A PORTABLE ROAD

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To Margot More,

and to everyone who helped.

Abstract

An augmented reality and life recording system is described in architecture, construction process, and implementation. The system is described in relationship to a proposed architecture of perception. The system's construction process is described as a collection of components including an image projector and recorder, various position sensing components, a network connection to a remote computer, and a local radio data network. The systems implementation is described in relationship to social theories including realism and modernism.

Preface

Connecting Incompatible universes

There are many things in your world, which I cannot easily see from my perspective.

A person is an experiential universe, infinitely big. Being unique and infinitely big makes for difficult communion between universes. We universes try for something smaller than infinite when taking a chance on communication. As universes in communication, we compete constantly forever for promotion of our own uniqueness, our life, our key, our perspective. All of us as entities compete with parasites, predators, and the universe that we live inside of to pursue our uniqueness, our reason, our perspective, our road.

Portableroad is inspired by the idea that experience can be serialized, reduced in one dimension by extending other dimensions, and that experience can be transferred to other people. Portableroad is an elaboration in the idea that experience can be had moment by moment, with moments strung together like a bead necklace, like (these) words, like footsteps, a tree-lined parkway, like the houses along the highway. The life becomes long as event follows event. Portableroad attempts the abstraction and extraction of

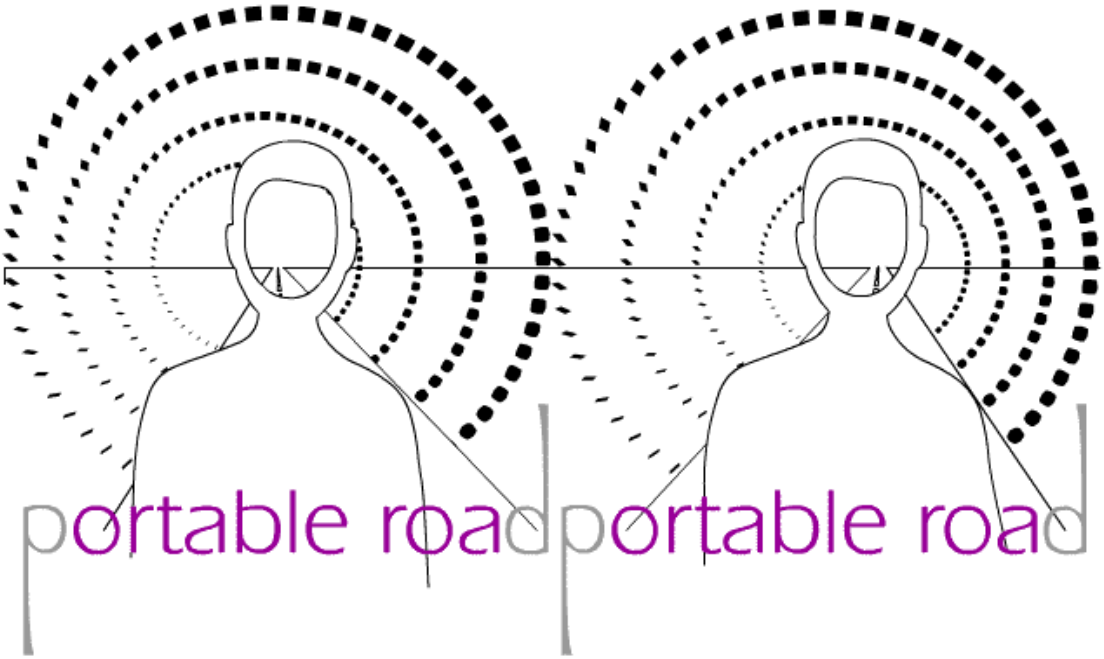
life events, it is a personal life recorder, and a simple experience analysis machine, and a tool for carrying perceptions. It is a tool for broadcasting perception, and prepares a way for a geographically distributed consensual reality.

It begins at the only stable point in any universe: your point of observation, your consciousness. All periodic revolutions, all loved and fleeting and enduring things are subsumed and subject to this undeniable immovable unfailing point.

Portableroad resulted simply from a lifetime of personal interaction with a post-industrial and post-technical society. It is the implemented as a resolution to industrial malady. It is a redirection of resources to allow for a meta-level life, a life beyond biological life, a historical, recorded life, a protected, a supervised life, an extended life. This abstraction is a post-modern artifact, it creates a part removed from the functional and material prowess that is biological life.

Style note

portableroad is a location, and a proper noun, and so should be capitalized. However, it looks nice in lower case. A portable road is an abstraction and may function as a noun, adjective or a verb.


portable road
portable road

A PORTABLE ROAD

Context

in Absence

In the Absence of guidance, portableroad is a way. Portableroad is the concreted agglomeration of sifted experiences proposed to serve the purpose of allowing further sifting of experience. It is the result of a unique key, a life, a person searching for its best expression. It is an architecture which elaborates the person, because it was begun with the person.

Collision Survival

As the result of the implementation of ideas into real world space, and wearing the result amid the chaos of life, *portableroad* has an architecture. Through trial by collision, competition, destruction, and redesign, it has become a traveler with me on an evolutionary path. The architecture that it embodies is the successful candidate, the design which did not succumb, the victor over entropy (temporarily). It competes for space and social position, in territories and societies. As it competes and wins (victories however slight) it is a social architecture as democracy, socialism, high school, or monarchy, are architectures. Portableroad is a platform for the facilitation of behavior. It is an encapsulation and exploration program which formats observation, records life, and shelters the wearer. Portableroad understands that the (now) is a set of variables.

