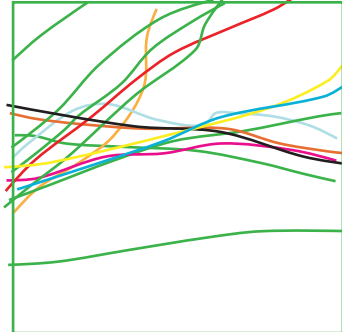
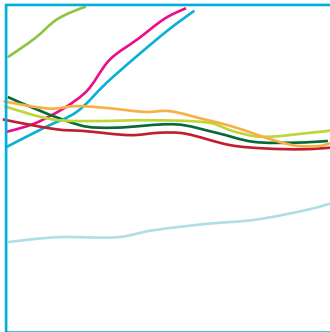
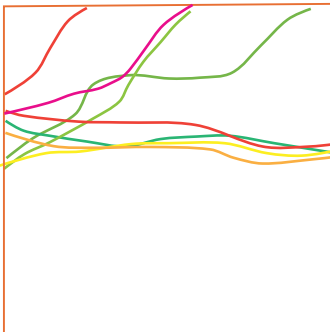


Pedestrian Fabric



Lynn Maharas
Studio: Interactive
Parsons School of Design
05.15.08

PEDESTRIAN FABRIC

QUESTIONS:

The following are a few questions I used to help frame my interests in thinking about this project.

In what other ways can you experience geography, mapping and urban space?

How can you experience a space as patterns that are not initially visible? And how can you visualize this temporal process by incorporating additional sensory perspectives?

How can you incorporate the collaboration of many individuals into a single project?

DOMAINS:

The domains of work, for this project, are broken down into 4 areas:

1. **technology**
 - a. computer vision
 - b. data visualization
2. **mapping**
 - a. geospatial analysis
 - b. temporal analysis
3. **sewing**
 - a. analog outputs
 - b. data visualizations
4. **collaboration**

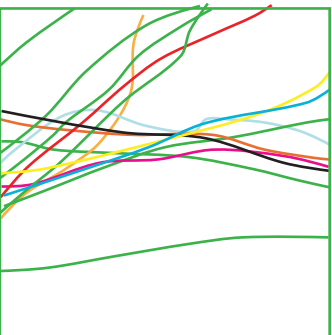
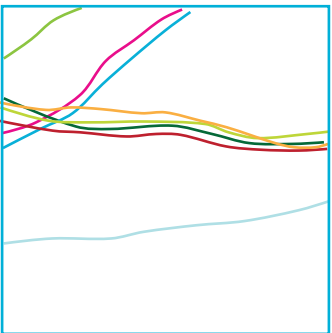
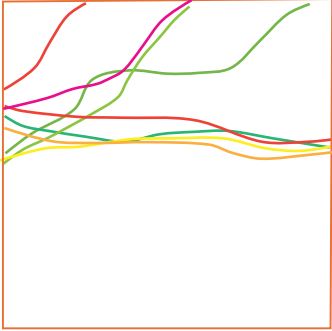
SUMMARY:

PEDESTRIAN FABRIC is an investigation into the foot traffic patterns in the intersection of Stuyvesant St. and 9th Street in Greenwich Village. Individuals are aerially filmed each day for 5 minutes, Monday through Friday, over the course of 3 weeks. The film is analyzed in Max/MSP, using computer vision, and output into images of pathways. The images are then used as patterns and sewn to individual patches of fabric. The final output is a 5 x 3 quilt, each patch equaling one day.

