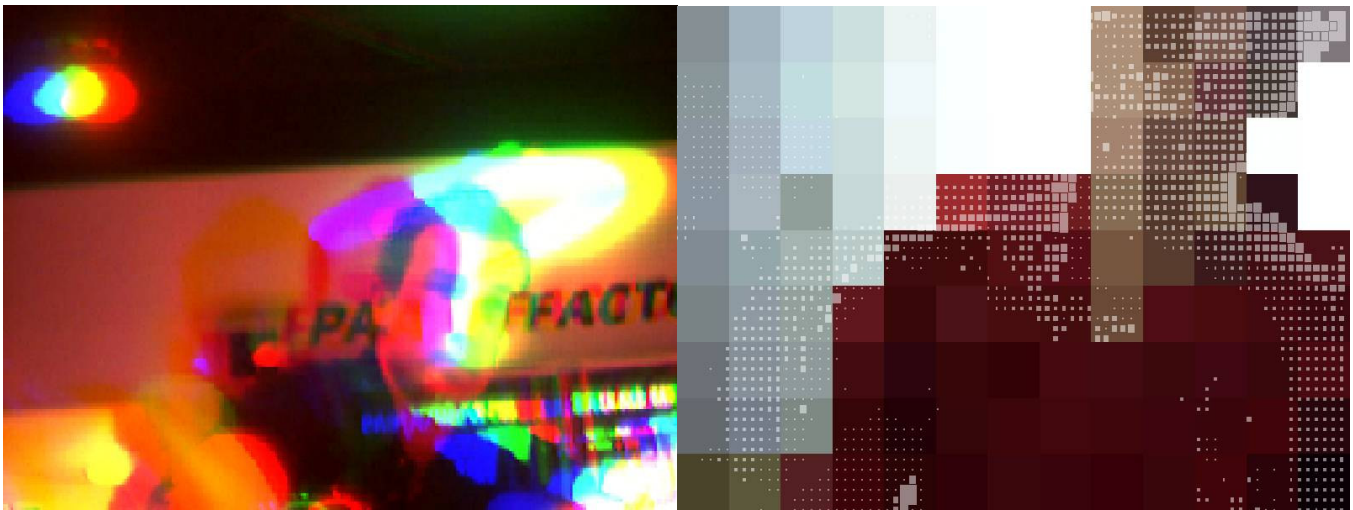


# Context Photography

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**Figure 1: Two examples of context photographs.**

## **ABSTRACT**

Context photography consists of capturing context when taking a still picture, by sensing physical input in addition to light and representing it visually in real time. With this new concept, we explore alternative potentials of the digital camera as an everyday creative tool. We have developed a working prototype that senses sound level and movement and represents them visually in real time into the picture being taken. In the interactive exhibition we wish to present, visitors would be able to try out this prototype. The pictures taken by visitors would be dynamically displayed throughout the day as a large projection on a wall. Large hardcopy photographs taken at previous occasions would be hung on another wall. This exhibition is meant to serve as a forum for discussions about alternative approaches to digital photography.

## **Keywords**

Context photography, digital cameras, everyday creativity.

## **Website**

[www.viktoria.se/fal/projects/photo/](http://www.viktoria.se/fal/projects/photo/)

## **CONTEXT PHOTOGRAPHY**

As creative tools, digital cameras have the potential to transcend the mechanical and optical constraints of analogue devices, thereby giving birth to new aesthetic practices in the act of taking a picture. However, for the average photographer, taking pictures with a digital camera is still very similar to its analogue counterpart. In order to explore alternative means of creating pictures, we are developing a particular concept, context photography (Figure 1). This consists of capturing more than incoming light in an image, i.e. the context. Information about the physical context, such as sounds and movements gathered from sensors, visually affect pictures as they are taken. This opens a new scope of possible experiences and practices. The following scenario shows how a context camera can be used.