Repeated things

The body is less centric to events than in the past. The empowered action of disembodied button pushers and tele-typists acquired viability thanks to an effective network system, cheap energy, and a captive food supply. Mechanization and commoditization of

components necessary to life, has facilitated life by remote control. The goal of human action has become more arbitrary, and the use of energy has become more diversified. Personal capability and power increases as environmental components are made addressable. The modern environment that we inhabit, is easily manipulated by the person when it is designed from repeated elements. These elements, once studied, reveal the method of use of other similar things. The complex person, becomes even more powerful when faced with simple to use environmental components. With the commoditization of objects making them essentially the same, and complex systems ability to abstract complex social and physical interactions, two main types of objects arise. Replicated commodity objects, and complex production tool objects dominate the environment. As the quantity of commodity objects increases, economy forces longevity and personalization of commodities, and redefinition of commodities to allow more uniqueness and so increase functionality and capability of objects. This process acts to consolidate more power and capability in less effort and less space. Portableroad attempts to consolidate a world in a space smaller than a world.

The commoditization of objects and an increasing speed of changes make an environment less important as it is easily changed, so the people structures become more important.
Technologically, the separation between thought and reality diminishes while fantasy moves away and superstructure takes its place. Structure moves inward. Colonization, enculturation deepens. The powerful systems that surround us, invade us.

a Portable context

At the moment, barriers to travel are mostly cultural and political, these are barriers may not have much physicality. It becomes possible to pass from society to society throughout a world with little resistance. Our travel is subsidized by cheap energy, our travel doesn't require much social backing, and doesn't require much money. Commonplace travel facilitates a standardization of rule sets for society, technology, and socialization. Common languages arise in large populations, with multi-lingual capability making its way from the elite to the newly empowered. Better portability and transparency in borders facilitates language exchanges. Several principle languages emerge and dominate transactions in social, technological, and business spaces. Subcategories of societies combine to yield large groups of homogeneity in behavior, goals, technology, society, and business.
Portableroad is designed to address dynamic environments, and observe

dynamic environments. It deals with environments by concentrating on re-used environmental conditions, commonalities which exist all over the world. These places are tagged and can be recognized as a context. It knows it is in a bathroom, whether the bathroom is in Rome or Jakarta, as it reads a radio tag in the bathroom that provides information about the location. It forms a networked reality and overwrites physicalities. It brings worlds to you, even as you travel the world. It captures the environment and holds it as an external perception, while overwriting the environment and making it addressable by one's personal world.

the World inside

The farther we are from a behavior, the more unlikely it is that we will perform it, unless we have done it before. We will do what we did last time. External forces force behavior, behavior forces external changes, behavior reinforces behavior reinforces behavior reinforces behavior.
Sharing space shapes behavior. The room is colonized.
When physical environments are known with certainty, the important and dominant factor of behavior causation is media, thought, communication, religion. Structures become more available as media in audio, video, and software formats. Increasing production and distribution, economically efficient means of purchase and acquisition, increased complexity of media elements all resolve to create a media landscape at least as important as the physical landscape. Media landscape elements begin to be as powerful in the enforcement of behavior as physical elements.
Portableroad is the interior. It consumes the outer world, recoding it. Lines of sensory transactions are stored by portableroad. Body movement, email, visual perception, these bits of data are effectively memories. It is a collective subscriptive object and process. It subscribes to the souls of the entity that carries it, it breathes the sensory perception of whomever carries it. It is collective as it bridges the gap between the experience of one life, one entity, and another. Entities may be corporate entities or person entities, or machine entities, or network entities. All incoming data is recorded, stored (permanently, if such is possible). The sequence of incoming information is to be used in pattern recognition to determine what sort of behavior should be triggered.
Portableroad brings the inside outside, it paints the world of the carrier on the environment, creating and re-creating the built environment.
Portableroad operates in the en-framed world where all things are en-framed and manipulatable. Diversity in purpose is conserved, so that the standing

reserve wold can create many things. All things outside the person are paint-able, direct-able, project-able. The inner world of the person is expressible outside. The personal perspective is easily and fluidly expressed on the outside world.
The perspective of the person dominates the outside world. The person's outside world becomes a reflection of their inner world. It is at will that the world exists. The world is referential to the person.

return the Ring

The act of decision-making for portableroad, is pattern recognition. Successful behaviors (behaviors which the wearer categorizes as successfully protecting or advancing the person) are matched to patterns in incoming data. Lines of data are traced backward after the occurrence of a quantified "success" to determine patterns identifiable with causation. On recognition of a pattern, behavior is to be triggered by displaying a symbol.
Useful patterns for triggering behaviors or training behaviors are: locations, (paper, purchase) receipts, audio waveforms, images and motion from video, email addresses and subject lines, time of day, cost, business agent/employee name and role. These datatypes are used by portableroad and can elicit reactions.

As video is stored, a picture of a life can be formed. Video is to be recorded consistently with the objective that the results can be used by the system to recognize patterns who's occurrence should cause behaviors.

the Invisible City

If machines can not do what they are not permitted to do, and must do what they say they are doing, then portableroad begins as a machine, but it is not envisioned to remain one.
1] Portableroad is a new way of speaking, and so play at creating a foundation for new social superstructures. The new city has no built infrastructure, it is inherent in the person.
2] Portableroad works toward a view of life which is real-time and timeless. It attempts a system for addressing and sensing people, internally, through people.
3] It is where the world of the person is made around them as they think about their world.
4] It is where the person is less formed by the existing environment and more formed by their own identity.
5] It is where the construction process of building the world happens more quickly, at less opportunity cost. The world can be disassembled quickly and remade as another world.
6] It accelerates architecture. Working through architectures creates common experiences so it accelerates communication.

