

Interactive Party Textiles

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Abstract: This paper describes the idea of using context aware soft furnishing for decorations. Textile has the ability to easily change the experience of an environment. This quality combined with the dynamics of ubiquitous computing and context awareness creates an interesting design space to investigate. The examples we show, a tablecloth and a drapery, are designed for use on festive and social events. For the first prototype we have chosen a design suitable for weddings as this is a well-known event for most people. The underlying technology is Smart-Its, small context-aware computers with ad-hoc networking capabilities. The result is dynamic textiles where the pattern changes according to the immediate surrounding.

Keyword: IT & Textiles, Soft Furnishings, Context Awareness, Ubiquitous Computing, Interior Design.

1 Introduction

Baudrillard (Baudrillard, 1968) writes in "System of Objects" about how every object is connected to other ones, in this existing system an object is made to fit in the existing system in a given environment. You want a sofa to sit in and then you need a suitable table to put your glass of water on and you need a carpet for your feet. Often, all these objects made to fit each other in one or another way. This can be seen in what different ways an object is decorated, the size and so on (the size on a bookshelf is made to store books, or are books made to fit the shelf?). Computers and other technical objects do not often fit into this system in our home environment today

As computational technology increasingly becomes a part of our everyday environments and lives, new design opportunities are uncovered. While some of these are related to solving practical problems by means of for instance automation, design for everyday life is also very much a matter of experiences, as well as aesthetical, social and emotional values. It is therefore important not just to think about this new technology as the means for implementing certain functionality, but also as a rich and expressive design material that we can use in design (Hallnäs & Redström, 2002).

When designing computational things for everyday life, we need frameworks for how to

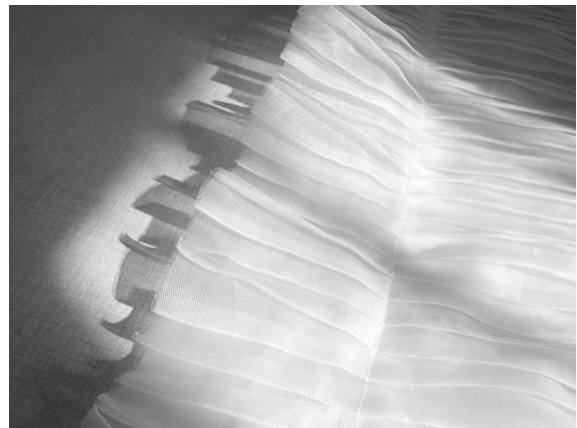


Figure 1: Party Textiles table runner for decoration.

approach the design issues at hand. To consider computational technology as design material can be one such approach that invites thinking about how this technology can be combined with traditional materials and objects that we use to furnish our homes and other places.

2 Interactive Party Textiles

In this project, our starting point has been to investigate how computational technology can be combined with textiles in interaction design for ubiquitous computing. The idea has been to work with how primarily decorative objects, rather than

e.g., practical tools, can be created using this material combination.

2.1 Textile Qualities

Textile, with its long tradition, well-known properties and ubiquity in our world, is used both for clothing and for changing the look and feel of places. Textile as soft furnishings can easily change the appearance of things and places e.g. people use different clothing for different occasions, and if you change the carpet in a room, the room can be affected greatly. Textile can also be used for other purposes than pure aesthetics; it can efficiently muffle sound and can keep the daylight out or let it in etc. Another interesting property of soft furnishings is its function as time delimiter. The act of changing tablecloths in a room divides the time into pieces in a more natural way than calendars and clocks do. For example, the Christmas decorations give us the Christmas feeling, and much more so than just a look in the calendar.

A fast intervention with textiles in an environment can make a totally new look, but this is often a static look. You need to redo it when you want to create another atmosphere.

In this work we have been looking for materials from which a dynamic textile can be created, a textile with changeable visual properties. This could be made depending on what materials are used and in what way they are fabricated, for example knitting or weaving. Today you can find yarn with properties that change colors depending on the light or the temperature, weaves can be made out of fiber optics and conducting paste or threads can be integrated into or made to a fabric. Textile is a traditional interior material with changeable values in an environment; IT is more integrated in static materials, but with dynamic properties.

2.2 Applicable Technology

Ubiquitous computing research is growing rapidly and both platforms and programming tools are continuously developed. Concepts like context awareness (Abowd & Mynatt 2000) and ad-hoc networking make the idea of helpful, ever-present and invisible computers for our convenience interesting to explore, in a setting where we usually don't expect to find them; integrated in soft furnishings. Contextual information is a rich source for implicit input for computing technology. When we integrate this mode of interaction into dynamic textile with changeable patterns we can create party textiles, including context aware cloths and draperies. We have chosen to integrate the

ubiquitous computing technology platform, Smart-Its (<http://www.smart-its.org/>) with textile material to research new and emerging properties of context aware soft furnishings.

