

ElasticMapping: implications of a GPS drawing robot in times of locative media

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How working with (nomadic) dairy transporters in Nigeria results in the need for software that makes GPS data flexible.

To scale is not yet to edit. Editing begins when scaling can be balanced and adjusted to differed, chosen parts of data, to make pace for a choreography. This will give data an interval, a rhythm and a tone: in brief, a style.



Figure 1. *NomadicMILK* Cameroon version (courtesy Foundation Beeldkijk)

As an artist I have been working with GPS¹ since 2002 in a series of projects. My engagement with GPS data means that I am an artist working in the field of locative

¹ After a development phase of about twenty-five years, the NAVSAT GPS satellite system was fully launched between 1989 and 1993 for military use by the US army. The signal was only released at full accuracy for civilian use in 2000 by president Clinton, so general access to the technology is not even 10 years old now.
http://en.wikipedia.org/wiki/Global_Positioning_System

media. As it is very difficult to find a solid definition for 'locative media', I borrow a description by Mark Tuters and Kazys Varnelis: 'Broadly speaking, locative media projects can be categorized under one of two types of mapping, either annotative - virtually tagging the world - or phenomenological - tracing the action of the subject in the world.'² For me, my main interest has always been slightly different still. Although I do trace subjects in the world, my focus is to create new visualizations of these tracks and see what new kinds of experiences of space these visualizations bring about. The newness of the medium is very important to me.

To see this in a perspective that makes sense, I like to compare the radical new possibilities of GPS data collection and visualization with the invention of photography around 1825-1838. It fascinates me to have the opportunity to witness a new visualization tool acquire a place in the world. During this process one could argue that all visualization tools undergo a comparable evolution: from a representation of the world that is as realistic as possible, towards a fictional story-telling tool, to finally becoming a medium for autonomous representation and art.

Let us assume for a moment that this evolution might also take place *with* GPS data visualization. If that is the case, it is now in an extremely early stage. Working with GPS data means that I have the opportunity to make evolutionary giant steps within the medium with relative ease. To illustrate the early stage we are in, where collected and visualized GPS data is seen as a fundamental print of reality, I'd like to quote some reflections by the artist Jeremy Wood³:

I make maps of my tracks to contribute to the field of personal cartography. The act of tracing one's movements will be commonplace as it is such a rich source of information for business and government. (...) but perhaps it's most important for the public to have access to records of their own movements. I once considered providing an alibi to the police with GPS data after receiving a speeding ticket. I wanted to prove with my evidence that although I was there at the time, I was travelling at a different speed. The ticket was issued by a fixed camera on a

² Beyond locative media
http://networkedpublics.org/locative_media/beyond_locative_media

³ Jeremy Wood; Synapse list July 11 2008
<http://lists.synapse.net.au/pipermail/elist/2008-July/000136.html>

motorway so I checked its position against the speed recorded in the GPS data at the corresponding position. Unfortunately the results were the same.

(Jeremy Wood, July 10th 2008 on Synapse list.)

What strikes me in the text is that although Jeremy Wood has already worked with GPS for years, (he is one of the founding fathers of locative media with his www.gpsdrawing.com project) he still totally trusts the data as an unquestionable representation of the real world, to the point that you could even use it as legal, juridic proof.

GPS and surveillance

It is not surprising that issues addressed by locative media projects are often determined by the fact that the medium produces actual data, connecting a set of coordinates with exact time, thus providing accurate information on speed, acceleration, elevation, accessibility of terrain, accuracy of satellite signal and so on⁴. The surveillance issues that come with the unquestionable realism of GPS data have been widely discussed in newspaper articles, in depth theoretical articles and in 'locative media' (art) projects. The fact that this might be a stage that will be left behind (and weakened) in time is not often acknowledged.

What does this mean for my own practice as a 'locative media' artist? Instead of engaging with the surveillance issues I have always been more curious about the experience of space that GPS visualization brings about and its power as a story telling tool. In this context I also depend on its realism in my projects: it makes my participants (and audience) experience GPS-tracks as being an accurate portrait of themselves, almost as part of their body, and certainly physical proof of their very existence.