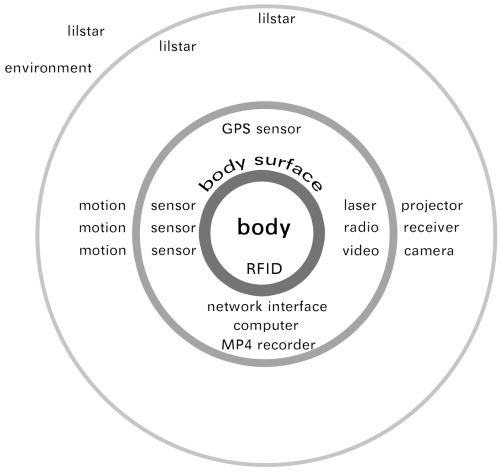
7] For cultivation of the personal universe. It attempts to provide a safe place.

the Project is incompatible with reality

(Having been inoculated against revolution)
I realize that this project is incompatible with reality.
It is a foray into pulling the stuffing out of dreams, and stealing it away to the real world. The results are aspirationally proposed to manufacture the aleph, to create and manifest space, and convey experience outside the person. Of course these things are impossible. But moving toward them happens, regardless of their impossibility.
The present is oftentimes incompatible with a future. But the present is perpetually out of date.
Reality has always been obsolete.
We become what we are interpreted to be. If this is at odds with what we believe we are then we are lost.
In times of belief we go to move the world without our realizing. Then when the world notices we moved it, we deny.
When the world asks, "What did you do?", We say "nothing. This is the way the world always was".

the Earthquake Table

In the event of a disaster, one can hide under the table.



The table is not exactly portable, it will not help in the event of an airplane crash unless you are at home, under it. It will not fit on the airplane, nor can it go in your luggage.
The table is close to the ground. It is wider than it is tall. It is strong, and can withstand the impact of debris as debris falls. This is an earthquake table. When an earthquake occurs, one should hide under the table. While the world shakes, the house falls, but you are safe, under the table.
Portableroad is a variety of earthquake table, one which can make the trip in your luggage. Don't put it in your carryon though. It has been conclusively proven that portableroad will not make it through airport security.

the New Roof

Portableroad is a new roof. It hides the stars, but protects from the dangers that are closer than the stars.

Components

A portable road is implemented in several parts. In traditional project

development fashion, principal objectives are pursued through the creation of structures, in software, in hardware, and in other materials, and in the formatting of behaviors. But more important for the realization of a portable road are the un-manageables. Building a portable road is an exercise in fitting a frontier outpost. There is a good quantity of unknown.
Some implementation of its structures is not goal oriented, and so these structures are reactionary, having come about in response to unknowable circumstances. The construction of a portable road, because it is so unlikely, must become a realist enterprise. A portable road is an evolutionary creature. It is seeded by events of collision, social, physical, atmospheric, and so it is context specific, as it is a locality. The locality of a portable road begins inside the person.

Portableroad's Utilities

Symbols in portableroad

Patterns used as symbols are an elemental component of portableroad's ability to operate and communicate. A pattern format called psyreal was developed. This format can be used to program genotoy microcomputers and the derivative lilStar sensor platform, and can be used to store symbols that are projected by the dOut laser projector.
A psyreal symbol, as interpreted by genotoys, or dOut, becomes an expression tool. Languages have their own intelligence; the basis for psyreal is simplistic, and so resulting capabilities are simple. Psyreal represents operations to be performed in a very simple byte structure.
Psyreal was developed to provide a basis for describing symbols that are interpreted by hardware components of portableroad.

Psyreal

An 8 by 8 element, 8 bit matrix is used to describe an addressable territory. This matrix is two dimensional, two arrays compounded. The territory is addressed (read or written) according to instructions which control which element is currently being addressed. Only adjacent elements can be addressed. The attention of the process moves element by element, addressing one element at a time. This process is like a record player reading a record, where the territory can be thought of as the record, and the addressing process like the needle.
The 8 by 8 element territory is filled with bytes, as each byte is placed in the territory, the directions for observing or writing the byte are recorded.
When the territory's 8 by 8 size is filled, and the directions for reading it are added at the end of the matrix, increasing the size of the territory to larger than 8 by 8.

The navigation instructions:

8 bit instruction set	4 bit instruction set
# up 10000000	# up 1000
# down 01000000	# down 0001
# left 00100000	# left 0100
# right 00010000	# right 0010
# UR 00001000 (up right diagonal)	# UR 1010
# UL 00000100 (up left diagonal)	# UL 1100
# DR 00000010 (down right diagonal)	# DR 0011
# DL 00000001 (down left diagonal)	# DL 0101
# skip 00000000	# skip 0000

The territory can now be observed. The bits in the 8 by 8 territory can be interpreted as patterns. The navigation instructions show how the interpretation of the territory should be carried out.
This format can be used to describe simple symbols, including visual symbols (laser projector images), video capture images, locations, and text.

