Hands on soft prototyping and its applications in educational practices

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ABSTRACT

Hands-on soft prototyping and its educational practices is a workshop that will present an overview of the activities in digital fabrication, soft materials and sustainable production in Open Labs and university practices. During the workshop participants will explore different soft materials thinking in the possibilities of application and how to introduce interactivity and ways of prototyping from a material research point of view.

Author Keywords

Soft Prototyping, Digital Manufacturing, Materials research method. Soft Interfaces, Social Fabrication.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous; D.2.2 Design Tools and Techniques: User Interface

INTRODUCTION

Digital Fabrication has in the last times been increasing the boundaries of how and why we are manufacturing. This process provides efficiency and individualization of the prototype, working in a small scale, but in a high level of complexity. This development includes not only the use of the machines but also an in depth study of the materiality of prototyping, process and their applications.

Why Rapid Prototype? On one side, Rapid Prototype refers to functionality and effectiveness, on the other side, it empowers the transition from digital to tangible. Tangibility is the matter that connects the objects to something real, understandable and near to the human being. The possibilities to conduct experimental research in soft fabrication in an open laboratory gives the physical and mental space for innovative re-thinking and reframing of today's realities. It offers the resources for visions to be materialized, tested, developed and makes an active impact in people's life, not as a linear process, but as a spiral iteration and implementation in the reality [1].

Practicing with materials allows a participatory process of learning and making by experimenting, creating feedback loops with project development, where materials, aesthetics, sustainability and customization play equal and important roles [2].

In this workshop we will look at the spectrum of prototyping in educational practices and its impact in the global and local community. In the first part of the workshop we will share some of the local and global community activities. In the second part, we will work on soft prototyping, experimenting with different conductive and non-conductive materials, thinking in the possibilities of generating embodiment interaction and its applications.

WORKSHOP PROPOSAL

In this workshop we will reminisce the role of surface and materials in the process of prototyping. For this aim emerging technologies and methods of prototyping will be introduced and evaluated from the materials research design [3] looking for a new way of fabrication with soft interfaces.

In this overview, previous experiences in the Fab Lab practices will be referred, illustrating how professors, students and researchers from different disciplines can make an approach in this field. Next, attendees will be instructed about the materials and their experimentation with modularity within non-conductive and conductive materials for interaction practices.

In this context, we will explore some Sensoaesthetic [4] perceptions of the materials and the transformation that comes with digital fabrication, thinking in their possible applications and implications. Participants will have the opportunity to explore through prototyping and with the materials at their disposition. At the end of the session, we will share the results, and discuss future work and the impact in the global community.

WORKSHOP TOPIC COVERED

Model making and its impact

Model making is one of the practices that connects the visualization of our thoughts to the human tangible space. With typical drawing or computer modelling, your brain must interpolate a third dimension, assuming relationship between the previous experiences with the objects [3], but with rapid prototype, we have the ability to produce actual material objects, even in full scale. The model as an actual object, becomes an autonomous thing that one can feel and see for what it is. The brain is allowed to observe, analyze and project. "Your mind is like a database of sensory experiences [4].".

Linking manufacturing with soft prototyping

Textiles and its production has had a very important role in the history of machines and industrial fabrication. As a material, textile remarks the development of personal fabrication due to the individualization in the process of making clothes. Soft goods have a strong connection with the development of bespoke fabrication. Soft prototyping, hacking, reconfiguring and individualizing are some of the features that facilitate an open laboratory. Today, these activities allow the intervention of the new craftsman in the digital manufacturing era.

Fablabs and the educational practices

There are different aspects that make the FabLab a generator of knowledge. Digital fabrication laboratories are becoming incubators for innovative technologies, and creators of derivative and disruptive initiatives, implemented in the "real" word. The philosophy of making is transforming the way of learning, in which teachers, professors and students are learning together. Documenting the work process creates a setting where the FabLab users are not only learning through the making process, but also there are able to teach it afterwards. This process allows the engagement of the participants and them to be independent in their own experimentation.

"We work locally, while creating connected communities globally" [2]. This exchange between communities opens the opportunities for learning and extends the thoughts in trends and ideas in prototypes. FabLabs are catalyst in the community allowing a contact with the space and the sharing of know-how for a common purpose.

New Materials and Soft Interfaces

The term soft matter was established around 1970 [6]. **Physicists, like *Pierre-Gilles de Genne*** [7], used the term for describing the importance of materials that were neither simply solid or liquid.

"*It is no coincidence that biological material generally is soft. Life simply could not be without the unique properties of soft matter, combining the flexibility and suppleness of fluids with the stronger interactions and sometimes also long-range order otherwise seen only in solids.*" Soft matter is a concept that today is connecting interfaces and fabrication. Using material experimentation provides a different approach of prototyping interfaces, envisioning the changes of a more near connection between the human being and the interaction.

ABOUT THE AUTHOR

Adriana Cabrera is scientific assistant in the project 3D Competence Center Niederrhein in the FabLab Kamp-Lintfort, Germany, at the University of Applied Sciences Rhine Waal. Originally from Colombia, she works in different areas of design, art and interaction. Having a background in Industrial Design, she complemented her studies in the MFA Media Art and Design at Bauhaus University Weimar, combining traditional techniques with new technologies in the field of Printed Electronics. In 2013, she began the studies MA Surface and Textile Design at the Weißensee Academy of Art Berlin, focusing on material research, introducing textiles as a medium of communication. She completed the FabAcademy 2016 with the project MyOrthotics, developing an orthosis for a patient with a paralysis in his left arm. She also participated in the Textile Academy at the Waag Society, Amsterdam. She is leading workshops in soft prototyping and implementing a sustainable experimentation at FabLab Kamp-Lintfort by exploring new bio inspired design, soft interfaces and the impact of today's prototyping.

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