## Scenario

It is a summer evening. Alma is riding her bike to a party when she hears, from a distance, the familiar sound of a ferry departing from the harbour. She has been waiting for this moment and sets off towards the river walk to catch up with the huge ship. She is excited to see what pictures she can take with the sound of running engines in the background. By the river, she picks up her camera, points it at the bridge and the sky, and when the horn of the ferry blows, she snaps some pictures. She likes the way the loud noise has given the bridge a rough, pixelised look, quite different from the images taken yesterday morning when the river was quiet. She puts the camera back and heads for the party. She is eager to show Andreas the pictures she just took and wonders where he will have to go to beat this.

## CONTEXT CAMERA PROTOTYPE

A prototype (Figure 2.a) has been developed as the result of a design process involving workshops with potential users and amateur photographers practicing lomography [7]. For more information about the design process, see [4] and [5].

The prototype uses sensor input, currently vectorial movement and sound level, to affect the image in real time with graphical effects, as it is being captured. It is implemented on a Tablet PC, with the screen acting as a viewfinder, and all processing is performed by a C++ software program. A webcam serves as a lens, and a small mouse taped on top of it is used as a trigger. A condenser microphone connected through a small pre-amplifier, measures the sound level. Movement is retrieved as a vector field from the differentiation of subsequent images captured by the webcam. Input is calibrated to default values corresponding to a normal image without effects. Graphical effects are grouped in combinations of one "movement" and one "sound" effect, based on how well they would fit together, in order to avoid putting too much focus on one particular design. They are linked to the sensor input with a simple one-to-one mapping strategy. Effects combinations are the following:

1. Small white dots follow the movement as a decreasing trace + pixel size increase with sound level (Figures 1.b and 3.a)
2. Traces of coloured shadows follow the movement + the rest of the colours evolves towards a grey scale with increasing sound level (Figures 1.a and 3.b)
3. "Swimming-pool" effect + colours evolve towards a grey scale with increasing sound level (Figure 4.a)
4. Extreme zooming on movement + colours evolve towards a grey scale with increasing sound level (Figure 4.b)

The user points with the webcam, sees the image and its real-time effects on the viewfinder, takes a picture by left-clicking on the mouse, and changes effect combinations by right-clicking. When a picture is taken, an audio feedback is

heard; the image freezes a couple of seconds on the screen, and is saved as a JPEG file.

## CAMERA PROTOTYPE IN USE

The camera has been put into use, mainly in two evaluation workshops: lomographers and an amateur photographer took pictures with the camera at the local central train station (Figure 2.b), and high school students interested in photography used the camera in their high school.

These workshops provided insight and inspiration for a new scope of possible experiences and practices in digital photography. We observed how participants sought out interesting contexts such as the sound of a departing train, or actively created a new context by screaming or moving. The workshops also gave us several ideas on how to continue the design of the context camera. For example, we discovered that the participants preferred visual effects different from those that can be achieved with traditional cameras. Based on these observations we plan to go through a new prototyping and evaluation iteration.

## RELATED WORK, TECHNOLOGIES AND PRACTICES

Integrating context information into photographs by adding audio to images as been explored in [1] and [2]. Other projects have developed new interactions [9], f.ex. by adding sensory properties [3, 6, 8].

Current trends in consumer digital photography show an increasing interest in the use of meta information, such as GPS in combination with MMS (Multimedia Messaging Service) e.g. with the camera phone KDDI A3012CA.

Built-in visual manipulation programs are increasingly being provided e.g. in the Samsung SGH-E700.

IR cameras visually represent temperature - i.e. invisible context data - but does not capture visible light in the image.

Our approach to photography is inspired by amateur photography societies, such as the Lomographic Society [7], that playfully and open-mindedly explore the limits of everyday analogue photography.