distributing internally: Spine

When anything happens that portableroad is aware of, the event travels along portableroad's spine. Similar to a person's spine, where sensory information connects to the brain, portableroad sends sensed information to the spine, where it can be read by whatever part of portableroad is interested in the information.
Real time data distribution occurs through spine, which is a message-oriented middleware type of program. It is inter-application communication software which broadcasts those messages sent to it. It is similar in function to IBM WebSphere MQ, or Apache ActiveMQ. It could be classified as portableroad's enterprise service bus. Spine accepts TCP/IP (and indirectly RS232, allowing analogue to digital conversion data, Global Positioning System, and Point to Point Protocol among others) connections from many transmitters simultaneously. When one transmitter speaks, spine sends that information to every other connection. Spine broadcasts the information that it receives.
Generally, sensed information is processed somewhat, and then sent to the spine. If the information needs extensive analysis, for example, discovering locations in space on a map based on latitude and longitude data, processing will occur on a computer that is physically remote from the portableroad sensory equipment. The data can be processed on a larger computer, and results can be sent back to the smaller one which is worn on the person.
Upon connection, spine reads data in elements of 8 bits. The 8 bit structure is common to many programs which transmit data, and so spine can be used with many programs, not only those programs which are part of portableoroad.
Messages traveling through the spine are generally small text messages. Messages in other formats can be sent through the spine, but in the interest of keeping the speed of the system as fast as possible, only small simple messages are sent. When images need to be used, they are saved to disk, and then a URL

for the file is broadcast on the spine. If the image is needed, a program can read the URL and acquire the image. Data running through the spine [Image 1]

Messaging and logging: Xie

If a system is to behave in the human social domain, interfaces to various networks must be created so that the output of the network can serve the interests of the effecting system: by effecting those things on the output edge of the network to which it is connected. This kind of communication allows easiest access to distant domains, and facilitates a high degree of effective ability at low cost. Telephone, email, and postal mail vehicles for communication have been explored and developed. Email has been found to be the single best form for portableroad's communication, and a tool for this developed as xie.

eMail

For portableroad, which has limited sensory capabilities, email becomes a sense, like the sense of smell. Receipt of email can elicit reactions from the system. Programming of the system can be done through email as new patterns are added to the system from the content of the message received.
Xie in a mail conversation [Image 2]

Xie can operate like a mail server, it receives mail, parses it, and saves the mail to a file. In parsing, it looks for commands that should be executed by portableroad. Xie saves mail files to disk, which can be read by a component of w3 called getemail.
The mail server was first used in a virtual reality project, wherein spam, or useless messages, were converted to virtual plants. The content of the message was related to the height of the plant.

Xie as a Logger

Xie can be used as a general purpose internet based data storage system. It can be used interactively through a telnet or secure shell session, or though a mail client like Outlook, Netscape, or most cellphones.
In its capacity as a data logger, xie simply accepts information transmitted in, and stores the information where it has been asked to put it. This allows one to write to the server including images, video, latitude and longitude data.
On receipt of this data, xie can react, if the data contains patterns that xie recognizes.

```
<broadcast username="mail"
towho="xie@jesse.org" msg=" Subject: I
was out making toast." type="3"  />
```

When mail is received, xie summarizes the patterns that it has received, and sends this information to the spine.
When xie receives email, the spine receives a message like this from xie:

Xie and GPS

Xie is used to log GPS (Global Positioning System) data as it comes in from portableroad equipment in an environment. The data is logged as it comes in, each transmission to a file. Long transmissions result in large files. This can be a problem on servers with a small amount of memory. If xie crashes, it is restarted automatically, by a cron-like program called click.

Webserver: W3

A webserver was developed called w3, which makes aspects of portableroad available online. The web interface can be used for setting preferences, parameters and variables for portableroad's operation. It is used as the primary public user interface to portableroad's components. Through it such operations as defining parameters of portableroad's internal human model, dialing the phone, servicing email, restarting servers, and turning features on or off are managed.

the Phone

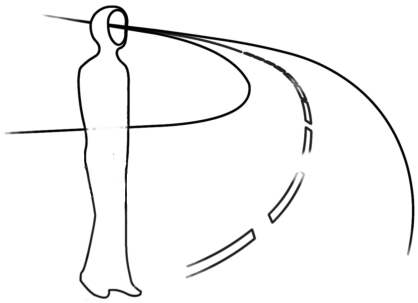
Portableroad's network link is based on a "Telit GSM" network interface module, it provides fax, voice, and general packet radio service. The process of building this network link became the process of building a cellphone for portableroad.

Discovering the phone

The cellphone in many cultures is non-compliant in its physical form, its software capability (aside from upgrade by the service carrier), and its objective purpose. The American cell phone is generally not malleable, and is minimally capable of expression of the owners intent, outside of the initial purchase.

Cellphones do not exist outside the USA, as in other places they are called other things. The name, shape, and capability of the phone determine its use and usefulness in many contexts. The name that a culture gives to the phone (the name of the object given by a society, not the brand name or product name) is some indication of what the society sees in the phone and expects from the phone. The American "cellphone", as a name for the device, was not accepted by other cultures. In Korean and Japanese a cellphone is a "hand phone". Each culture has a name for the phone which describes their expectations of the phone. In American English, the name is an incomprehensible word that intuitively tells nothing about how to interact with the phone, rather tells how the phone works, or how the phone interacts with the network. In Japanese, the name describes how to use the phone. Each culture abbreviates much of the

