

Motivating digital fabrication processes – learning from the demoscene

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INTRODUCTION

As more and more materials become available there is a growing fokus on DIY and maker-cultures as well as fablabs. In his societal exploration of the idea of "Digital Fabrication", [4] outlines how the revolutionary part of 3d-printing is not the ability to create things on demand, but rather the ability to turn data into things and things into data. In short, the data, or blueprint if you will, provides the exact instructions for creating a thing, and that data can be transported everywhere and changed by anyone.

In my opinion it would be a mistake to focus only on the "data-things" part Gershenfeld's definition of digital fabrication [4] when discussing makers. I argue that we should rather focus on the second part, the fact that anyone can change the data-things. The results of digital fabrication are the results of a conscious process of appropriation - there is an act of designing involved in much digital fabrication. This leads to the position of this paper - that if we want to examine digital fabrication we must approach it from a design process perspective as well as the more metaphysical errand that [4] has, discussions that are also prevalent in my home field of HCI [8].

If viewed from a design process perspective digital fabrication is the customization and exploration of design materials. By working with materials makers explore the possibilities of fabrication. And ever so frequently, makers will send ideas, tools and instructions back into the ecosystem of fabrication. By doing so and by participating in this eco-system, makers take the opportunities offered by new materials, opportunities to create things that were previously the domain of big companies, or create things that nobody could have dreamed of. This aligns well with the utopian ideals of PD [5]. This aligns well with the utopian ideals of PD whose ambition and obligation is to generate alternatives [5]. By using new tools and materials, and by re-appropriating them for new purposes, makers and DIY-people have the potential to reinvigorate the ideas of alternatives.

There are a sizeable amount of examples of materials that are generated by makers and used by other makers. A good example is Thingiverse.com, an online repository for 3d printing models, or Instructables.com a website with instructions for the DIY creation of almost anything - from interactive light systems based on Raspberry PI and sensor

technology to instructions for cooking eggs in the wilderness using birch bark and wood. Furthermore I want to stress the Open Source Software movement, who contributes tools like Django or the massive amounts of custom technology developed using for instance arduino-platforms[3] or toolkits for tangible tabletops [6].

MAKERS AND DESIGNING ALTERNATIVES

By creating and exploring new materials and tools, makers contribute to the creation of design alternatives. I argue that design ideas can be alternative insofar they explore and push the boundaries of a design space. And, a design alternative is critical when it offers a contrasting, outlying or in other words utopian solution to a given problem. If considered as part of a potential design space it makes sense to ask how utopian design alternatives emerge throughout the design process. Thus the utopian aims in PD align with the description of Critical Design offered by [2]. Critical design is a research through design approach that brings to the fore ethical questions, hidden agendas and values. In their paper from CHI'13 [2] elaborates how Critical Design also focuses on "exploring alternative design values". As such there is a strong link between critical alternatives and the field of Participatory Design (PD).

In the call for the 2015 Aarhus conference, "critical alternatives" are defined as "in alignment with utopian principles—that is, the hope that things might not only be different but also radically better." This means that an alternative is not just "a new idea" - it has to be qualitative better for the people using it. Thus the question of makers and fabrication draw on both the original ideals of Participatory Design as well as the vibrant contributions of critical theory. I am in particular interested in discussing how critical alternatives are not just designs that question the status quo, but are also something that emerge through the design process.

THE DEMOSCENE

At the workshop I want to detail a case from a recent study on the *demoscene* [7]. The demoscene is a 30-year-old subculture of hobbyists creating digital art: demo(nstration)s (demos), which are audio-visual presentations that run in real-time on a computer. The main goal of a demo is to show off coding, artistic, and musical skills. These demos runs on different platforms, ranging from both old hardware like the Commodore 64 or the

Commodore Amiga, to contemporary platforms like the PC or even Arduino.



Figure 1 – Screenshots from the demo ‘Fracture’

Having created a demo the participants meet up at “demo-parties”, conventions of up to 1000 people that meet for a weekend to compete and show off their work. The demoscene can also be described as a subculture of makers that explores and experiments with the qualities of computers in different forms and shapes.

Some of these might be old computers while other makers in the community focus on exploring the aesthetic possibilities of state of the art systems. At the workshop I want to outline what drives the creation process of a “demo” from three perspectives: *competition*, *tools* and *social*. I make the overall point that all three perspectives can serve as departure for understanding what motivates and enables personal fabrication and maker culture.

Competition

Competing was the initial motivation for many members of the subculture. Having its roots in the early 80’s cracking and hacking scene, creating realtime art was about bragging, highlighting one’s “eliteness”. Nowadays this has metamorphosed into a general focus on competition. Participants in the demoscene will submit their productions to competitions in different categories. Doing so serves to settle who the “best” is, as well as creating recognition for both the creator and his product.

Tools

In the demoscene there is a strong focus on tools. Historically each participant in this culture developed and used his own tools. Because of *competitiveness*, sharing your tools was seen as a detriment - if everyone had your great tool for developing on the Amiga, your competitive advantage disappeared. However in recent years there has been a greater focus on developing and sharing tools. These tools can be both conceptual in the form of accounts of how someone did something, and technical in the form of software tools like GNU Rocket [1]. By doing so, the subculture becomes a more collaborative effort that, together, explores the possibilities of computers in creating realtime art.

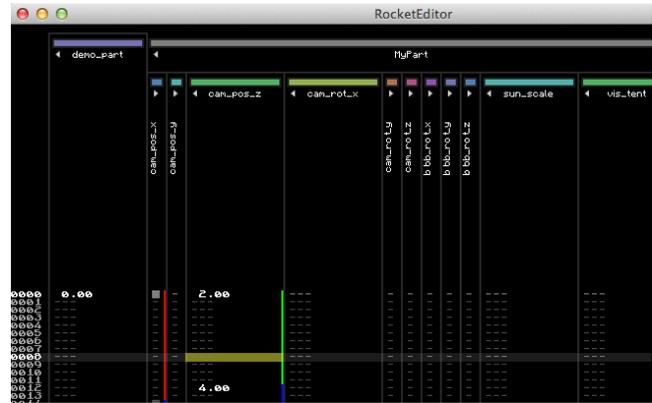


Figure 2 - Editor for the Open Source Rocket library

Social and cultural

Last there is a strong history and culture to the demoscene. I have myself been a part of this subculture since 1998, and part of the attraction is meeting old friends from all over the world. And while the demoscene term for meetings is “party” perhaps “festival” would be a better term to explain the intricacies of what goes on at these gatherings. In general there tends to be DJs, performances and alcohol to compliment the main draw of the many different competitions.

CONCLUSION

I started from the observation that personal fabrication can be seen as a process of exploring materials and tools. Personal fabrication and makers have a potential to advance utopian agendas by generating alternatives through collaborative use of tools and materials. Through the case of the demoscene I offer an understanding of motivations for digital fabrication - focusing on competition, tools and social/cultural factors.

By understanding different arenas of digital fabrication I believe we as researchers can advance and strengthen digital fabrication, as well as begin to understand why some initiatives prosper while others fail.

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