

Revealing Space

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Summary

The main project idea is to visualize movement in space using the frame differencing technique. This enables the software to reveal hidden paths in public spaces and therefore act as a metaphor for the entire making of public spaces including social activities, built environments and time as the main components for public space-making.

project video: vimeo.com/38471426

<< screenshot of one result using method two with a very low „space memory“



main principle of the software: circles are drawn where people have walked. „space memory“ tells about the time period how long the paths are stored

Concept

Public space is a far more complicated phenomenon than we realize in our everyday life's. Public space is not just about the physical setting or the social interaction, it has a component of time as a very basic element of its constitution. The project „Revealing space“ aims to reveal people's physical movement in public spaces by making them visible in a certain space over a longer time span. Thus the project aims to sensitize the viewer of the fact that space is not just made up at one certain moment in time (the moment we perceive it), but it always relates to what has happened in its past (and one could even say, of what will happen to it in future). This is not just true for people's movement in public spaces but also for the built

physical environments and the social interactions that have been performed or will be performed in those spaces.

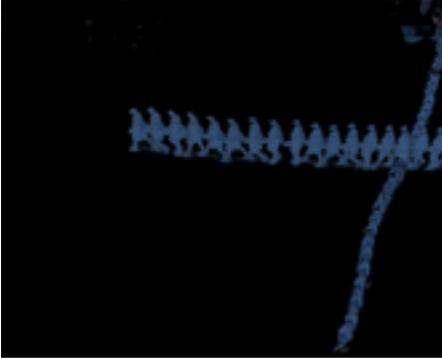
Thus the project uses the metaphor of people's movement to raise the awareness for something much wider: Current public spaces have developed over time, they are the result of changes that happened to them in the past (and will happen in future). Everyone acting in any way in a public space becomes part of the process of making the space.

In a smaller scale the project raises awareness for the fact that even if one is using a public space alone at a certain moment in time there have been other people before and of course it also implies other people will use it in future.

Using videos as the base material the project shows the path people use in a certain space and therefore enables planners

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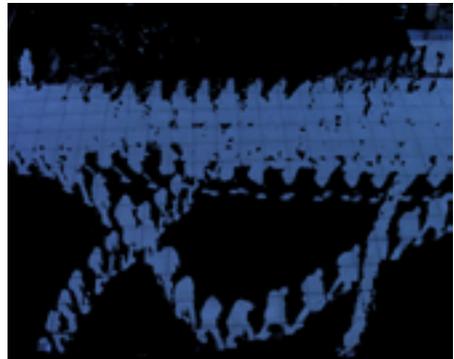
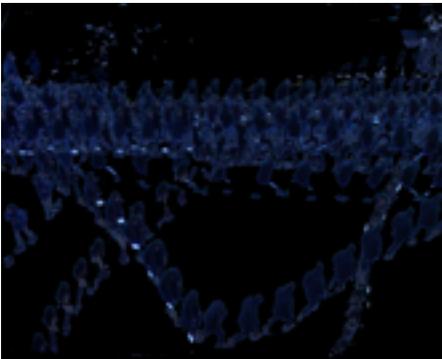
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to rethink the design of those spaces: Are the built surfaces used in the way planners have imagined before or do people actually only move on certain paths and the space could then redesigned containing new green areas?

Whereas this project does not aim on implementing a 'classical architectural machine', it rather focuses on analyzing space thus enabling the viewer to use the analysis for further planning and design tasks.

In many ways the project "Revealing space" relates to the installation project "secret trails" (video available here: vimeo.com/26826534), that I realized in different locations in Helsinki in summer 2011. Whereas the earlier project used Kinect's depth data to track people's movement and projected it back into the same space in real-time, 'Revealing space' uses traditional prerecorded video input.



the three images show different ways to add up to the base images using the simple frame differencing technique

Methods | Programming

The project uses two quite different methods:

1 – Simple Pixel Differentiation

The first attempt compares all pixels of the current video frame (red, green, blue values) with a base image and adds the difference to the output image if the difference is higher than a certain value (threshold).