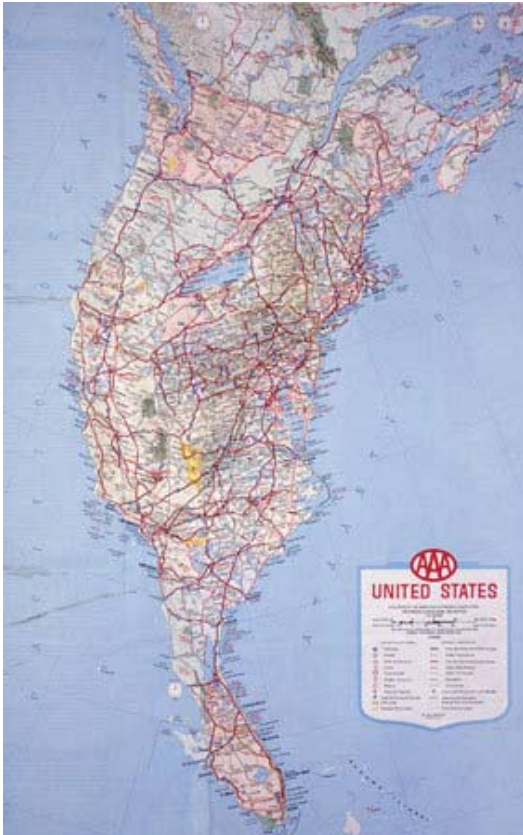
MOTIVATION:

PEDESTRIAN FABRIC attempts to bridge the gap between digital and non-digital interfaces for the use of data visualization.

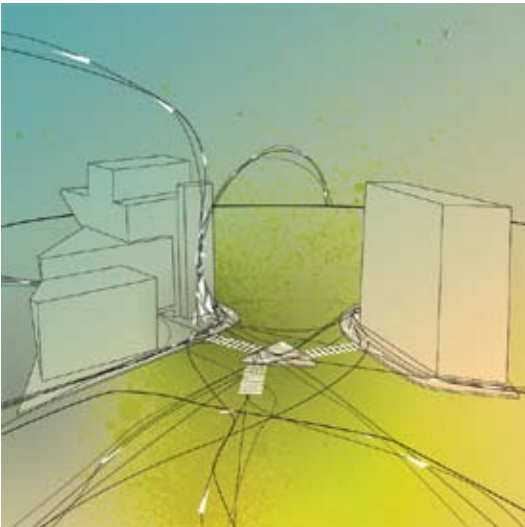
Analysis of pedestrian paths can provide insight into the flow of neighborhood streetscapes in urban settings and may also begin to reveal similarities in biological structures (bio-mimicry) as well as geographic structures (geo-mimicry). Furthermore, combining new and emerging technologies, in the form of computer vision and Max/MSP software, with mechanical embroidery provides an interesting juxtaposition of two major turning points in history:



Coastal Merger
by Nina Katchadourian



Pedestrian Levitation
by Thomas Laureyssens



industrialization by way of the textile industry vs. the current use of web cams and ubiquitous computing. Additional areas of interest also include mapping related concepts of scale and resolution and the intersection of people, geography, and the built environment.

The aim of this project is to investigate the movement of people through a public space via computer vision and output the digital analysis into an analog display of patterns via sewing. The patterns are combined to create a quilt and move this data visualization from the digital, screen-based view to a more tangible, analog display allowing for the additional sensory perception of touch to aid in comprehension of patterns. This transition from digital to analog also allows pedestrians to passively contribute to the actual fabric, sewing and labor of the final output in a collaborative effort in much the same way that quilting is traditionally produced.

PRECEDENTS:

For this project I looked at 3 areas for new media precedents:

1. mapping
2. sewing
3. collaboration

Mapping:

Coastal Merger by Nina Katchadourian

<http://www.ninakatchadourian.com/maps/coastalmerger.php>

This is an art piece that reworks a map to display the artists' bicoastal lifestyle. The artist spent her childhood on the west coast and a majority of her adult life on the east coast. It's an interesting idea to rework a map to reveal personal patterns and connection to geographic space over time. Although, this piece doesn't reveal the pattern of movement that I am interested in visualizing.

Pedestrian Levitation by Thomas Laureyssens

<http://www.pedestrianlevitation.net/>

"It visualises the real movement of people, and adds a virtual movement based on the assumption that the mind of people is not subject to gravity or any other physical limitations." I find the aesthetic look and feel of this project particularly elegant and chose to work towards the same approach and visualize pedestrian paths as clean lines through the space. I also appreciate the documentation of tracking people thought the space and its application to the physical art piece reinstalled into the same location.



