Wearable Information: Information Visualisation in Daily Wearables

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Theoretical Framework

> "Clothes are indented to be worn in public space; we dress for others not for ourselves."
> Diana Craine

Clothing, besides its commonly attributed function of protection, has always been a medium for communication in public space. In class societies, clothing could clearly indicate the social status ascribed to the wearer by the society. Clothing styles were defined according to such parameters like social class, gender, occupation, religious affiliation and regional origin, and one could be smoothly matched with a certain social status through clothing (Craine 2000: 235-49). The apparent signalling of clothing operated rather through the 'non-verbal' language of 'outlines' of clothing then. The significant message of clothing in post-class societies, on the other hand, has more to do with the desired self-image of the individual. Daily clothing styles offered by the fashion industry are more open to assemblages of personal choices and allow for creation, transformation and expression of senses of self identities in public space. Some people adopt clothing styles to express their affiliation with a certain lifestyle of a social group, some create styles to articulate their individuality, and others reassemble clothing items from various styles to be casual. Due to the complex multiplicity of styles and their continual transformation, the legibility of the non-verbal language of outlines of clothes has fairly decreased.

Contemporary societies generated additional ways of communication in clothing such as accommodating text and imagery on clothing items. Starting with logotypes and icons of commercial fashion brands and provocative slogans of alternative lifestyles, typographic and iconographic elements have been increasingly integrated on wearable garments. We come across various textual or iconographic mottos, remarks and witticism printed on casual t-shirts everyday with an increasing tendency towards more personal and customised content. A crucial addition to the recent public daily life is virtual public interaction. Chat rooms with fictitious nicknames handed over their popularity to social networking sites and other web 2.0 facilities with actual names of real persona. Due to emerging portable and wireless communication devices, public spaces are hybrids of physical and virtual spaces which can be simultaneously occupied. One's public identity is not only determined by physical appearance and interrelations, but also by virtual representation and activities. Effects of digital cultures and the quest for expressing hybrid public identities are widely illustrated through various wearable-technology art and fashion projects. However, these explorations have not entered the wardrobes of daily people—the suggestions made by the pioneers of art and fashion do not match the very act of getting dressed yet (Barthes 2006).

Bearing the aforementioned impressions in mind, our approach is formed by the following questing: How can ephemeral information which is generated, absorbed and evaluated by real people on a daily basis can be materialised, attached back to the physical body, and enter the urban daily life?

News Knitter

News Knitter is the first output of our quest for user-generated fashion. Combining our interests such as large scale information visualisation, low resolution design style and mass media and its broadcast, we materialised online news through knitted sweaters. The first collection of News Knitter consists of ten unique sweaters produced in summer 2007.



Figure 1. News Knitter Sweaters Fashion Shots

Design Approach

We found it crucial to create a solid pipeline and to use a good algorithmic approach as a design method. Software-based generation gives designers more time to focus on the idea of the design rather than creating patterns with classical design tools. This shifting role from execution of the pattern design to creative planning of the production pipeline is critical in terms of defining the positions of designers and audience in the process. In such a system, the designer becomes more of a decision-maker and concept developer while the actions of consumer/audience/user become a part of the design itself.

Materialising Platform

News Knitter aims to translate digital information into the language of the physical world as much as possible. We utilised knitted garments as a medium, because by means of knitting, digital information can be visualised through generating the tactile object itself, as an alternative to the common trend of projecting the visualised information onto an existing object. Knitting builds up a meaningful whole from a mass of strings, just like information networks of virtual space do from digital bits. Knitting is very different than printing, as it has a structural order and can be constructed and deconstructed at any time.

Additionally, the contemporary trends of fabrication of knitted garments are a very fruitful field to explore as they utilise computers and high-technology at a variety of steps throughout the process. Knitted garments are mostly produced with highly complex computerised knitting machines which allow more flexibility in patterning; however patterning is still executed by individuals manually.

Data Sources & Content

Aiming to draw attention to the data delivered by mass media sources, News Knitter has a political context. We know that political news arise from all over the world each day. However, we cannot predict the events, acts and cases of the following day. The agenda of the world is not only generated from objective events, but also from how these events are presented by the media and how they are acknowledged by the audience. We used online daily political news items as our data source, as these items carry the second level information of our interest—meta data—such as date, location and popularity attached to them.