⁴ See for a list of relevant projects <http://delicious.com/locativeNL>



Figure 2. *AmsterdamREALTIME* (courtesy private collection)

AmsterdamREALTIME

In my first project, *AmsterdamREALTIME*, 2002⁵ we gave GPS devices to 60 people and transmitted the data via the mobile GPRS network. From these data a map of Amsterdam constructed itself in real time in the exhibition space. In addition, we visualized the data of each participant individually. In the project we inverted the surveillance situation by setting up the project so that our participants were on centre stage. We decided not to show the real time visualization on the website: the audience had to come to the exhibition space to see. There they could sit down and watch the tracks unfolding, or fill in a playful form to apply for participating themselves. This resulted in the audience identifying with, rather than observing the participants. After they took part in the project we gave each participant a printout of his or her own route. What surprised me was the emotional reaction of the participants to their own personal tracks. One of them even stated: 'I am going to show this print to my grandchildren.' My conclusion was that people experienced their GPS tracks as part of their identities. At that point however it was not clear to me as to how: as a portrait, a diary, a story, or even as a part of their physical being?

⁵ <http://realtime.waag.org/>

MILKproject

In the next project, *MILKproject 2004*⁶, I wanted to investigate this further, and decided to focus totally on the reactions of participants to their own tracks. We followed one dairy transport, from the udder of a Latvian cow to the mouth of the Dutch consumer. All participants involved got a GPS device for one day. We developed special visualization software which focused on appearing as recognizable as possible for the participants. At that point I was very interested in the simultaneous presentation of different media: GPS visualization combined with photography, texts or sound⁷.

In *MILKproject* the participants were confronted with GPS visualization for the first time in their lives. Sound recordings of their direct and personal reactions, in combination with still images of them watching their own tracks and being engaged in their personal life, formed the heart of the project. It was telling that participants made comments on their daily life on both a micro and a macro level: comments on the path to the water well along with comments on how time goes fast, what their expectations had been 20 years ago and how life turned out now... Apparently this was the kind of reflection our current GPS visualization brought about.

NomadicMILK

For the recent, and not yet finished project, *NomadicMILK*⁸ I wanted to focus on this idea of micro versus macro - which seemed so important to the MILK participants. I wanted to focus on people for whom mobility is an intrinsic part of their economy and daily life. Also I choose to work in a setting where the existence of the micro versus the macro was strongly present: economies that were interwoven in global and local structures. I found this situation in Nigeria, where two dairy economies exist side by side: Fulani nomadic cow herders and truck drivers transporting canned or powdered dairy products. They both depend on mobility for economic survival.

⁶ <http://www.milkproject.net>

⁷ MILKproject: Sources of Inspiration, Esther Polak 2005
<http://www.beelddiktee.nl/projects/GPS-projects/milk/Artist-statement-EP-eng.htm>

⁸ <http://www.nomadicmilk.net>

As the people I planned to work with lead a life along the road I needed a new visualization tool independent of indoor shelter or power supply. To meet those needs we developed a GPS sand-drawing robot. The robot draws pre-recorded GPS tracks directly on the ground by plotting them to a chosen spatio-temporal scale. In the previous projects I had wholly respected the GPS-data and their visualization as a form of realism. This now started to shift when working with the robot.