Stitching Together

by Kristina Lindstrom and Asa Stahl



Sewing:

Stitching Together by Kristina Lindstrom and Asa Stahl

<http://www.misplay.se/projects.htm>

“The project explores the temporary nature of text messages and archives special text notes by hand or machine stitching them onto pieces of fabric that will eventually turn into a quilt.” In this piece I enjoy the juxtaposition of the digital, text message and analog, sewn output. I find it interesting how they memorialize short bursts of communication into more permanent quilts that traditionally get handed down through generations. This project displays private conversations into a semi-private form of a quilt. *PEDESTRIAN FABRIC* also works with the semi-private form of quilting, but draws its content from the most public realm; that of city streets. I am influenced by “Stitching Together” to pull information from a new, digital source and convert it into a traditional fabric piece.

Because the digital age has not fully infiltrated all generations, it remains a limiting factor when trying to communicate to “digitally unfamiliar” audiences. I also find that digital data can often feel cold and disconnected. This is why it is important to explore different kinds of “printers” or outputs for digital data. In an effort to make the pedestrian data I collect warmer and more approachable, I chose to use sewing as the final means of display. Sewn items have a grounded feeling mainly due to the manner in which sewing traditionally occurred in the home and hand-sewn items remain very intimate non-threatening objects. Where as digital outputs or displays of data can be less approachable or familiar to some people. It has also been my experience as a cartographer that digital mapping can be difficult to communicate data to unfamiliar individuals and at times intimidating to some people.

Moving the display away from the screen was a conscious choice to explore different realms of communication design. I find that the data becomes more approachable by combining visual and tactile senses. This is based on the Representational System of Neruo-linguistic programming model that examines how the human mind processes information through the senses of sight, sound and touch(1). I remember as a child trying to restrain myself from touching things in stores. Children often want to touch new things as it helps them to better understand those objects.

Love Has No End
Ghada Amer



White Glove Tracking Project
Evan Roth and Ben Engebret



Leaf Veins and Ant HillTunnels



Love Has No End by Ghada Amer

http://www.brooklynmuseum.org/exhibitions/ghada_amer/barbie_loves_ken.php

I am also influenced by the aesthetic look of these sewn objects. The sewn words “Barbie loves Ken” and “Ken loves Barbie” provide for a very graphic display of text in horizontal stripes. The bright color of the thread against the natural toned background further emphasizes the sewn information. I look to this as an aesthetic inspiration for my piece.

Collaboration:

White Glove Tracking Project by Evan Roth and Ben Engebret
<http://whiteglovetracking.com>

This project asked for help in tracking Michael Jackson’s white glove in over 10,000 frames of his televised performance of “Billy Jean”. It’s an interesting project in collaborative work where the project depended on the participation of others to complete the final outcome. I, too, am looking to draw all the data from other individuals’ participation. However, my project is a very passive interaction where this one, participants take an active role. I wanted to keep the interaction in my piece minimal in an effort to concentrate my energy on the technology and data visualization.

I also drew inspiration from nature in looking through a lens of biomimicry and geomimicry. Bio- and geo-mimicry are looking at models, systems, processes and elements of nature in biology and geography, respectively, and applying these ideas to human systems of organization to solve problems in a sustainable manner (2). I was interested to compare the data of pedestrian paths to vein structures of leafy plants, tunneling in ant hills as well as braided river systems. The initial observations I made about the movement of people down streets was reminiscent of how water in streams moved around rocks and how river systems shifted around topographic barriers. On the biomimicry side, I noticed the similarities between the movement of large crowds, some people branching off into similar directions, to the layout of veins in leaves where larger veins carry more nutrients and smaller veins branch off in similar directions. This helped build a process to investigate the intersection of art, technology and nature.