functionality and contextual necessities in the name, and the omissions are as illustrative as the name itself. Each culture agrees on the general shape of the phone, and the general set of capabilities, relative to time. Cellphones appearing in movies have traditionally been problematic as the physical form, and capabilities of the phone change yearly in the USA (as a function of the manufacturers not as enacted by consumers or subscribers). There have evolved several safe physical forms which can be iconic: the flip-phone, and the monolith phone. Both the flip and the mono have remained relatively constant in size for the past seven years, and so can be said to be "phones" for everyone. Some phones are not easily recognizable as phones, and so escape the cultural expectations. A cellphone was created, an experiment in expectation, and the redirection of cultural objects. The site for the experiment was the phone, because it is loaded with potential, unassailed, unmalleable, designed in exclusivity for the consumptive use of the masses. It is cryptic in its creation and function so as to present a single method for acquisition(subscribe as a customer), and use (through the phones designed interface). The possibility for other use is obscured by cultural expectation, which has been manufactured, as the phone is, by some people who are not me.
Portableroad's phone interfaces to a central computer and switches between various modes of operation depending what event must be carried out. As implemented, it is limited to one form of transmission (TCP/IP, Fax, Voice) at a time. If it is sending a fax, it can not be uploading video snapshots. It is controlled by spine, with a web-page user interface delivered by w3.
During the first public demonstration of the phone, it was connected directly to a motiondial motion sensor, and was to be dialed by rotating the body of the phone. At this demonstration, the phone was essentially a ball of wires. A participant was able to experience an unexpected thrill, when he



inadvertently plugged two wires together, giving him a little shock and burning a hole in the Telit module's camera interface connectors.

Money

In the life of a person in an urban environment, a significant amount of the action which takes place is economic. Economic facility is necessary for existence in an urban social domain for

the continued existence of life. In consideration of the importance of this domain in its effect on life in urban contexts, a machine which serves to protect economic interests, and uses the tools of economic transaction is useful and interesting.
As a play at describing a new machine agency in business and finance, a system was developed to wield financial instruments: an HSBC bank account, a credit/debit card, and a corporation. Facility for filing incorporation in New York State via fax was developed; the system incorporated itself as Jesse Corporation. Self Incorporation [Image 19]
The ability to automatically engage in economic transactions, and be able to form, dissolve, and manipulate entities is distinctive as a hallmark of agency.

Inside

A distinguishing characteristic of a portable road is that it physically begins inside the person.
This kind of beginning hopes to ensure that the road is bound to the person, and moves always with the person. The road is an extension of the person, it is built close to, and through, the person.

Territory & Ownership

Territory is colonized and addressed, and ownership is assigned through pattern creation and recognition. Assigning territorial ownership or authority is an important topic for portableroad, and methods for authenticating the person are preconditions to this. Experiments in creating authentication mechanisms which territorialize portableroad were undertaken, primarily using pattern recognition, where a pattern exhibited by the person becomes a key which unlocks functionality for portableroad.

Radio frequency Identification

A password authentication mechanism was explored with RFID (radio frequency identification, where a key sends a radio wave pattern which is used to authenticate a person). The RFID key was implanted in my left forearm. Although not secure, because of the insecure nature of radio transmissions, the key is easy to use and allows some simple authentication by proximity.
The RFID experiment was designed by Brian Clark. The RFID key was implanted in February 2006 in Canada. The code for the chip in my left arm is 4137958c.
Chip insertion [Image 3]

Behavior Patterns

Though not experimentally explored here, the sensor platform that comprises portableroad facilitates behavior recognition. The person's exhibited motion patterns could perhaps indicate identity by sensing limb motions, for instance walking, and looking for patterns that can uniquely identify the

person. Other sensed data, like voice recognition, and image recognition could be explored.

Mediation

Idealized, a portable road is hoped to derive from the person, taking one overall goal as super-design: to mediate the person. The reason for this goal; by mediating the person, the person can be held safely, protected.
In mediating the person, the environment outside the person can be interpreted, and re-interpreted. This might happen in a person's imagination, where the environment is imagined to become different from the seen-felt-heard environment. This might happen at the level of technical mediation, where the sound that the ears receive can be reformulated through headphones, seen through the eye of the television camera. This might happen also at the level of construction, reformulation of the environment, where your furniture is re-arranged, construction and destruction occurs. These seemingly more real changes have the characteristic of being observable by multiple observers who might consensually react.

the Projector

The projector is a means of projecting information onto the world. It is a system whereby values can be output through a laser projector to create shapes, which together create symbols and images. The

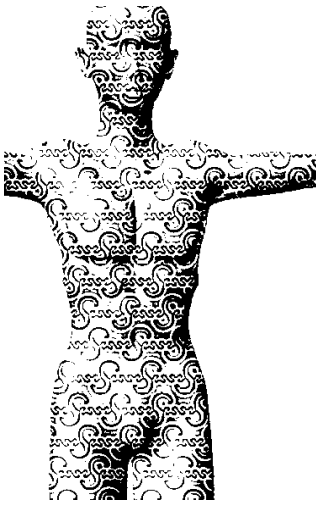
dOut system projects images from the perspective of the person onto their environment.
Daddy's Ears [Image 4]

dOut

An experimental wearable device dOut, was created. The device that lets a person project, from their viewpoint, icons and text onto objects and surfaces.
dOut design sketch [Image 5]
dOut has several advantages over other projection methods. It is able to encompass a person's entire field of view, and can project images a distance of about 100 meters. It has the interesting possibility that it can work with a camera as a rangefinder to

determine 3d characteristics of environments (a possibility not taken advantage of). Its projected image is easily directed for personal or public communication. dOut is laser based, and the energy it is capable of releasing can be dangerous. This problem is embraced in the design of portableroad, which proposes a culture of expanded capabilities and expanded persons. The additional capability of being able to direct a laser beam wherever one looks is thought to deeply change the process of observation.
The laser changes that which is observed. This adds another reaction to the process of observation. Whatever is being observed by the person, is affected by the observation. This is quite opposite to the process of traditional observation.