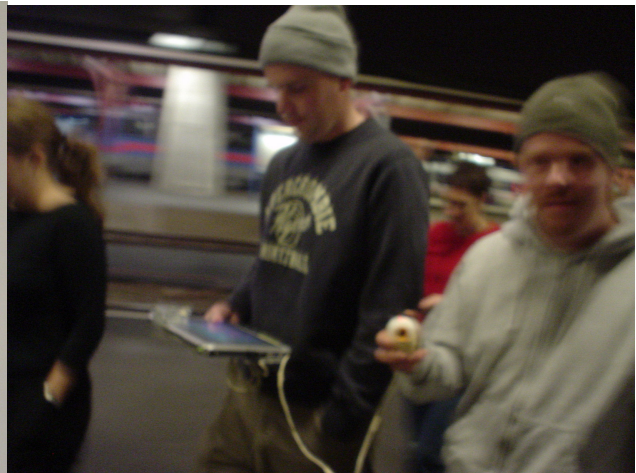
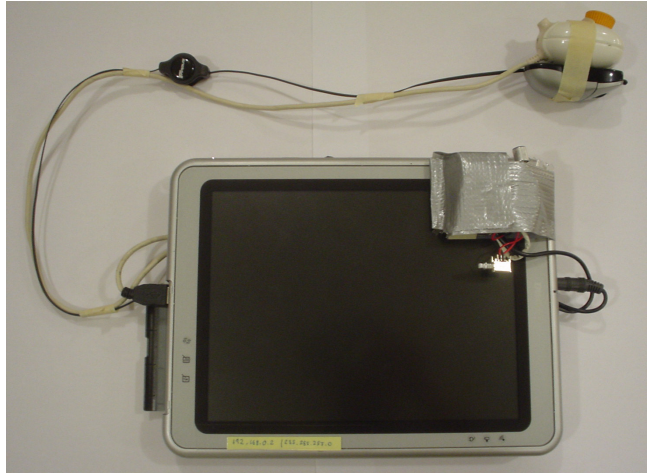


Figure 2: a) Context camera prototype; b) users taking pictures.

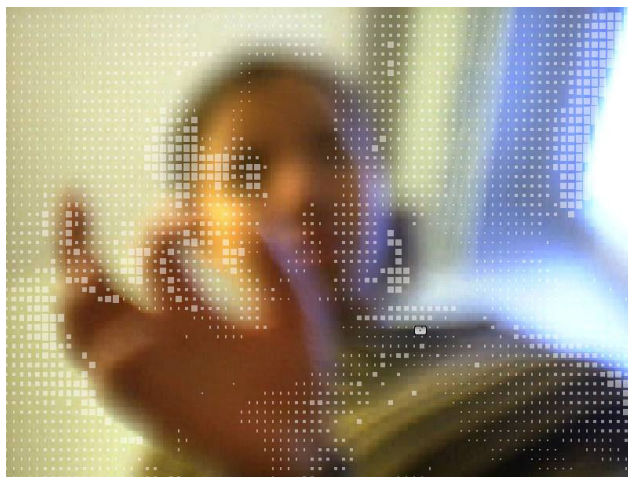


Figure 3: Effects 1 and 2: a) traces of white dots; b) colour shadows.

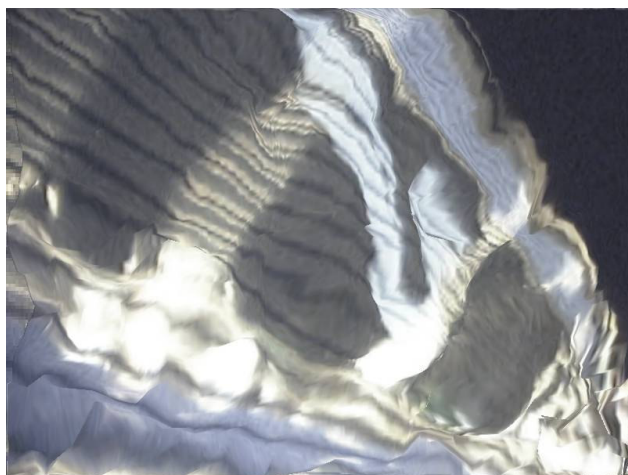


Figure 4: Effects 3 and 4: a) water ripples; b) extreme zooming.

