3 X Interactive Urban Lighting: AUL demo cases

Henrika Pihlajaniemi

University of Oulu,
Department of Architecture
Aleksanterinkatu 6
90100 Oulu, Finland
henrika.pihlajaniemi@oulu.fi

Toni Österlund

University of Oulu,
Department of Architecture
Aleksanterinkatu 6
90100 Oulu, Finland
toni.osterlund@oulu.fi

Tuulikki Tanska

University of Oulu,
Department of Architecture
Aleksanterinkatu 6
90100 Oulu, Finland
tuulikki.tanska@oulu.fi

Aulikki Herneoja

University of Oulu,
Department of Architecture
Aleksanterinkatu 6
90100 Oulu, Finland
aulikki.herneoja@oulu.fi

Anniina Valjus

University of Oulu,
Department of Architecture
Aleksanterinkatu 6
90100 Oulu, Finland
anniina.valjus@oulu.fi

Abstract

This position paper introduces three real world lighting demos, which research interaction with urban lighting in different contexts and through different thematic approaches. The first case project – LightStories – employed existing street lighting to create interactions through participatory design and communication. In the second case – Urban Echoes installation – interaction between the lighting and the park users is achieved both with instrumental and non-instrumental means. On the one hand, a mobile service provides the visitor with urban information visualized by park lighting, and on the other, the lighting responds to visitors' movements. Finally, in SnowLight case, the lighting scheme of a wintertime event interacts with music and with people playing with snow, and the participants' roles shift from choreographer's to performer's and to observer's role.

Author Keywords

Interactive urban lighting; LightStories; Urban Echoes; SnowLight; participation; communication; urban information; interaction; lighting

ACM Classification Keywords

J.5. Computer Applications: Arts and Humanities: Architecture

Introduction

In this position paper, we introduce three real world lighting demos, which explore interaction with lighting in different urban contexts and with different thematic approaches. All the case projects are part of the Adaptive Urban Lighting – Algorithm Aided Lighting Design research project.

The aim of this paper is not to present the final results of our inquiries, which will and has partly been done in other publications [1] [2] [3]. Instead, the target is to introduce our approaches to interactive city lighting, as well as the challenges we have encountered while preparing these demos, to the workshop participants and other readers. Our research is still ongoing and two of the demos are currently being evaluated.

LightStories

In the LightStories case project, we approached lighting as a participatory, interactive, and communicative element of public urban space. The main concept of LightStories was to introduce a part of public street lighting as a forum for personal narratives, messages and greetings. Through this playful idea of a street lighting as a social media, people were invited to participate in the lighting design of a public street. For one hour at a time, anyone could have the power to decide what kind of atmosphere the lighting is creating there through RGB-LED stripes situated on the sides of street light poles. The stripes provided colouring and ambiance to the environment, but the more functional part of the street lighting, provided through indirect metal halide lamp luminaires, could not be controlled.

User participation in lighting design was enabled through an easy-to-use web interface which was designed and built in the project. Each participant using this interface, booked a suitable time for their story and created a lighting design by choosing different colours, effects and at which tempo they are displayed. Additionally, users wrote a story, a message or a greeting, which related to their lighting design. These texts were viewable on the LightStories website and on the public UBI touchscreens in the city centre. Real-time video of the street was also displayed to illustrate the current story for the website users. The LightStories project was designed and realized during autumn and winter 2011-2012. The design tool was in use and the LightStories were presented during February 2012 along a pedestrian oriented street.

In the LightStories project, we learned that participatory design and communication with light was a successful way to achieve meaningful interaction with lighting, and the feedback from participants was very enthusiastic and positive. Anyhow, also some requests for more direct and more real-time ways of interaction with lighting were presented in our evaluation interviews. In the LightStories demo, the participant could not experience the results of his or her design right away, but due to the constraints of the booking and censoring system, had to wait for the scheduled time of presentation. This shortcoming is being eliminated in our further development of LightStories system.

Urban Echoes

The second case – Urban Echoes – is a temporary park lighting installation, which provides urban information expressed in the form of dynamic lighting for the users of the park. With their mobile devices, people can make inquiries about current events and the real-time activity

LightStories, 2012.