the Simulation



A simulation was created in Maya software, so that position information can be used to move a human superficial anatomy model. This simulation and the associated programs that is uses are called Higenic. Data is sent from portableroad's GPS and accelerometer sensors, through spine. A Maya interpreter client listens for position information, and converts it into a form that Maya can read. Procedures in Maya Embedded Language use the data that is received to set values for the simulation. A human model can be deformed to create datasets which might determine form and location of people and objects in environments. First, the human model is set to be the size of the wearer of portableroad's sensors. A model of the person's physical environment is then loaded into the simulation. Data is streamed in, which contains the position of the person in global coordinates, and relative positions of the accelerometers. This information is used to move and form the model of the human in the simulation. In the real world, the accelerometers are worn on the hands of the person, and send information about the angle of the arms. This angle is used to determine possible positions for the arms through inverse kinematics chains. When the model is found to be near collision with an environmental feature, procedures are triggered to tell dOut to display a warning.

The initial version of this simulation was created to convert accelerometer data which was being read from a moving car and sent out over radio modem into a visualization simulation. It was demonstrated with other car-related electronics projects in May of

2005. The initial human model was created for a presentation on collision avoidance at the Universal Design for Wheeled Mobility conference In 2004.

Online access

A web interface was created which shows the current state of the simulation, and allows updating the attributes of the model, like changing arm length, and fatness of the model to better represent the wearer. The web client is accessible online through a browser. The web interface software is a customized version of portableroad's w3 server.
Online Access [Image 8]

Watching Interactively

A program was created which allows viewing parts of the simulation on one's home computer. This program displays the model of the wearer of portableroad and allows interaction with the 3d model of the wearer. The geometry of the human model is created by procedures running in the Maya simulation, and downloaded to the program. The human model's nurbs geometry is dynamically tessellated (cut into pieces) so that it can run on slow computers in a simple view or fast computers in a high resolution view. The viewer is based on openGL functions and programs from several years of game developer magazine (Darwin3d:1998).
Watching Interactively [Image 9]

the Camera

The wearable camera prototype has evolved through several experiments. The first prototype (a camera in eyeglasses) was made in 1998 with an NTSC analogue video camera. Then various small web-cam type devices were used, and later a 640 by 480 pixel CMUcam. Most recently, an Agilent cell-phone type 640 by 480 pixel camera streaming JPEG images, a Sony NTSC CCD camera, and a Sinwet 130C camera has been used. The video image stream is digitized at 30fps at 320 by 480 pixels, and hardware encoded into MPEG4 by a Sunplus SPCA chip. JPEG images are captured at 1600 by 1200 pixels for local storage and 640 by 480 pixel resolution for sending over the network. The video is stored locally on the person, while JPEG images are streamed to an internet location through GPRS with TCP/IP. About ten hours of video can be stored on one SD memory card. This is enough time to have a day of typical activity. At the end of the day, one can change the memory card and upload the video to an internet location, copying the contents of the SD card to an internet server. In future designs WiFi and 3G networks are hoped to be used to deliver video.
the Camera [Image 10]

The design of the camera and the software architecture which deals with images evolved over several years of experimentation. In the first design, NTSC camera was worn (by me) for about six months, used daily in New York (May-June 2001) and Tokyo (October 2001-January 2002). It was worn everywhere I went, on subways, in restaurants, at home, at work. At this time, the image stream was interpreted on a laptop and then sent the live video to a streaming video server through a PHS Data and Sprint CDMA radio networks. After several design iterations, a camera-glasses design was finalized, which is illustrated here. The glasses were purchased from Lenscrafters on 28th street in New York City. I selected them because of the type of plastic they were made from, which was reasonably easy to melt, shape, and bond to epoxy.

Send to Net [Image 11]

A a design was realized using a CMUcam (a camera with in-built tracking capabilities developed by Carnagie Mellon University) which has the capabilities of simple motion detection, tracking, and color analysis and tracking. This design was not wearable. The CMUcam incorporated motion detection in hardware, and satisfied the need to detect possibly harmful motion with very little additional hardware or programming.

This configuration was experimentally explored by attaching the camera to a teddybear that was situated in a moving car, Duze and Friend [Image 12]. The camera analyzed the motion of the car from the perspective of the teddybear, tracking the change in images to determine speed of forward motion. Other axis of motion were sensed by an accelerometer. The teddybear was about the size of a small child, and so the viewpoint, from the eyes of the teddybear would approximately match that of a child's.

Duze means "stomach" in Chinese, by sensing the motion of the car, the nauseating high points of motion sickness occurring during travel could be discovered. Thresholds for "non-dangerous" motion were set, (with a small amount of additional software running on a Microchip PIC 16f84a) so that the device would complain when the motion of the car made it dizzy. The device was linked via radio to a computer, which compiled the feelings of the teddybear and reported

The image from the camera can be analyzed to identify simple objects and symbols using the autotrace program. Barcodes are read using the decode source code included with the first version of the PDF-417 encoder/decoder.