PROCESS:

I began the process by documenting five (5) minute videos between 8 and 9 am from an aerial perspective looking down on the people on the street. The area of focus: a triangle shaped island and the cross walk surrounding it on the cross street of Stuyvesant St. and 9th St. in Greenwich Village. The video was gathered daily, Monday - Friday, for three (3) weeks.

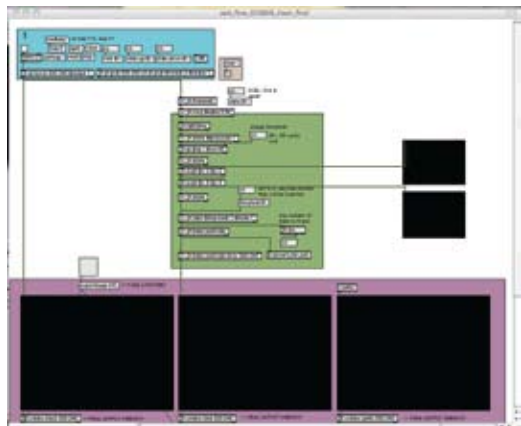
Video Documentation



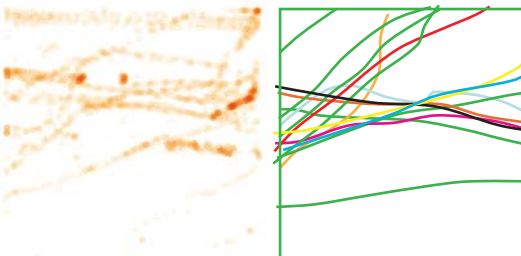
Cropped Video



Max/MSP patch



Computer Vision and After Effects cleanup



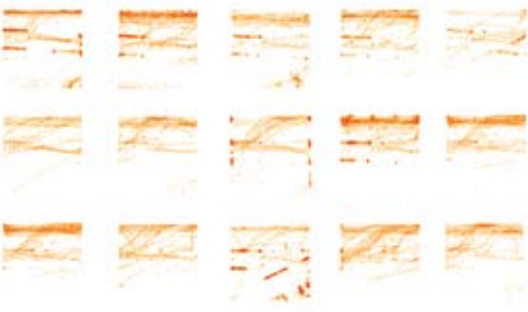
The video was then imported into After Effects and treated for stabilization, motion tracking and cropped to the size of the square, fabric patch it would later go on. Afterwards, the video was run through a computer vision, tracking program built in Max/MSP to analyze the data. I ran into problems getting the computer vision to correctly track people and not cars or other small movements (bikes, scooter, motorcycles, etc). I learned the value of having “clean” data and the importance of using computer vision in a very controlled environment where thresholds do not change with each set of new data. It was difficult to maintain a high level of consistent analysis of the data. In fact, the path tracking algorithm created was very buggy and rather than producing clear, consistent results I was only able to produce general trends and overall patterns. This was disappointing, but I learned to find a creative solution by manually tracking people in After Effects to get more elegant, finite outcomes.

It was at this point that I began to think about the aesthetic look and feel of the final piece. I played a lot with different fabrics, thread colors, stitching styles, iron on imagery and sewing techniques. It became almost as engaging as all other aspects of the project. I found that although I was pressed for time, I was pleased to spend as much time sewing as I did. I didn’t expect to feel so good about working in another medium, but I now know my initial intent to bring data away from the screen is really very important. People learn more when they can combine more than one learning style. Auditory, visual and kinesthetic are traditionally thought of as the 3 main ways to learn (1). By combining the visual with kinesthetic, this project attempts to deepen the users understanding of the data.