Urban Echoes demo setting in Otto Karhi park, Oulu, Finland, 2013.

levels of different districts of the city centre, and receive the answer in a visualised form, as lights playing on the surfaces of the paths and the surrounding trees. The same information is readable as graphical and textual representations on their mobile devices. The mobile service is accessible from the park through QR-codes and web links situated on the site.

Besides this device-based interaction with lighting, another challenge is to create interaction between the park users and the lighting by applying a network of movement sensors. We have studied different scenarios of adaptive park lighting from the perspective of park visitor's experience, employing the algorithmic design tool developed in our project. We are testing and evaluating various movement-light response patterns in the real world conditions, in order to understand the influence of adaptive lighting on e.g. park users' feeling of security and their experience of nocturnal urban light environment. One question is, whether our installation, which situates on a rather inactive park footway, succeeds in attracting real, conscious interactions between visitors and lighting, or will the effect remain only as entertaining and atmospheric visual play of lights, triggered by people passing by. What are the possible forms of interaction, which will arise, and what kind of movement-light-response patterns caused by different algorithms will attract them?

The Urban Echo project is functioning from the middle of January to the end of March 2013, and it is evaluated with the help of online and printed questionnaires, and with interviews on site and in remote locations.

SnowLight

Our third demo – SnowLight – is in operation from mid-February until mid-March. Whereas the other cases situate in the context of everyday urban environment – a pedestrian-oriented street and a park thoroughfare passage - this case is as an event beyond every-day and perhaps potential venue to attract interactions between visitors and lighting.

The demo is a part of "Snow-world"-installation - a construction made of snow and ice - on a market place. The installation is meant for people – especially children – for climbing and sliding in the snow, and for enjoying the sound-scape composed for the event. Our light installation is controllable by visitors by the public touch screen situating on the market place, which allows the users to choose colours for the RGB-lights in the installation. In addition, the lighting interacts as animation patterns with people climbing up the wall and sliding down the snow hills. The sound-scape also influences on rhythmical alterations of light in one part of the installation. Visitors are encouraged to take photos of the installation and of the interacting people, and to send them to be projected onto the adjacent theatre wall, as well as to be published in the public touch screen. These projections add an extra level to the interactive play of light, as the observers are attracted to join the game and to communicate with light in pictorial format.

One aspect of the demo, is to increase the citizens' use of public touch screens. We assume, that the process of seeing real-time interactions with light according to one's own design in public space, would be sufficiently rewarding experience to attract users to the system. However, there are some challenges and problems to

be solved: 1) Finding the balanced joint effect of interactions created by the participants using the touch screens and mobile devices ('choreographers'), the climbers and sliders ('performers') and the photo senders ('observers'), so that each group has a sufficient sense of control; 2) finding balance between the sufficiently interesting user control options and the touch screen use limitations in harsh winter conditions (temperature usually between 0 and -30 Celsius degrees in February and March; and 3) creating suitable censoring procedures for the interactive photo projections, to prevent any offensive content.

Further work and expected results

The Urban Echoes demo provides us with an excellent test field of adaptive and interactive urban lighting solutions for the development of design methods and tools, as we can instantly see the effects of different control algorithms on the real world lighting behavior and the inhabitant responses. In addition, the energy use caused by different scenarios and control algorithms will be monitored. The evaluation of both the Urban Echoes and SnowLight project will widen our understanding of the experience of interactive lighting, and help to develop suitable design strategies for designing interactions with light in urban settings.

Acknowledgements

References

[1]   Pihlajaniemi, H., Luusua, A., Österlund, T. and Tanska, T. (2012). LightStories: Designing and Evaluating Interactive and Participatory Urban Lighting. in: DIS 2012 Workshop on Designing Interactive Lighting, June 11, 2012: Newcastle, UK.

[2]   Pihlajaniemi, H., Österlund, T. and Tanska, T., 2012. Tools for interaction and user participation in urban lighting. LightStories case. In: *Proceedings of Digital physicality | physical digitality. 30th eCAADe Conference*.

[3]   Pihlajaniemi, H. et al., 2012. Experiencing Participatory and Communicative Urban Lighting through LightStories. In: *Proceedings of Media Architecture Biennale 2012*.