## EXHIBITION

The general aim of the exhibition is to communicate the concept of context photography to the visitors and to discuss it with them. Showing an alternative approach to digital photography, we mean to stimulate new thoughts about unexplored potentials of this field.

We wish to present the project in two parallel sections: an interactive one focusing on interaction aspects of the project, and a visual one presenting aesthetic qualities of still images created with a context camera (Figure 5).

### Interactive Section

#### *Exhibition Visitors Becoming Context Photographers*

On the interactive side of the exhibition, visitors would be able to try out taking pictures with a context camera. Using our interaction prototype, they would experience a new type of interaction with a still camera, and directly see the result of this interaction on the images, by looking at the viewfinder. This hands-on experience of creating images affected by context is meant to give visitors an embodied understanding of context photography and a feeling of how to modify images with sensors in real time. Judging from previous users' behaviours encountered in evaluation workshop, one could expect the visitors to either look for sources of input such as loud environments or explicitly create such input themselves by e.g. producing noises.

#### *On-Going Projection of Visitors' Photographs*

Pictures taken by visitors would be saved and regularly transferred to a database. Then, they would be continuously yet randomly projected on a wall, with short time interval between picture updates, and throughout the whole duration of the exhibition. In this way, visitors would become active

participants in a dynamic photography exhibition. They would situate the concept of context photography into the setting of the venue, linking the displayed images to the environment in which they were taken, namely the exhibition hall. A caption would explain the procedure of the projection.

### Photography Exhibition

In parallel to the interactive section, we wish to run a 'traditional' photography exhibition of pictures taken with the context camera at previous occasions. It would consist of a number of large-scale hardcopies hung on an adjacent wall. Captions would indicate author, place and contextual factors of capture.

This visual exhibition would provide a straight-forward way of communicating concept and aesthetic qualities of resulting still images. Our aim is to create an experience reminiscent of traditional photography exhibitions, in order to reflect the project's focus on supporting aesthetic expression and the fact that the end-product of a context camera is after all a still image. We also wish to use these images as a means of triggering discussions among visitors, and between visitors and the project team, f.ex. about what it implies to view such pictures in a context different from the one in which they were captured.

### Additional Information

Finally, posters would provide related information. One would introduce the concept of context photography and situate it in the broader field of alternative digital photography. Another would be placed next to the interactive area of the exhibition to explain the functioning and implementation of the current prototype.