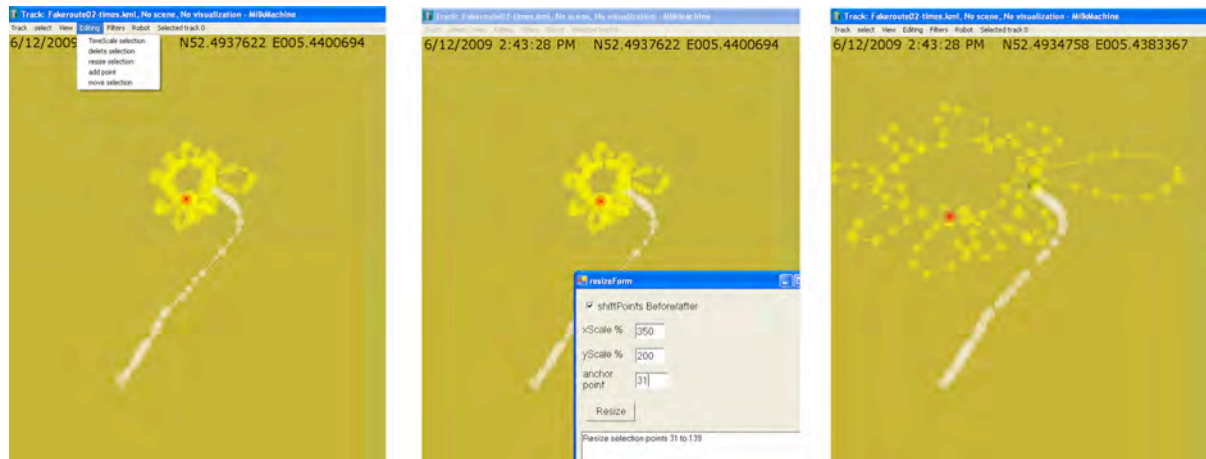


Figure 3. *NomadicMILK* Nigerian version (courtesy Foundation Beelddiktee)

I used the robot sand drawings to present the tracks to the participants in small workshops - on location in the camp, parking lot or beside the road. The robot functions as a performative tool, making the GPS tracks tangible and physically present and drawing the tracks took on an autonomous quality of its own: as a performance it began to stand on its own feet, to be independent and less in need of combination with other media.

Each time I make a robot-drawing like this the tracks need to be adjusted to the contexts: available space and social setting; how many people will be present; light conditions; colour of the ground and sand available. To be able to do this effectively I had to develop my experience with the way the robot draws tracks and the way people react to it. This approach brought about new needs in drawing. I found that radical manipulation (a

choreography) of the tracks was needed. The representation of both time and space had to be compressed, scaled and deformed in order to make the robot draw a sand line that could function as a representation to which the participants and audiences could relate in a direct manner.



Figures 4,5,6. *MilkMachine* screenshots. (Used track is fake for privacy reasons)

To give a practical example: one truck drove a long distance from one city to another, but also made very detailed movements within the city. This produced meaningful data, but it proved impossible for the sand-robot to draw it. I had to be able to enlarge the scale of the movements in the city and shrink the distance between the cities with a flexible morphing tool. I also had to adjust the duration, as the city experience needed more time for its details to stand out. To my surprise, the manipulated tracks became even more 'real' in the experience of the participants ... if being recognizable as belonging to the self is a criterion for realism ...

In this context I'd like to quote Jeremy Wood one more time:⁹

Seeing the rhythms and patterns of one's tracks can have the affect of seeing your own ghost. The qualities of line in GPS drawings can reveal a great deal about movement and process. Just like a pencil drawing where smooth lines have a different speed to jagged edges, GPS drawings can detail the elegant lines of a railway and a squiggly walk to the local shops.

⁹ Jeremy Wood; Synapse list July 25 2008
<http://lists.synapse.net.au/pipermail/elist/2008-July/000150.html>

Seeing your own ghost! How poetic and involved can you get - a GPS ghost! It exists by the grace of its movements. It can move through walls, grow and shrink if desired. Its appearance is related to routes, travellers, and it exists and does not exist at the same time ...

For me this is a beautiful and inspiring metaphor and I believe the magic of GPS visualization peaks at the moment of personal identification with the tracks. In the *NomadicMILK* project the Fulani herder Idiris got very engaged when recognizing his track during our robot performance. This recognition seemed to happen time after time, as if the fact that it is *him* being represented repeatedly throughout the process: he slapped me and interpreter Aliyu on the shoulder in surprise, pointing to the same spots in the sand track again and again, and never stopping explaining what had happened.



Figure 7. NomadicMILK Nigerian version (courtesy Foundation Beelddiktee)

The truck driver Usman had a more analytical relation to his route during performance. At a certain moment he pointed to a small heap of sand representing a bridge where he knew never to stop because of the robberies which frequently occur there. He pointed to the sand heap, explaining, touching it and at that moment the sand line truly became the protagonist: the scary bridge. The story carried both Mr. Usman and myself away: we felt scared and I admired Mr. Usman for always having been able to avoid sbeing robbed, for being smart enough, and with the aid of God ...

Editing

I expect many different GPS-editing tools and interfaces will be developed to make drama, drama in sand lines, or otherwise but nonetheless, drama in location data. As soon as GPS data becomes subject to editing its meaningful forms can be emphasized, it can be composed, become song, not only by changing scale or colour or adding some additional data, but by changing and manipulating the 'true' data itself.

