Aarhus by Light

An experiment in socially engaging media façades

Aarhus by Light was a social experiment with an interactive media façade at Concert Hall Aarhus in Denmark. In the façade lived small creatures of light. When you approached the concert hall, you entered their world, which was also a part of the city. They were social beings like us, always happy to see you.

On the central path leading visitors towards the concert hall were three illuminated zones, each covered with carpets in bright colors (pink, blue, and yellow). In these zones, sensors translated the visitors' presence and movements into digital silhouettes on the façade, and through the silhouettes, visitors could caress, push, lift and move the small creatures. The creatures would wave back, fight, sleep, climb, jump, kiss, and occasionally leave and come back, thereby creating a relation to the visitor which is not just physical and embodied but also emotional.

Behind the silhouettes and the creatures was an ever-changing skyline of the city of Aarhus, with contours of characteristic landmarks slowly rising and falling.

The purpose of Aarhus by Light was to create a media façade which was engaging both the people passing by as well as contributing to the visual qualities of the architecture and surrounding urban space. Therefore, the façade was an experiment in both visual expression and experience through interaction.

During its almost two months of activity, the installation became quite an attraction for citizens of all ages, and it found its way to national and international media. Not only were children drawn to the mirror-image interplay with the enormous façade and the pink, blue, and yellow carpets. Their parents, teenagers, elderly, workers, disabled people ... were all attracted to the façade and to the interaction zones, both to watch and to explore. Just as importantly, the regular visitors and staff of the concert hall enjoyed and engaged in the interactive experiment to a very high degree.

One of the biggest challenges in creating Aarhus by Light was designing the interaction, since the façade should offer an experience to everyone in the large urban space in front of the concert hall.

Concert Hall Aarhus is situated in central Aarhus with other cultural institutions as neighbors: The ARoS art museum, the town hall, and several cultural venues and organizations. In front of the concert hall is a park with paths leading up to the large glass foyer, and this is the route most visitors follow. On the far side of the park is a busy street connecting to the city's central square.

Our goal was to address the situation of people simply passing by on the street on their way to buy groceries, only glancing at the façade more than 150 meters (500 feet) away; others would follow the main path through the park towards the concert hall, not going in but simply passing by; and some would attend a regular show, stay awhile in the foyer before and after as well as in the break. As a consequence, the audience was very heterogeneous in many ways, e.g. in a physical sense, because some were close, some were far away; in terms of engagement, since some were engaged in other activities which did not leave much attention to the façade while others would have come to be entertained and perhaps even challenged; and in terms of experience with technology. This was no simple task.

Aarhus by Light addresses this heterogeneous audience in several ways. First of all, the façade always offered something intriguing to look at. It had a certain aesthetic quality, somewhat resembling that of an early computer game because of the coarse

resolution of the LED panels (each pixel was offset by 4 cm (1.5 inches)). But up close, especially the creatures had a finer quality due to the underlying vector-based animations. Furthermore, the façade was clearly visible from any distance whether there were people on the carpets interacting with the creatures (or each other) or not. If no people were around, the creatures would go about with their lives and the skyline would rise and fall.

Another important design decision was to place two of the three interaction zones on the path most frequently used by visitors. In this way, we forced the audience to engage with the façade. This had the effect that no excuse was needed to "break the ice" and overcome your shyness to see your silhouette on the façade. It would show up as you passed each of the three zones as long as you took the natural straight way (which was difficult to avoid because of the planting. We could clearly observe how many of those who did not step onto the one "voluntary" (pink) carpet did in fact stop in the two other zones and look for their silhouettes and perhaps wave an arm or umbrella to see the effect. This greatly expanded the part of the audience who became actively engaged.

A third major concern was the design of the interaction zones. Since the façade was running non-stop 24/7 for almost two months (February and March), there was certainly some technical challenge in establishing proper tracking in all lighting conditions, from pitch dark to bright sunshine. But just as important, and more relevant to the experiment as such, was creating the relation between the visitor and the façade.

In each zone, the ground was covered by a carpet that served no technical purpose. Its function was purely to show where the interaction could take place. The silhouettes generated by each zone were represented on the façade in the same color as the carpet in that zone.

Camera sensors (and spots for nighttime lighting) were placed on top of lampposts by each carpet, pointing at the back of the people on the carpet. This gave a direct mirror effect and was very easily understood by visitors. No instructions were available at any time. Together, the strong cues – color and motion – helped visitors establish a simple but evidently very strong relation between themselves (or the people they observed) and the façade. Furthermore, silhouettes from each interaction zone were shown on dedicated, but not visibly marked, areas of the façade so that they fell within the natural line of sight from the specific carpet toward the concert hall.

