# Phototropic Memories

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## ABSTRACT
This paper illustrates the thesis research and process that led me to conceive, design and evaluate the Phototropic Memories device, a novel interface supporting the intimate sharing of personal visual memories over spatial and temporal distance, between two emotionally bound persons.

## Keywords
Affective, digital photography, context aware, telecommunication, symbolic, slow tech.

## INTRODUCTION
The inspiration that initially gave impulse to this project comes from my passions, *photography* and interactive systems and, in addition to them, from a series of events and circumstances that I've experienced during the last two years namely leaving my home country to pursue a Master 's degree abroad.

## MOTIVATION
With the very first impulse spawned by photography, building interactive systems and displacement the project was pushed forward by a more focused impetus, caused by a personal analysis of the transition from analog to digital Photography and the current design trend in the non professional photographic field. Comparing the experience provided by analogues digital and analog cameras, I was feeling something was gained, and lost, by each single photograph, during the transitions between the two mediums. *Surprise* was traded for *immediacy*, *value* for *quality and speed*, *intimacy* for *convenience*. With my project I want to bring back these elements, using digital technology not to perform an action faster, better or more conveniently, but to build valuable relationships between the components of the photographic interaction, finally delivering a novel experience able to evoke the elements of magic, curiosity, surprise, value and commitment in its participants.

## PRECEDENTS
A multitude of projects demonstrably connect to my thesis investigation from many different perspectives; the following is a selection of those most closely related.

**"The Moment Camera" by M. F. Cohen and R. Szeliski**

*"...Imagine a modification in the camera's underlying functionality that keeps it always recording... Thus, rather than only recording a snapshot, the camera constantly records time slices of imagery."* [3]

This precedent is valuable to my project as it shares a key conceptual and technical element, that of putting the 'moment' in the centre of the memory capturing interaction. A moment, in my case a visual memory, is not a single slice of time, but is a more fluid, in motion element able to represent a memory in both its spatial and temporal dimensions.

**"Iso-phone: a total submersion telephonic experience" by Auger J. and Loizeau J. and Agamanolis S.**

*"...By blocking out peripheral sensory stimulation and distraction, the Iso-phone attempts to create a telephonic space of heightened purity and focus... This project examines how tele-communications might exist from a perspective that prioritizes quality of experience over the design industry's blinkered notion of efficiency, often represented in multi-modal, omnipresent services and portable products... "* [2]

The strongest similarity with this project is the critical perspective set by the remixing of an existent communication tool, in their case a mobile phone, in my case a non professional digital photo camera, to underline the problematic relationship between a design based on efficiency and that which focuses on quality of experience.

**"Between Blinks and Buttons" by Pohflepp S.**

*"Between Blinks & Buttons are two projects about the camera as a networked object... Blinks is a prism which refracts the ray of time running through a photo into all the moments that were captured simultaneously in different places. Buttons is a camera that actually shoots other's photos, taking the notion of the networked camera to the extreme."* [6]

This project shares one central element with mine: Time. Each visual memory, each photo is not considered just as a visual snapshot captured from it, but as an active element still immersed in its stream. In the case of the "Between Blinks and Buttons" project, time is a portal, a link to other memories, experiences, configurations that happened in the same moment. In my project, time lives in direct relationship with space in the form of the element of distance, a force all the memories in the system are subjected to, a force able to empower the emotional potential of each visual memory to its extremes.

## METHODOLOGY
The Phototropic Memories device can be imagined as a camera split into two halves, one half, the Capturer, just able to capture a visual memory, the other half, the Attractor, capable of showing the memory back. These two parts will be shared among two