2.3 Smart-Its

The Smart-Its project is a collaboration between TecO Karlsruhe, ETH Zurich, VTT Finland, PLAY Interactive Institute and FAL Viktoria Institute and is funded by the European Union's Disappearing Computer Initiative. The goal is to create an enabling technology for practical ubicomp

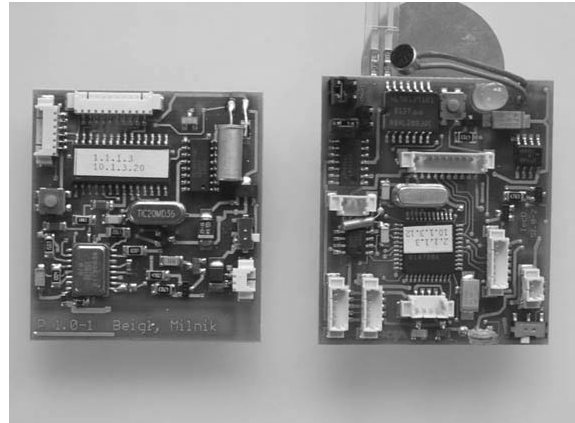


Figure 2: The Smart-Its boards that are embedded in the Party Textiles.

experiments, based on large numbers of inexpensive computational devices. Similar to Post-it notes, Smart-Its are used for post-hoc computational augmentation of everyday things, allowing these objects to perceive their environment and communicate with peers. Today the Smart-Its prototypes are the size of matchboxes but sufficiently cheap and non-intrusive that they can be used to build and test ubiquitous computing scenarios. The aim of the research is to study collective context-awareness, scenarios and the feasibility of these kinds of applications (Beigl et al, 2003). Smart-Its provides something that can be called multi-sensor context awareness (Gellersen et al, 2002) which means that the combination of multiple and relatively simple sensors captures context in a way that may characterize the situation as well as location- or vision-based context.

3 Computational Textile Design

By using information technology and modern textile materials dynamic textile and furnishing can be made. This can be seen in the following

examples: "The Interactive Pillow" (Melin, 2003) where a fabric is made out of electroluminescent wire, this material gives the opportunity to "switch on and off" different pattern in the weave. The "Electronic Tablecloth" (Post et al, 2000) is an example of interactive furnishing where users interact with a computer and each other in a social context. Another example of information technology and textile is done by connecting a computer controlled uv-light with a uv-sensitive fabric (Holmquist & Melin, 2001) and in that way create a dynamic fabric. The fabric of the present Party Textile prototype has electroluminescent film integrated, which are luminous sheets and makes it possible to switch on and off different patterns in the fabric. We map different input to different kind of output and are working with four levels of aesthetic patterns.

3.1 Examples

We are experimenting with two types of party decorations: a cloth and a drapery. The party scenario could for instance be a wedding. The Smart-Its, integrated in the textile, derive the context from the each sensor's input for interpretation and controlling the patterns.

The cloth, with the characteristics of a cloth – lying still on a table, uses input from the thermometer, light sensor and microphone. Consequently it senses temperature, intensity of light

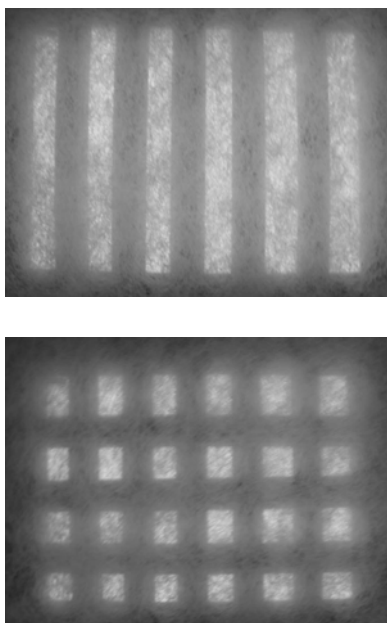


Figure 3: The picture shows the early examples of how a pattern can be altered. Here, we are working with the electroluminescent film in layers.



Figure 4: The drapery with electroluminescent fibers as output and motion and light sensors for input.

and sound volume. These inputs are compared with predefined threshold values for certain contexts. For example when the wedding starts off the patterns tries to get the party going, as a party starter, with a table runner glowing statically or twinkling in different patterns and unexpected ways. As the wedding continues during the evening it might be necessary to calm the cheerful attendees down with patterns designed for this. Imagine attending a boring wedding and the Party Textile functionality is calibrated to engender a festive atmosphere it might generate themes for discussions and prevent awkward silences.

The drapery could for instance hang in a door post. The characteristics of such a drapery is motion and as a cover, therefore it uses input from the Smart-Its' motion sensor and light sensor. When people walk through the drapery it senses the motion (Hallnäs et al, 2001) e.g. when people go out for some fresh air. Depending on how many people walk in each direction the application can assume that the wedding starts, it's between two events or the wedding is finishing.

With multiple textile decorations, i.e. cloths, curtains wall-hangings and draperies, used at the same time more interesting output can be obtained because of the wireless networking functionalities of

Smart-Its. For example, if people are going out for a smoke or if people are dancing intensively this could be expressed by using different colors and shapes of the patterns. Contextual information can also be routed by the Smart-Its and viewed by other decorations. People outdoor could for example get an implicit reminder from the front door drapery that it is time for the speeches. One can look at the Party Textiles either as party moderator or as party booster.

4 Discussion and Future Work

The design experiment, Party Textiles, suggests that there is a design space concerning context aware soft furnishings. The Party Textiles continues on the Smart-Its project's research and demonstrate a field of applications, namely interior furnishing. We believe that it can function as a moderator, either calming or inspiring depending on the immediate situation. The combination of aesthetics and context awareness gives the field of interior furnishings new aspect to consider. For example in what way should the different furnishings interplay with each other, which sensors are important to use and how is the system supposed to interact with its environment.

We will continue work with Party Textiles to realize a fully functional prototype for user testing in an appropriate context, since we need to learn more about how the patterns and behavior should be designed. Because of the ongoing textile technology development we will also test other materials and techniques to find other and more interesting displaying options. For example, Gimpel et al. (2003) recently showed that it is possible to integrate the electroluminescent effect into the very fabric material, leaving out the plastic EL-sheets. As a design challenge it might also be beneficial to augment more things in the party environment, such as party hats and garlands.

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