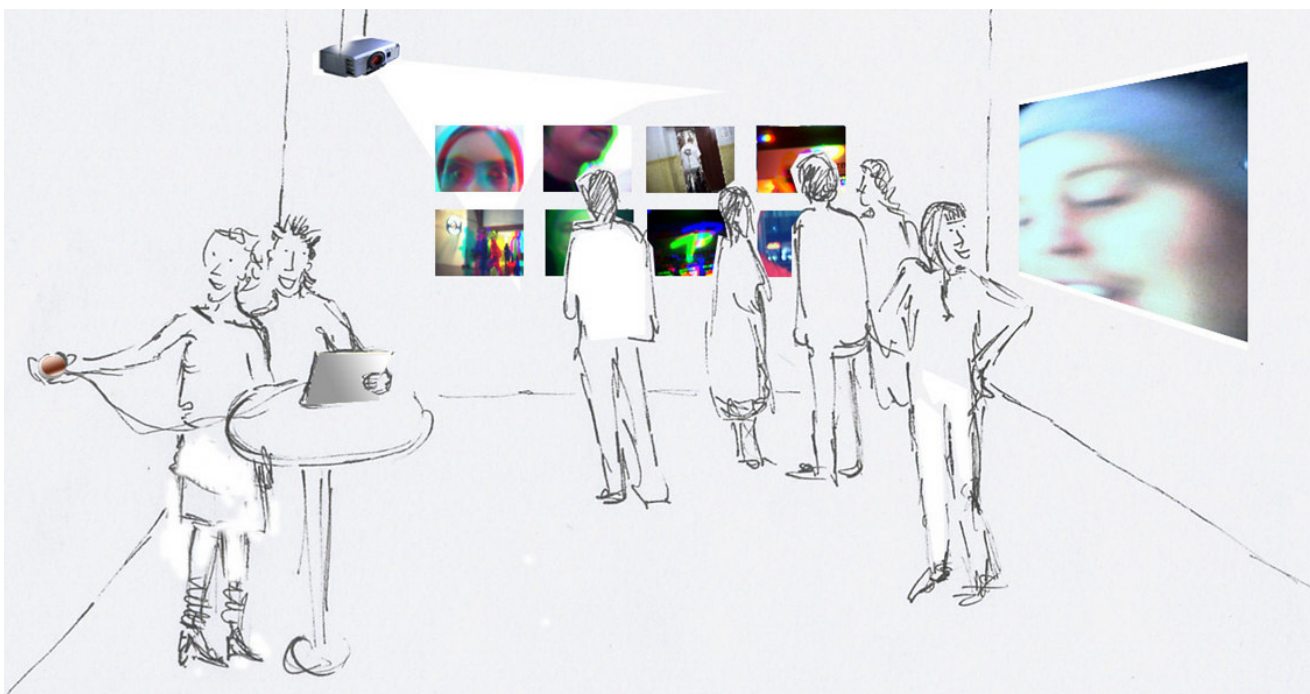


Figure 5: Sketch of the exhibition format.

## BIOGRAPHIES

### Lalya Gaye

Lalya is an engineer and researcher working in multidisciplinary projects at the convergence of art, technology, and design. Her research focus is on exploring how Ubiquitous Computing can trigger new aesthetic practices, by enabling people to transform their everyday life into a raw material for creation and personal expression. She received a B.Sc. in Physics at the University of Geneva, Switzerland, a M.Sc.Eng. in Electroacoustics at the Royal Institute of Technology in Stockholm, Sweden and is a Ph.D. candidate in Informatics at the University of Göteborg, Sweden. She currently works at the Future Applications Lab, Viktoria Institute, in Göteborg and occasionally teaches Music Technology at the IT-University of Göteborg.

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### Lars Erik Holmquist

Lars Erik is the leader of the Future Applications Lab at the Viktoria Institute in Göteborg, Sweden. Before this, he founded and led the PLAY studio, Interactive Institute, from 1997 to 2001. He received his Master's degree in Computer Science in 1996, and his Ph.D. in Informatics in 2000, both at the Göteborg University. His research interests include Human-Computer Interaction, Information Visualisation and Ubiquitous Computing. He has been a member of many international conference committees and published extensively in these research fields. In 2002, he chaired the international conference on Ubiquitous Computing, UbiComp 2002, which attracted almost 500 visitors from companies, universities and research institutes all over the world. He is an associate editor of the Springer journal Personal and Ubiquitous Computing.

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### Maria Håkansson

Maria is a researcher working in multidisciplinary projects that mainly focus on user aspects and design in Ubiquitous Computing and mobile media. She received a M.A. in Computational Linguistics at the University of Göteborg, Sweden, in 2002, and is now a Ph.D. candidate in Informatics at the same university. She currently works at the Future Applications Lab, Viktoria Institute, in Göteborg.

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### Sara Ljungblad

Sara is a researcher working within the field of Interaction Design, with a close connection to novel technology and art. She is a member of the Future Applications Lab, at the Viktoria Institute, Göteborg. Sara is involved in several

projects with a user-centred and multidisciplinary design approach. She has a B.Sc. in Cognitive Science, a M.Sc in Informatics and is a Ph.D. student in Informatics at the University of Göteborg.

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### Panajotis Mihalatos

Panajotis is an architect and a software developer. Among other projects, he has developed software for live video manipulation and reactive digital projections, focusing on element of playfulness, movement and idleness in public space. He studied architecture at the National Technical University of Athens in Greece, and is currently a Master student in Art and Technology at the IT-University of Göteborg, where his thesis consists in developing software for supporting early stages in architectural design.

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## ACKNOWLEDGMENTS

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