In the process of my project, I found myself conceptualizing and developing a basic editing software tool for GPS data and I find this extremely exciting. From here on I am able to adjust my data whereby their meaning starts to blur - between real time and memorized time. It gains artistic autonomy and poetic potential. This is comparable with 'rough' video or film footage which, no matter how real in itself, can tell a 'real' story more effectively after editing and manipulation.

Surveillance

From a conceptual level I think GPS editing is also a milestone. It undermines the 'trueness' of GPS data, its nasty side as an unchangeable record of surveillance, without denying the beauty of its realism. For the time being I explore the original data, with the goal of making the story or expression of this data more intense. It might construct a new medium, a means to construct space bottom up, from the actual step-by-step, human and personal perspective that these very special data bring about.

This brings me to another aspect that I am curious about, and which might be even more relevant - from an artistic point of view. This is whether GPS data will develop as a mature medium which can stand on its own feet: a medium that can have value by itself and be(comes) representational and/or an artistic or poetic tool for expression. Will we soon become so literate in personal/subjective mapping that pure location data can tell stories, or be used to write rather abstract spatial-temporal data-poetry?

Could there be a future where people hire professionals to GPS record their wedding day and afterwards do an edit so that it can be shared with friends and family? Could GPS data visualizations be part of news features? Could there be GPS-journalists, just as there are photo-journalists now? Could there ever be a GPS-Hollywood???

Cloud Car

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Project Description

Any conversation about the environment inevitably comes to the automobile. Necessary for the movement of people, goods and services, automobiles are essential to the lives of most urban residents, but with these benefits come serious consequences: polluted air, dangerous roads, noise and congestion. Increasingly, we look at the world through the window of a car, airplane, or other transportation vehicle, less and less aware of what's going on outside.

The connection between the automobile, life and the air in the city is explored through *Cloud Car*, a car fitted with special effects equipment that produces a cloud of mist, enveloping car and rider.

In-person guides stationed near the car distribute fact sheets and encourage passers-by to discuss the environment, automobiles and traffic in the city.



Cloud Car at the New York Hall of Science

Automobiles and air

The most devastating impact of the automobile is its effect on air quality. Automobile pollution causes cancer, respiratory problems and heart disease. Research suggests that air pollution is responsible for 310,000 premature deaths in Europe yearly (BBC News, Feb 21 2005).

Beyond the direct damage to our bodies from auto pollution is the fact that automobile emissions are contributing to global warming. Atmospheric concentrations of carbon dioxide (CO₂), a heat-trapping gas, have increased by one third since pre-industrial times, and a majority of that increase is caused directly by the burning of fossil fuels. The effects of this global warming are widespread and are happening now: rising sea levels, habitat destruction, extreme weather conditions and the spreading of infectious diseases. According to the National Resource Defence Council, cars emit a huge amount of CO₂, 20 pounds per gallon of gas burned.



Cloud Car as part of Transportation Alternatives Park(ing) Day, NYC

Significance of research to public architecture

In the 1950s and 60s, Yves Klein's idea of *Air Architecture* challenged the definitions of art and architecture. Klein was interested in the ways that humans can use science and technology to conquer the ephemeral, to the point of turning even air and fire into building materials. Klein sees science and technology as the saviour of architecture, promoting new forms and structures made from sculpting the air and other 'immaterial-materials'. (in Peter Noever and Francois Perrin's *Yves Klein Air Architecture*, 2004)

Klein's work was very influential. In the late 1960s several artists including Robert Barry started producing work questioning the limits of art. Barry's work, known as 'invisible' art included *The Inert Gas Series* (1969) in which a specific amount of gases such as neon, xenon and helium are released 'from measured volume to indefinite expansion' in the Mojave Desert. Lucy Lippard observed in *Six Years: The Dematerialisation of the Art Object* that 'novelty is the fuel of the art market', and at the time of *The Inert Gas Series*, this 'fuel' is was being burned at a rapid pace, constantly stretching the boundaries of the definition of art. These works paved the way for the contemporary use of ephemeral materials in public art and architecture, for example Diller + Scofidio's *Blur Building* (2002).