2 – Blob detection using open CV

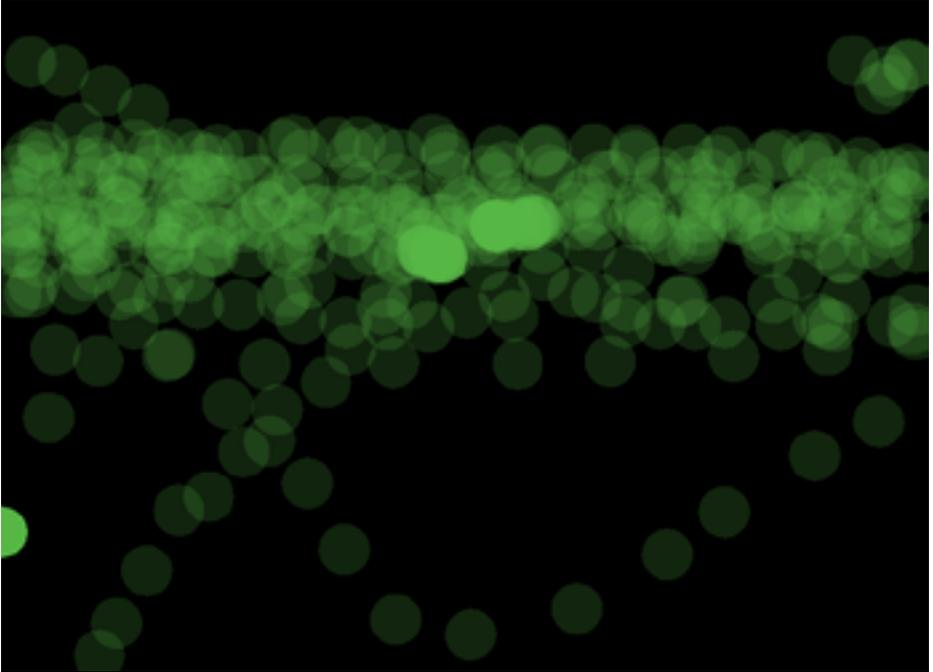
The second attempt uses the open CV library for openFrameworks. The library add-on enables to detect the moving person as a blob (the person itself is detected similarly to the method mentioned above). All blob center points of one frame are added to one vector (for blobs per frame), which is then added to another vector (for all frames). This nested vector recalls the principle of a two-dimensional arraylist in processing. The principle enables to store as many blobs in one frame as needed and at the same time know the time sequence of the blobs. The blobs are then redrawn to the screen as circles of different alpha values according to the time they were detected (higher alpha value for newer blobs).

In principle as many frames as wanted could be stored, thus enabling to encode videos of unlimited time. The time period is just limited by the patience of the software user: For the results shown in the project video I ran the video material that was originally 9:34min at a speed of 3x thus reducing the time to 3:12min. In principle the software could also be used for real-time encoding.

I included a limitation for how long blobs are stored, a reasonable and quite effectful function. The time period can be chosen before running the program. It was only in the process of implementing when I realized the power of the choice: How long is the "memory of a space"? Is it just a second, a minute, an hour or a year? The choice has a great influence on the results and therefore shows the power of software developers and information designers: the power to influence our memory.

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encoding the movement using method 2

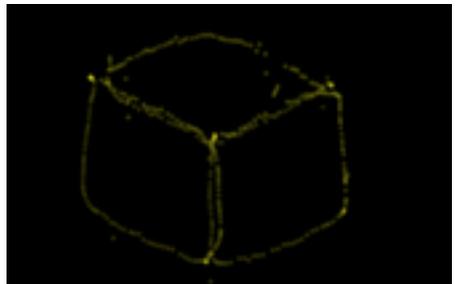
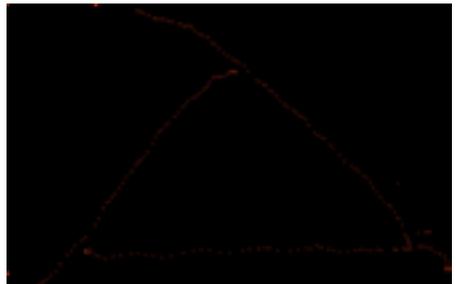
A few notes about the results

- Due to time limitations I only shot video material of one public space: In Weimar just behind the universities main building towards the cubes. It is also just material of all in all 2.5 hours for the whole project video. Initially I was thinking about shooting 12 hours of constant video (which is impossible using the VX2000 and this would have produced a huge data set to analyze frame by frame).

- The video material is not ideal: It should be shot from a central point above the public space. It's also important that there are about the same light conditions for the time recording and the camera is not moved (not even a tiny little shift).

- Finally the results shown here and in the project video are just very few variants: By manipulating
the shape of the drawn blobs (circle, triangle, square,...);
the color, alpha values and size of the shapes;
the speed of replaying the video material;
the maximum number of detected blobs (=maximum number of people per frame);
changing the threshold and/or
changing how long blobs are stored and redrawn
endless variants could be produced. And here I'm not even mentioning different film material, other public spaces, other times of the day and of the year and so on.

The analyzing machine is produced, now it's time to analyze and 'miss-use' it for artistic purposes.



artistic „miss-use“