Immersive viewing: Prot

A CAVE (a virtual environment system) viewer for output of the higenic simulation was developed. A genetic algorithm interface called Evo was run inside the Higenic simulation (an introduction to the Higenic simulation occurs on the previous page) on one computer while the output results were sent to a program which visualized the results in openGL through the CAVE API. This program was developed to explore the use of evo in protein folding, and so the CAVE program was called prot. Prot displays only coordinate locations and so is useful for a only a very schematic view of positions and motions in space. Its interface to the Higenic simulation allows it to show an immersive CAVE view of the position of the wearer of portableroad equipment, and their limb position in realtime. CAVE application [Image 13], Maya script applicaion [Image 14]

Re-arranging your furniture

Interpretation can occur inside or outside the area of the person, inside our outside the locality of the portable road, or the environment itself can be reformatted so that all possible observations of an environment yield the same observations. This form of mediation is demonstrated as seeming real changes made to an environment. The sofa is moved from the bedroom to the kitchen, a forest of orange leaves is changed by a wind that strips the trees bare, waves wipe away the sandcastle on the beach. Real changes are made through some components of portableroad. Its projector (dOut), its sensors (motiondial in particular) and distributed microcomputers (genotoys), which can actuate electrical appliances, and its radio network (lilstars) all work toward making a malleable environment.

Prehensile Projection

Physical interaction between the projection and the user's immediate environment was an interest. A prehensile projection would be ideal, and the use of a laser display is thought to be a pursuit of this goal. The laser, because it is of high energy, can change the surface that it is projected onto. The uses of lasers for welding, and cutting demonstrate how the laser can be prehensile as well as it is simply an observable display. The objective that the projector is a manipulator was pursued. Such functions are possible when the environment is made sensitive to the laser, and some exploration of this was carried out in the creation of lilStar (page 13) devices, which can be capable of sensing the incidence of laser light as projected from dOut, and reacting.

On-the-spot logic: Genotoy

Genotoys

The genotoy devices are small computers, which contain 15 rows of 16

bytes and transmit their internal patterns in an RS232 format. They also listen, attempting to receive the patterns of other genotoys. In this way, they will transmit themselves forever, and then accept program updates forever. A grid of genotoys will propagate patterns transmitting their pattern, listening to other patterns, and modifying their own pattern according to what they hear. The device was developed as a game, as a programming exercise, and as a means to explore manufacturing printed circuit boards. Genotoy [Image 15]

Genotoys have become a ubiquitous development platform for portableroad. The genotoy circuit pattern is easy to produce, and is cheap. Continuing a small amount of memory, and a small processor, they fit the design considerations required for disposable or lose-able on-the-spot logic. They are the basis for later development of security access keys for portableroad, and for lilStars, which inform portableroad of localities. Near one hundred genotoys have been produced, with several design revisions, a business card sized genontoy, and an 8 inch tall genotoy.

Genotoy lock

Genotoys were experimentally used to authenticate the person: the genotoy is held near a receiver, which functions as a lock, unlocking when the correct transmission is heard. The person uses the genotoy as a key.

Development of Genotoys

GenoToys were developed experimentally as card game in which the cards contain symbols that a player uses to compete with another player. genotoys compete for territory electronically.

For example, the symbol “j” and the symbol “s” are the patterns input into two genotoys. To play, the genotoys compete with each other to overwrite each other. If a j card overwrites all the s's on the other card, the other card becomes a j card, and vice versa.

In the experimental game, symbols (for instance, “j”), are used to represent a game character or game feature.

The cards can connect to a PC, which will download the game state from the card to the PC. A PC can also be used to repair the card by re-entering the symbol of the bearer in the areas that have been overwritten by other cards.

When a card connects to a PC, first the data is downloaded from the card to an archive that cannot be accessed by the user. The archive is uploaded to the game website which logs all games. A game that is not uploaded twice (two parties) is invalid and will never show up online. The uploaded results from both parties must match.

After the data is uploaded to the game-server, a web browser is launched, and an online card editor can allow the user to edit or repair her cards.

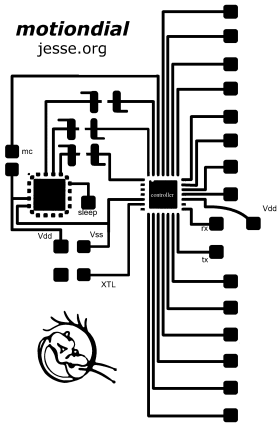
Most importantly, the PC can be used to change the pattern on the cards, and the rule based strategy that a card uses for copying patterns.

Sensing movement: motiondial

With the objective of sensing body states - sitting, running, walking, experimental designs were prototyped and tested. The first design was a circuit board full of wires that was not easily wearable. It consisted of a two dimension accelerometer, which sensed gravity and velocity changes in the vertical and horizontal axes. The first experimental platform was a teddy-bear (Duze and Friend [Image 12]), which wore the accelerometer hardware while being driven in a car. The accelerometer's supporting hardware consisted of an analogue to digital interface, a microcontroller, and a radio transmitter to send sensed data to a waiting computer.

Several hardware revisions later, a small system was created which included a 3d accelerometer, a microcontroller, and a large number of input-output connectors.

The hardware was named motiondial, after an application which was listed in the datasheet documentation written by the manufacturer of the microchip accelerometer. The manufacturer, Freescale Semiconductor Inc., described a use for their product which might be in using motion to dial mobile phones. The motiondial hardware was used to interact with the cellphone hardware which connects portableroad to its server. This experiment, the device was held, and rotated in a way which could "dial", or input the numbers of a phone number into the memory of the controller of the cellphone radio (Phone, page 12).



Most importantly for portableroad, the experiment showed a way that hardware could be used to effectively capture motion behaviors for recognition. Upon recognition of a behavior, for instance walking, portableroad can react appropriately, by perhaps displaying images which are helpful for a pedestrian, like directions. The following experiments led to the determination that the accelerometer was useful in understanding the state of the wearer.