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users, one will keep the Capturer half while the other will hold the Attractor half. When the first person captures a visual memory it won't be immediately displayed back, instead it will be sent to a non tangible space called Memory Plane, a region where all the visual memories shared by the two users float waiting to be attracted by the second half of the device, the Attractor. When the second person takes the Attractor and holds it in her hands, it will start to retrieve the memories which reside in the Memory Plane, to be seen through a loupe. When the two users will meet in person, finally reuniting the two halves of the device, a stream of light will be emitted from the Attractor, letting the users enjoy their shared memories on a large projection. Some rules will govern this system: The capturing phase will be controlled by the *equilibrium* rule, which checks the ability of the Capturer to record new memories in relation to the behavior of the Attractor. A second rule, *environmental*, will control the attraction process to make sure the user is an active element of the interaction, i.e. if the person who holds the Attractor half wants to start the attraction process in order to enjoy some memories, it will have to prepare the surrounding environment accordingly. This rule tries to make sure the person who interacts with the Attractor half actively commits to the memory sharing event, focusing on it, giving it the attention it deserves, almost as if the other person is present in that moment telling a story using images instead of voice. A third rule, based on the actual *physical distance* between the two halves of the device, will control the speed each memory will travel at in order to reach the Attractor, high distance/speed causes immediate attraction, low distance/speed causes attraction delayed in the future. Finally, a fourth rule will regulate the reunification process, the event during which the two users will come together and physically join the two halves of the device. In that moment most of the previous rules will cease to exist, all the memories residing in the Memory Plane will be attracted and visualized to be enjoyed by the two users on a large projection outside the Attractor interface. Each memory captured and played back by the device won't be a still image or a clear video. It will be close to the idea of a breathing visual memory made up of fragments of light sent by a special person just for you, from another space and another time. A possible scenario of use is available at http://www.vimeo.com/4427431 .

## IMPLEMENTATION

As of today the Phototropic Memories interface lives in the form of a demonstrable prototype. From the physical side, the two halves of the device are made of wood; they have a box-like shape with the rear side cut in a positive/negative fashion, letting the two halves physically join and sense each other with the help of some embedded magnets and electronics. From a software perspective, the system is run by a custom C++ application written with the support of openFrameworks [5] a collection of code initiated by Zach Lieberman and Theo Watson, specifically targeted towards artist and designers. The software interfaces with the physical elements of the project thanks to the Arduino Nano [1], which enables the real time sensing of parameters relative to physical context, such as light level and activity in the environment, human presence and touch. The software and the electronics are then run by a dedicated laptop which supplies the computing power necessary for the system to work properly in a tethered fashion. In between Arduino and the Openframeworks application, there's Firmata "a generic protocol for communicating with microcontrollers from software on a host computer." [4] which establishes a communication bridge which let the C++ application running on the laptop exchange inputs and outputs directly with the Arduino in real time, with no additional programming needed on the microcontroller side.

## EVALUATION

The project is still in its early form, but the results from the initial user test session are encouraging. The selected user was a professional photographer which had a relationship with the second user, a design student. They were given a digital camera, modified to simulate the functionalities proposed by the Phototropic Memories device, and two letters, one labeled Capturer and one Attractor. The letters contained a series of instructions that informed the interaction that had to take place between the two users through the interface over a period of time of three days. Here are some excerpts from an interview after the testing: *"the limitations were positive, I was caring much more for each shot"; "... I was able to capture what I wanted even without a viewfinder; I was feeling a tension between what I captured and what I was expecting to capture, which led to surprise"; "...Time was a huge component. waiting for something to come enhances its value."* Additionally, the photographer found that the the experience was intimate and extremely personal. The following round of testing happened with the same two users after a period of three months, this time instead of the modified camera the actual 'demo' prototype was used. The users found the proposed interaction surprising, satisfying and almost 'sensual', especially in relation to the reunion event. When asked to define the experience with one word, one user defined it as romantic. Overall, the rules system worked, providing meaningful constraints enabling change of the traditional perception of one-to-one photographic interaction, making it more valuable, personal, intimate, surprising.

## CONCLUSION

This project represents a synthesis of my passions, ideals, and design perspectives. When I initially conceived it I was just fascinated by the idea of capturing visual memories and receiving them not immediately, but in the future: maybe one day you take this device in your hands and see a blurry image from your past, an image of you, or someone important for you, that you have never seen, that, together with its novelty, carries a part of you, of your memory, of your identity that you have never perceived before, that can contribute to the ever mutating mosaic that represents yourself.

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