Apart from the physical and embodied relation, we also sought to establish two kinds of social or emotional relations: between the visitor and the creatures, and between visitors. The creatures had an odd cuteness, at least to young children. They did not have vivid facial expressions, although they could blink, but they could, e.g., wave in a way that seemed directed to the engaging visitors. Interestingly, we observed a strong effect of these rather crude gestures. And although they were not in any way correlated to the actions of the visitors, they were often *interpreted* as such. It seemed that the fact that the audience could influence the world of the creatures in some ways (by pushing or lifting them) and because the creatures reacted to some simple situations (e.g., by running towards a newly arrived visitor), the audience often extrapolated these reciprocal relations to areas where none such causal relations existed.

We were intrigued by this case of strong relationships on the basis of an interactive system which was in many ways under-specified, i.e. there is more room for interpretation than it would appear. Our conclusion from these observed dynamics is that the successful engagement of the audience for Aarhus by Light was to a high degree due to the openness for interpretation.

The other kind of social relationship we were aiming to establish was between the people who had shared experiences while interacting with the facade. The interaction zones had the function of small stages where visitors performed simple acts and were observed and/or joined by others. While the silhouettes from the three zones – by design – were shown in three separate areas on the façade, there was no direct interaction

between silhouettes from different zones. But each zone could attract whole families or flocks of people who would come and go as they explored and showed off. Some knew each other, some just began talking and interacting. Sometimes it was goofy and sometimes it was concentrated, but when more than one person was present on or observing the action on a carpet, it was most often a socially rich situation. People would take turns or fight or test each others' hypotheses about the creatures. First-time visitors would exchange their perceptions, and often the conversations would get intertwined with other conversations they had before they engaged with the façade. Leaving along the path, comments and experiments would pop up again and trail off as the visitors passed through the two "forced" interaction zones and away from the concert hall.

A central point throughout Aarhus by Light was to break with the traditional rectangular form of a "screen", so the 180 m^2 (1938 sq ft) LED panels were set up in an irregular configuration especially adapted to the design of the large glass façade of the concert hall.

The panels were mounted on the inside of the facade, and being largely transparent, they created a "screen" that blended in with the existing architecture. This allowed transparency from the inside out during daytime. But when it was dark outside, the screen was visible from both sides (due to the reflection in the glass).

In addition to the main installation, an interactive dance performance, *Running Sculpture + Aarhus by Light*, was especially staged for the facade. By using cameras in front of and above a stage inside the foyer, the bodies of two professional dancers were blended with an interactive, graphical video scenography and pumping music, presenting the audience with multiple perspectives on the performance, both inside the foyer and outside in the park in front of the concert hall. This performance showed the façade's abilities to create different kinds of spaces within and around the building and the surrounding urban space, and, furthermore, it gave us an occasion to play with and try out the aesthetic possibilities of the technology.

Aarhus by Light ran from February 7 to March 31, 2008, on Concert Hall Aarhus in Aarhus, Denmark. More information and pictures as well as video is available at the website: www.aarhusbylight.dk/index-english.html

It was developed by CAVI, Martin Professional A/S, Wall of Pixels, and The Animation Workshop in collaboration with Concert Hall Aarhus as part of the Media Façades project.

FACTS

Project title: Aarhus by Light
Website: www.aarhusbylight.dk/index-english.html
Location: Aarhus, Denmark
Site: Concert Hall Aarhus
Cost: €67,000 (production) + €1,000,000 (equipment)
Produced by: CAVI Center for Advanced Visualization and Interaction (University of Aarhus), Martin Professional A/S, Wall of Pixels (animation), The Animation Workshop, and Concert Hall Aarhus.
Equipment: 90 x Martin LC-2140 semi-transparent LED panels (1x2 m, 25x50 pixels), 3 x ethernet cameras, 6 x 500W regular outdoor spots, custom tracking and visualization software (C++), 1 Windows PC. Max/MSP/Jitter was used for prototyping.
Funded by: Media Façades (a regional ICT corridor project, also part of the Center for Digital Urban Living)

3D model: Dagur Ballisager
Contact: Martin Brynskov, CAVI, University of Aarhus, brynskov@imv.au.dk, tel. +45 3068 0424, www.cavi.dk