Experimenting with the Physicality of Digital Materiality

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1. INTRODUCTION

I wanted to understand the idea of digital materiality and how software cannot be seen, as it has no predetermined visual form. Digital materiality is electrical signals and code, it has no tangible matter, therefore we cannot physically interact with it – therefore it is immaterial (Grombacher 2017). I wanted to render visible the invisible and to understand digital memory/storage as a physical form. It began with the exploration of a USB flash-drive, physically and digitally deconstructing it, to understand the idea of storage and treating memory as an object.

2. WHAT DOES DIGITAL STORAGE LOOK LIKE?

I've created a piece of code that creates visual responses through algorithms (from digital files) into tangible matter. I have visualised digital materiality. The digital file is converted into binary via terminal; then the binary data is converted to images in Processing, in which 6 bits are grouped into RGB pixel colour values. The binary data is portrayed into an image file.

GRAY = 1 SET OF DIGITS			'RGB' = 3 SETS OF DIGITS			'CMYK' = 4 SETS OF DIGITS		
11111111	11100110	11001101	11111111	01100110	00110011	00000000	01000000	01010010
			00000000	01100110	11001100	11000101	00111001	00000000
			00000000	11111111	10011001	10111000	00000000	00110110
						00000000	00000000	00000000
10110100	10011011	01110011	11111111	11111111	00110011	00000000	00000000	01010011
			11111111	00000000	11001100	00000000	01001010	00000000
			01100110	11001100	11111111	00111100	00000000	00000100
						00000000	00000000	00000000
01010000	00101000	00000000	00110011	00110011	11111111	01001100	01100000	00000000
			00110011	00110011	10011001	00111110	01011010	00110010
			00000000	10011001	10011001	01011100	00000000	00011010
						00110110	00000000	00000000

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Figure 1: RGB image has three sets of numbers per pixel.

2.1 The piece

This particular piece is 15.2MB of an 81.2MB song that was performed by my grandma almost 50 years ago. The file is sentimentally valuable and in

ways, a memory shared by my family. The piece allows for the 'new aesthetic', a term coined by James Bridle, or a way for us to understand how digital devices see. The pixelated aspect of the piece is not only a representation of a memory or a song but it reflects how machines see and understand the real world (Bridle 2011). The piece is a reflection of a collaboration with technology. My Grandma sings in the real world 50 years ago, it is captured into a recording and then over the years variously digitalised until it is again released into the real world, yet in a different form – merging untouchable virtual data with a tactile object.

I'm looking to expand the boundaries of my project; how much digital memory can I reflect into tangible matter? What form do files take, and what is the significance of the file (song) into physical space? Can we decode the image back into the original binary code? Can I listen to my grandma's song through the tangible piece created?

Figure 2: Grandmas Song (29.7cm x 500cm).

In order for a machine to process sound, it needs to be converted into binary. It works by the sound being captured on a microphone and then converted into a digital signal.

Over the years there have been many debates between which is better, print or digital. There is supposedly such contrast due to explicit differences that people believe there can't be a blur between them, this is digital dualism: the idea that they are two entirely separate things. As we know we have physical things decay and digital non-permanence. Do we care for things more when we know they can be destroyed, we have this idea that digital files are meant to last forever. What happens when we turn bits into atoms, is there a material distinction? Perhaps they are equal, yet different.

If we think of energy, it can neither be created nor destroyed, it just transforms from one form to another. Perhaps it's all just the same no matter what form.

Figure 3: A pictorial description of the recording and playback of sounds through an ADC/DAC.

In analogue to digital conversions, sound waves are copied and displayed as numerical values (binary). In digital to analogue conversions however the binary is put through a converter like a speaker as a vibration so then we can hear it.

My piece of design disrupts this and displays it as an image as oppose to through a speaker to hear. I want it to act as another step between this process, so that we can still eventually hear the song through the speaker. Songs are converted from the analogue to the digital world using a device called an analogy to digital converter (ADC) and the digital to analogy converter (DAC), to convert binary back to sound (Burk et al. 2002).

3. REFERENCES

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