EVALUATION:

In the end, the patterns of each day on the quilt looked very elegant and beautiful. I was pleased with the aesthetic of the project, but recognize that it fell short in effectively displaying more than the actual data itself. The goal of data visualizations is to find a pattern amongst the data and organize it in such a manner that others can extrapolate out from it new understandings and extensions of the pattern into new realms. This was a good starting point to investigate the connection between art, technology and geography, but produces little in the form of academic understanding of peoples’ patterns. This is mainly due to the small scale of the focus area. I feel that a proper grid was accomplished, but that the organization of patches in that grid left out key elements such as location and time. I also found myself in the trap of trying to display motion or temporal effects in a flat, motionless form. The display of each day as a single element

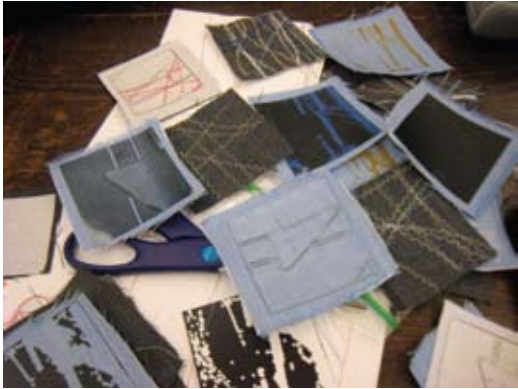
Final Computer Vision Quilt



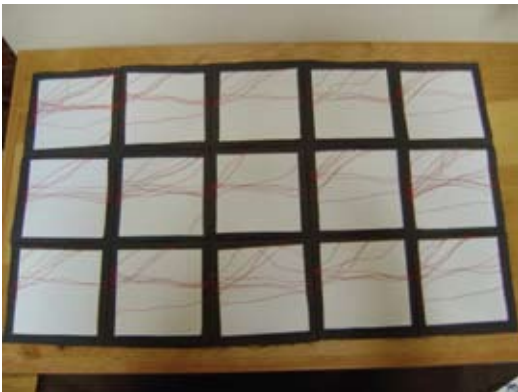
Hand Sewn Aesthetic Prototype



Various Aesthetic Prototypes



Final Sewn Quilt



does not suggest motion the same way that smaller increments of time over several patches would (similar to stop motion animation). According to Edward Tufte, “multiple images reveal repetition and change...the defining elements in the idea of information” (3). He goes on to discuss how in an effort “to resolve such discontinuous spatial representations of continuous temporal activity, viewers must interpolate between images” (3). It is in this act of interpolation that the viewer becomes more fully engaged to understand the piece and it is also here where I missed the mark. My version was very straight forward and required little interpretation from day to day, rendering the piece intellectually flatter than originally anticipated.

I do feel that a larger area of investigation and a better display of motion over time would provide a more interesting and revealing piece. Also, further investigation into the science of biological and geographic structures could also enhance the project with side-by-side comparisons of each, maybe in the form of a triptych.

I must say, I was surprised with the amount of time it took to accomplish each step along the way. My initial idea was to exploit the abilities of technology to do the “heavy lifting” of time consuming analysis and labor of this project. I intended to have the video tracking output images that could be easily formatted as a pattern for a computerized embroidery machine. The machine would do all the work for me, but in an ironic twist of “fate” (more likely bad design and planning on my part) I ended up doing the heavy lifting myself. In a nut shell the process went as follows: video capture, video stabilization, Max/MSP analysis, After Effects tracking, and physical sewing of final patterns.

I learned that this “mini-thesis” this was really more of a mini-insight or exercise in what to expect for the thesis process next year, rather than a small, but serious investigation of a specific topic. I learned that my process will appear simple in the beginning, but I will be forced to find creative solutions to unforeseen roadblocks that will inevitably try my patience and mental wellbeing. I will make certain compromises to my vision that will be necessary but disappointing for completion and ultimately will be very tired of the whole thing in the end. BUT, I will have learned things I never intended to, and will be led in interesting directions that will force me to do things I didn’t think I was capable of doing.

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1. Woerner, Janet J. & Stonehouse, Harold B., The Use of Neuro-Linguistic Programming Model for Learning Success. 1988.
2. <http://www.biomimicryinstitute.org>. 05/2008.
3. Tufte, Edward, Visual Explanations. 1997. p.105-108.

