



MATERIALS INNOVATION

Shenkar College, Tel Aviv: Architectural Knitted Surfaces workshop

AURELIE MOSSÉ, WGSN 05.08.10

WGSN reports from the Architectural Knitted Surfaces workshop recently held at Shenkar College of Engineering and Design, Tel Aviv, which offered a cutting-edge insight into interactive knitted surfaces.

With the increasing role of smart textiles in architecture, the Architectural Knitted Surfaces workshop brought together architects and interior and textile designers to highlight recent developments in intelligent knitting.

The five-day workshop was led by architects Ayelet Karmon and Mette Ramsgaard Thomsen, together with Amir Cang and Eyal Sheffer from the Knitting Laboratory, in collaboration with Amir Marcowitz and Yair Reshef for their expertise in interaction design.

Bespoke interface for digitally crafted knitting

Designed by Mette Ramsgaard Thomsen and Ayelet Karmon, Listener is a knitted textile membrane that senses and reacts to its surroundings by inflating. Each cell of the fabric can continually increase and decrease in size according to people's proximity.



Listener by M Ramsgaard Thomsen, A Karmon and Eyal Sheffer, digital model and prototype

Listener also has its own autonomous relationship to its environment. By integrating conductive fibres knitted directly into the textile, as well as embedding touch-sensors, this composite knitted structure allows the material to sense its own conductivity.

But this innovative textile is also pioneering in that it has been developed through the design of a bespoke interface, connecting architectural CAD tools and CNC knitting machines by directly outputting knitting machine code from the architectural software package. This allows designers to directly programme and produce parametrically designed knitting patterns from architectural software with little to no knowledge of programming and scripting.

Introduced to this breakthrough approach, the 24 participants were asked to form six teams to push further a predefined set of knitting patterns. Using both computational and electronical textile modelling, the experiments have led to a series of exciting interactive samples embedding a variety of sensors and actuators, from sound and light to vibration.

Textile switches



Crisscross soft switch by H Himmelschein, K Zolotovsky, M Darvish

Investigations into conductive fibres explored the knitting of soft switches. Traditionally used in wearable computing, participants have challenged this preconception by designing applications for the interior as a means to speculate on what a textile space could be.

For instance, conductive crisscross patterns were used to develop a double-layered switch system activated by pressure. By stretching the stitches, the stress applied to the material creates contact between the fibres, which close the textile circuit, enabling it to deliver signal. In this case, a sound response was emitted when contact was made.

Similar approaches were developed through conductive flaps and folding systems, playing further with the three-dimensionality of the knitted surface.

Light-emitting knitting



Embedding el-wire into knitting by Y Etzioni, D Aloni, I Lazovski, A Kleiner

A Iontef, K Soo Youn Kim, E Fabrizi and K Bech



Bespoke knitted surfaces with light-emitting properties by A Tontef, K Soo Youn Kim, E Fabrizi and K Bech

The second emphasis of this workshop focused on the integration of light-emitting materials into fabrics. While tailor-made knitting structures and embroidery allowed the manual integration of electroluminescent wires into the surface, successful experiments were also conducted by directly knitting electroluminescent wires with crochet technique.

Another project, entitled 'Caresser dans le sens du poil' (literally 'stroking in the direction of the hair') has explored the embedding of LED into knitting. The experiment led to a tactile interface that lights up when stroked. Playing with a falling-star effect, the intensity and direction of the light were directly affected by the gesture.



Caresser dans le sens du poil by A Blonder, Y Gilad, A Mossé, O Barr and B Bauer



Ephemeral net by Zmudjak Ofir, Shoval, Omer, Lilach Grosbard, Coorsh Avital, Lombrozo Ronit

The results of this inspiring workshop were displayed in the architects' house gallery in Jaffa, giving a chance for the public to get direct insight into the future of architecture.

Imagining a tangible perspective for architectural knitted surfaces, the exhibition drew the outlines of a more sensual and particularly poetic conception of space, where extreme material specification allows the design of soft and interactive bespoke surfaces.



Samples showcased in the architects's house gallery in Jaffa

WGSN Key Themes

- Integration of conductive fibres and sensors into knitted textile membranes for interactive surfaces
- Designing bespoke interfaces by combining architectural CAD tools and CNC knitting machines
- Investigating the creation of knitted soft switches for interior applications
- Embedded LEDs or electroluminescent wires for light-emitting textiles
- Explorations into the design of soft and interactive bespoke surfaces for interiors and architectural spaces

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