In order to acquire the best comparative results from this data source, we chose time and locality as two major aspects to study. Regarding time, our decision was to take one day—24 hours—and a specific period of time—2 months—as the two bases. Regarding locality, we focused on global political news and local news from Turkey. We avoided choosing particularly important days in the political history of the world and picked three ordinary days in summer 2007 to achieve 'casual' results. On the other hand, the two-month period was specified as the last two months before the general elections in Turkey in 2007. This period was a particularly important time frame for Turkey not only because of the elections but also due to discussions on several issues such as the concept of democracy, religion and militarism in Turkey.

Design in Depth

We decided for sweaters as the type of garment since human torso is the most dominant and the biggest visible part of the body, i.e. the most suitable space to display information. Additionally, since they are at the eye level, sweaters and t-shirts are commonly used displays and there is an already established focus and expectation on this area.



Figure 2. News Knitter Collection, 2007

Colours and Patterns

The three colour palette (blue-red-gray) is chosen to improve contrast and legibility of information coding. Blue and red carry important messages while gray serves to visualise neutral data or extra information such as dates and names of data sources. Patterns are categorised into two according to content and time cycle.

Daily patterns. A set of patterns is generated with online global news of a particular day. Live global news items which were broadcasted within 24 hours are analysed and filtered according to their time of publication and popularity. The filtered data is then visualised in two different graphic styles: typographic and graphical. In typographic patterns, headlines of news items are arranged according to their time of publication. The point size of the headline, the radius of the bullets next to the headlines and the length of the horizontal lines indicate the popularity of a particular item. In graphical ones, every news item is represented by a circle, a line and a plus sign. The radius of the circles, the length of the lines and the size of the plus signs indicate the popularity of the news items. In all patterns, all graphical elements are normally in dark blue. If a news item has been published in over 700 different sources, the colour of its elements turns into red.

Thematic patterns. The second set of patterns is generated with local Turkish news of a certain period based on particular themes. Each theme is expressed through two complementary keywords. Two main themes were designated for the first collection with the following keyword combinations: military-education and Asia-Europe. Live local Turkish news items broadcasted within two months were analysed and filtered according to their contextual association with the predefined pairs of keywords. The frequency of the appearance of the complementary keywords in news items is compared. The filtered data is then visualised in two different graphic styles: bars and pluses. In both versions, each element (bar or plus) represents a news item that is associated with one of the complementary keywords arranged chronologically from upper left to lower right. Each of the two colours represents a keyword. For the first theme, red represents Europe whereas blue represents Asia and for the second theme, red represents military whereas blue represents education. The length of the bars or the size of the plus signs depends on the frequency of the repetition of a keyword in a single news item. The gray dots represent the irrelevant news items that are not associated with any keyword.