As a public artwork, *Cloud Car* uses immaterial-materials for aesthetic reasons, but also to focus attention on the issue of air and the automobile. By creating a cloud of mist, air is made tangible and visible to the public. *Cloud Car* presents the automobile as an object to be observed, but also highlights the car as not only a vehicle of transportation, but as a space of contemplation and exchange.

Artist's biographies

Andrea Polli is an artist, Associate Professor in Fine Arts and Engineering and Director of Interdisciplinary Film and Digital Media at The University of New Mexico. Polli's work has been presented widely in venues including the Whitney Museum of American Art Artport and The Field Museum of Natural History and has been reviewed by the Los Angeles Times, Art in America, Art News and others. In 2007/2008, she spent seven weeks living in Antarctica: www.90degreessouth.org

In 1985, Chuck Varga joined with a group of five like-minded individuals and founded the theatrical rock band GWAR. Varga created the character Sexicutioner, who starred in eight major productions of GWAR that toured the US and Europe in over 1000 shows. He also wrote scripts, designed and built costumes and sets, wrote and designed over a dozen graphic stories for the GWAR comic, and co-authored two feature-length films including the Grammy-nominated Phallus in Wonderland.

level digital cameras. KYO picked five young people to participate in the program and we started.

A little history

Burma has a population of between 48 - 50 million people divided between at least 15 major ethnic groups. The Karen are roughly estimated to make up 6 - 7 million, living in the mountains on both sides of the border in western Thailand and eastern Burma.

The KNLA (Karen National Liberation Army, the armed wing of the KNU - Karen National Union) has been fighting one of the longest civil wars in history against the Burmese military regime, the SPDC (State Peace & Development Council) and its predecessors: forty-seven years is a long time.

Today there are nine refugee camps on Thailand's western border with Burma that house approximately 160,000 refugees. Many of these refugees know no other home than the camp. They are not allowed to work (legally), so spend their days in meetings, classes in leadership, management, English, computer programs and waiting for handouts of rice and fish paste from various NGO's

Some things we have learned over the past four years

While we expected participants to make images of the darker side of their lives this has not proven to be the case. They take photos of beautiful flowers and rivers and mountains, of children, chickens, cows, and dogs.

Place is very important to them, even though 'place' may be a bamboo house in a refugee camp with a leaky roof that will blow off during a big wind. They take photos of moms, dads, grand moms, cousins, and aunts; again, family is important and serves as an anchor, even though many of them have left family back inside Burma. They are very collegial with each other and with us. Editing their work for exhibition is done as a group; they all have to agree on the choices - and they do - albeit after sometimes, intense discussion. We don't see a lot of egos and they seem genuinely glad when one of them sells a print.

Frequently Asked Questions

Why do we do this?

We do it because it's a lot of fun for us and for the participants. The look on the faces of the photographers - when they are able to come to the opening reception of the *MY STORY* exhibition at Borderline Gallery in Mae Sot - is worth all the paper work, fundraising, camera malfunctions, and linguistic challenges we faced over the past four years. For a brief moment, they are artists, not refugees. For a brief moment, they are the centres of attention for the audience because they have made beautiful, funny, striking, narrative pictures. That is why we do it.

What do participants get out of the workshops?

They learn how to make a visual narrative and to look at their lives through pictures. The project gives them a means of creative expression. And they have a lot of fun.

What happens after you leave?

Each participant gets to keep and use his/her camera for as long as they remain in Thailand/Burma. If they resettle to another country, the camera must return to the sponsoring organization, e.g. Karen Youth Organization, Mae Tao Clinic, helpwithoutfrontiers. We do follow-up with as many students as possible after the workshop, continuing to look at their images by e-mail and uploading some of them to the project web site and blog.

What are your biggest challenges?

Aside from the language barrier (we speak very little Karen and/or Burmese) and our students' English is sometimes episodic, our biggest challenge is to find the money to buy cameras. We have had the support of family and friends and helpwithoutfrontiers, but this is an ongoing difficulty.

Conclusion

This is a small project that doesn't save lives, feed people, or give them a chance at higher education. What it does do, as one of our board members so aptly put it, is 'feed the spirit.' And we think that is important too.

If you would like further information on the project please visit our web site at:
msppa.org or blog at: mystoryphotoproject.blogspot.com