it was common to have longer stretches of audio from a single source, wherein one could choose whichever single sound fit the film best.

4.6 The dialogue problem

An interesting issue I came across during the mixing process was the way the film's dialogue was recorded. All the dialogue had been recorded in a studio and dubbed over the characters, making it sound unnatural and disconnected from the film and broke immersion in a similar fashion to

the overdubbed scream in *The Divergent Series: Insurgent*. The dialogue problem resided mostly with Thea's dialogue. Since Ravn is only heard through either Thea's phone or headphones, I was able to create a "telephone-filter" over his dialogue using EQ, making it truer to how he would be heard from Thea's perspective. Thea, however, is the character which we follow closely throughout the film, meaning that we are hearing her talk "as-is" in most scenes. Equalization was not effective in fixing this issue, so I tried recording impulse responses. An impulse response (IR) is a short and reasonably loud sound such as a clap or yell, which when used together with a convolution reverb plugin (a reverb effect that uses an IR to create reverberation), can simulate the sound of the surrounding area in which the IR was recorded. After testing multiple IRs and combinations of dry and wet signal on my convolution plugin, I decided that the best solution was to have a mix of the studio recorded dialogue (with some EQ), and the convolution dialogue as this was ultimately the most believable.

4.7 Mixing and processing

Some of my recordings needed little to no additional processing or mixing with plugins due to me finding them to be believable within the context of the film. In the case(s) of sounds not being believable, this was mainly due to them not matching their physical counterpart accurately. The plugins I used for processing my foley sounds were a stock equalizer and a pitch-shifting plugin. These were the types of audio processing that were best suited for my goal of creating believable sound design, as I could greatly impact a sounds specific and overall qualities, without changing it too dramatically so that it was unrecognizable. Small tweaks to pitch such as in the case of a ribbon shoelace that I used to replicate the straps on a medical facemask (Attachment 1, 00:39) and equalization to remove strong wind gusts residing in the lower frequencies from some of my ambient recordings (Attachment 1, 01:58) are both examples of how I used these effects to craft more believable sounds in my own sound design for the project. Tweaking the mask was another case of matching the sound to its physical counterpart, whereas removing the wind was more substantial. Not only was the wind overbearing in the film's sound design, but the trees and bushes in the film were quite still and clearly not being moved by wind. For this reason, removing the wind would only strengthen immersion, due to its presence having been too disruptive both visibly and audibly.

A few audio mixing techniques I used at multiple stages throughout the process were adjusting the volume levels of each track in addition to fading some tracks in or out. This was for the sake of creating a logical balance, making sure that certain sounds that held more importance were slightly louder and commanded more attention from a viewer and to ensure overall cohesion from scene to scene. I also used fading to create some interesting effects and solve some problems I came across when trying to retain immersion. In the scene beginning at 01:58 in *Avstand*, I tried to figure out a logical way to make Thea's dialogue remain audible even when she was far away. Fading the track in by steadily increasing the volume as she approached seemed unnatural on its own, so since she had a headset on, I decided to give her a telephone-like effect as well. As she approaches, the telephone effect fades away as her normal voice fades in, creating an interesting moment of storytelling in the form of a change in perspective when transitioning from "inside" the call between Thea and Ravn to the cameras point of hearing. Additionally, this helped fix the previous break in immersion due to an unnatural fading in of Thea's dialogue.

5 Notes on the finished sound design and process

The practical process resulted in 3 minutes and 41 seconds of film with sound design. This was more than enough time for me to apply theory and prior research within a process of my own creation and do so in a way that was challenging yet engaging. The process could be likened to putting a puzzle together and creating the pieces at the same time. Each recording had intent behind it; to be believable, immersive, or a storytelling device. However, with such a focus on believability and immersion, it was difficult not to constantly question whether or not the sound design I was creating could be considered as either. Sometimes it was difficult to tell only because of how many times I had heard one sound repeated over and over again. Whenever this was an issue, I simply took breaks and re-evaluated my work after a few minutes of silence, giving myself adequate time to rest my ears. Despite this there can never be a definitive answer for whether or not the sound design I have created during this project can be seen by all, any or none, as believable.

6 Conclusion

Sound design is ultimately a creative process. Individual decisions and artistic interpretation are what make each sound design project unique, where inspiration can go a long way in terms of learning the basics. Making a concentrated effort towards more concrete goals and standards for quality, this project gave me valuable insight into my own work, further deepening my understanding of the discipline while also giving it more purpose beyond personal enjoyment. What it came down to in the end was me trusting my intuition above all else. Theory can never be a replacement for creativity in a creative process, only a tool, and knowing how to use that tool to one's advantage will always make a difference.
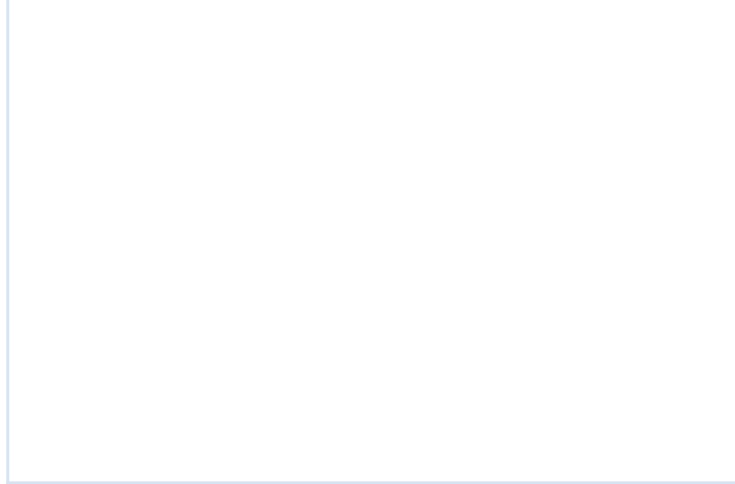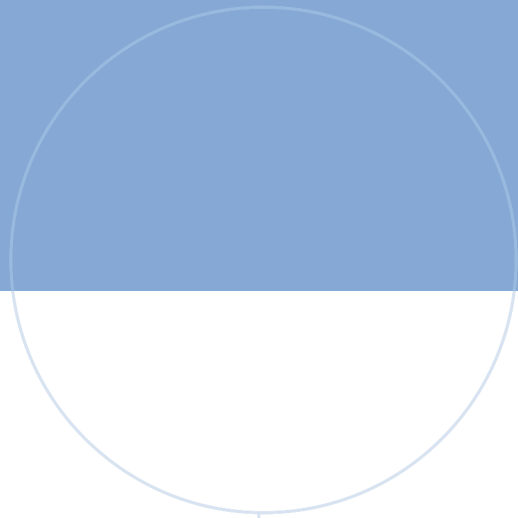
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8 List of attachments

- Attachment 1: Short film with sound design.
- Attachment 2: List of equipment