Production Pipeline

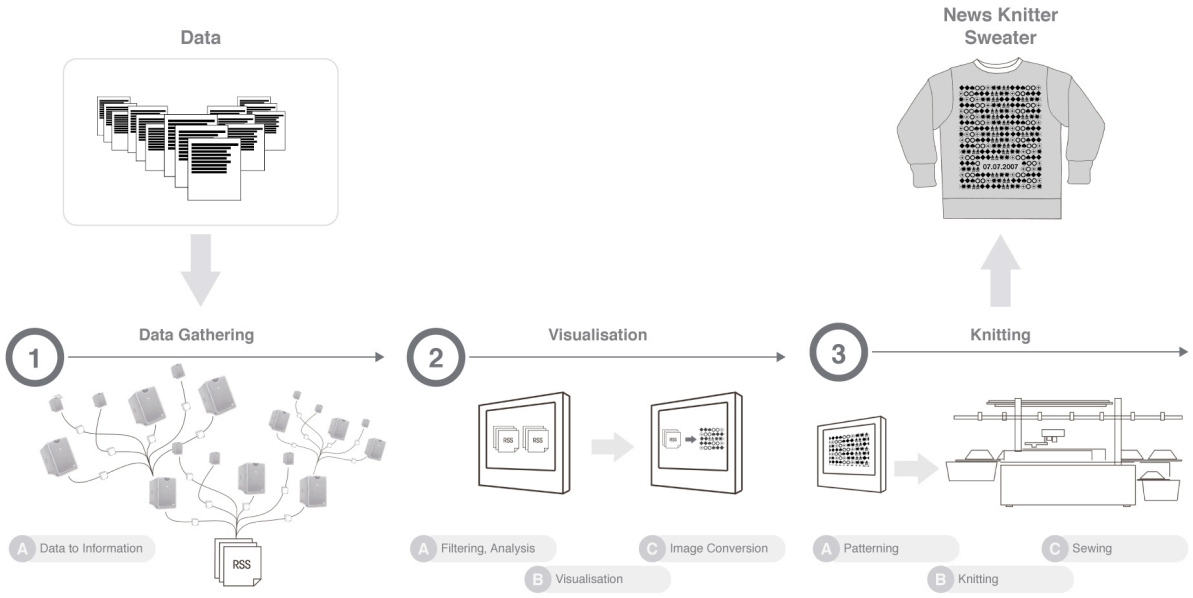


Figure 3. Production Pipeline of News Knitter

Today, it is possible to create new methods combining several tools, machines and software. Thus the designer not only designs the product itself, but also the production pipeline which can be used for different products, or by other designers or scholars in the field. Another big advantage of a consistent pipeline is that it makes unique designs available for mass production. By updating or changing the process of some functions in the system, it is possible to have varying results.

Production pipeline of News Knitter consists three crucial parts: data gathering, visualisation and knitting procedure. All these may include several sub-processes depending on the design details. Data gathering is a typical data collector software which streams and organises information from a given source URL. Visualisation is the part where this data is translated into graphical patterns by using algorithmic scripts

and it is the step where aesthetics of the product is shaped. After visualisation, the data is transferred to the computerised knitting machine and the wearable is knitted.[1]

Experiences & Results

We would like to share the following findings we came across through the process.



Figure 4. Shots from Production

Data Source, Data Gathering. Even though we have good standards such as API, XML sometimes data sources and formats may change. It is important to keep software up to date and backup the gathered data on a regular basis.

Image Conversion. In knitting, stitches define the possible resolution of the knitted surface for a displayed image, they are equivalent to pixels on a screen. However, the aspect ratio of a knitted stitch is not a square whereas that of a pixel usually is. The aspect ratio of a stitch depends on the type of knitting (Amreeva and Kurbak 2007: 151-60). Therefore, there is a need for an additional custom calculation to transfer the digital image onto a knitted garment without any aspectual distortion.

Patterning. The patterning software of most computerised knitting machines accept various raster image file types as a source for the pattern. However, in almost all commonly available systems, the image has to be reprocessed by a trained pattern designer for processes such as scaling, matching the number of colours in the image to the number of yarns, and coupling the image colours to those of the yarn. New communication protocols and mark-up languages such as XML are under development for knitting machines; yet most machines necessitate transfer of the data of the reprocessed image over the network or even sometimes with floppy disks or USB sticks. The patterning software are unfortunately not open source and also not available for visual programmers out of the textile industry. A further collaborative study with software developers for knitting industry should be carried out to develop software which would smoothen the process of translating images received by the patterning computer to a format suitable for the knitting machine.

Knitting. Operating a computerised knitting machine requires intensive training and experience. During knitting, the process has to be interfered at certain occasions and the knitting machine has to be stopped in such cases like a breakage or running out of yarn. A trained technician should be available at all times by the knitting machine. Therefore, our production depended on collaboration with the knitting industry. It would be

[1] The raw live data is gathered and analyzed by using Perl and all visualizations are made with Processing software. The pattern finalization and knitting were actualized in TETAS Tekstil in Istanbul using Shima Seiki's computerized flat knitting machines.

possible to carry the machine and the production out of the industrial context only if trained technical personnel were also engaged.

Sewing. In current knitting facilities, the most available computerised knitting machines suitable for knitting large surfaces are flat machines. Flat computerised knitting machines can only knit front and back body panels and sleeves to be sewn together afterwards. This requires calculating the seam allowance in order not to lose knitted graphical elements during ready wear. Knitting and sewing are undertaken by different specialists, and sometimes even handled by different factories at different locations. Therefore, working with a flat knitting machine interrupts our envisioned continuous production pipeline from gathering online data to receiving a knitted sweater. Recently the new “whole garment” computerised knitting machines became commercially available. With this technology knitwear can be produced three dimensionally as an entire piece. Getting access to this new technology would make the production pipeline of News Knitter smoother and would allow the patterns to be easily arranged to fit into the visible surfaces of a sweater.

Future Expansions

Today, fashion and wearable garments are important public displays for information and they will clearly continue being so in the future. Considering our experience as well as the feedbacks regarding News Knitter, we strongly believe there is a huge potential in the field of generative fashion and user-generated fashion. Besides the unpredictable data, customised data based on online platform profiles and social networks may prove useful as a source for pattern visualisations. This may give full control to users in creating their own fashionable product by using different software. Another expansion may be in relation to the range of products: creating not only sweaters, but also socks, gloves, scarves or even underwear would extend the fissionability of information.

References

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