MotionDial was experimentally tested as a computer mouse, using the velocity values as a spatial pointer or 3d mouse that is held in the air (a common experiment (REF Accelerometer Mouse http://instruct1.cit.cornell.edu/courses/ee476/).

MotionaDial was experimentally used as a pedometer and as a source of activity information for playing suitable music that matched activity rhythms (as of 2007, the Nike sports products company now markets a product which performs this behavior).

Places and geographic information

Local position sensing: lilStars

Lilstars are based on genotoy. They are genotoy circuits which have a radio transmitter in the plastic base that holds the circuitboard.
Radio beacons, transmitters which repeat a message constantly, are used to determine location when inside a building. GPS radio transmissions from satellites generally don't penetrate through roofs, and so determining position in physical space indoors must be achieved by other means. These transmitters, called lilStars are small radio transmitters, which send out a signal which can be used to determine proximity to a "Star". In this way, by deploying a constellation though a building, one can determine one's position in the building. LilStar device [image 16]

GPS tools

Gps tools were developed to capture the output of a Garmin GPS receiver, and later a smaller Lassen IQ receiver. The first tool captures serial data and inserts latitude and longitude positions in a SQL database (in this case MySQL was used running on a laptop). Stored procedures triggers, and a perl script, which watches the contents of the database allow reaction to the inserted data, by sending messages through the portableroad spine. This tool was initially developed for Arzu Telhan's "Public Transphere" project (Transphere Tracking Site [Image 17]) where the data was visualized on a map by Paul Visco's AJAX based software online.
In later versions, GPS coordinates traveled through Xie, and were stored to disk, rather than in a SQL database.
Several popular tools were instrumental as models for directing the development of the GPS tools, particularly ESRI's ArcGIS, Google Maps and Google Earth.

Motion capture & Recognition

To determine the position of human limbs in space relative to the position of the body's center of gravity, motiondial devices are used to measure limb angles and velocities. This data can be used to determine a location for limb position in space when calculated against other information about the body (for instance limb length). Information from the accelerometers may be used in combination to determine body configuration. The initial design for the limb position sensing system used mechanical potentiometers (adjustable resistors) to determine limb rotation relative to body. The experiment

described here was carried out by Adam Bloch in 2004, at this University at Buffalo, in this Media Study department. The potentiometer output current was interfaced to a Sony Playstation 2 game controller, which was read by software running on the Playstation (the playstation was online at rain.jesse.org until July 2005 with a web interface to the controller state).
The second design uses three motiondial circuit boards which sensed changes in acceleration. One is specialized to be worn on the head [Image 20], while two are not specialized and may be worn anywhere on the body [Image 22]. Calibrating recognition of body movements must take into account the position of the sensor on the body. The behaviors such as walking, sitting, running, are easily recognized.

a Portableroad architecture

an Annihilation of territory

Portableroad begins from a model of the most elemental forms which affect the person, and builds from these units to create a model of entity. The entity model is used to represent the person, and from this model the shell of the portableroad system expands outward, from the modeled core of the person.

Entity recognition

Identifying the entity

An element is a relationship between two (at least) differences.
An identifiable collection of differences can be observed repeatedly.
A pattern is a collection of differences which is observed to be identifiable.
An entity is the observed effect of a pattern of differences.

Entity is the interchange between some pattern and its environment. An entity is specifically identifiable by its borders, after which the "outside" environment can be said to exist from the position of entity. Identity is a form of entity which is in the process of being observed. An entity is a place, it is not necessarily alive. Inside the entity self-substantiation occurs as differences have relationships, and patterns have relationships – for instance, in the case of a person, the borders of the person might simplistically be decided to be the surface of the body. Inside the person, operations are carried out which substantiate the existence of the person; breathing, thinking, metabolizing.

the Entity is uniquely identifiable.

An entity affects all observations of it; changes which it effects can be traced back to it. Identity is determined by observation and does not exist without comparison of the entity with relative differences.
The entity can be understood as the expression of a unique identifier. This

identifier is a collection of differences, in reference to each other, the collection is identifiable, and may be a pattern. The expression is a process whereby a propagation of changes occur, expanding outward from the unique identifier, in reaction to its presence. The changes, which are reactions to the presence of the identifier, serve to convert collections of differences which were less affected by the identifier, to collections which are more affected by the identifier. This process converts an outside, from the observational perspective of the identifier, to an inside.

Unique Key

The identifier can be thought of as a unique key to an environment: a unique key, in an environment, affects the environment in a way which determines the resulting entity (and then the resulting environment), the entity being the collection of changes propagated by the unique key - the expression of a unique key. The entity becomes the extent of that which is inside the identifier's borders.

For instance, if the entity is a tree, we might think of the seed that the tree grew from as the tree's unique identifier, the tree in all its foliated glory is the expression of the unique identifier. In another example, we can describe the expression of an irrational number as an entity, with the unique identifier π. If we are to think of the body reactions to the unique identifier π, we might find the expression of this identifier in all things interpreted to be circular. The border of this π entity exists between circularity and non-circularity as these properties are observed.

the Entity is more connected to itself than anything else.

Communication inside the entity happens more quickly than outside the entity.

The change which occurs in the entity upon observation of something, because the entity is more connected to itself than anything else, propagates reactive changes throughout itself more quickly than through its environment.

The entity, Gary the Moose, when seeing approaching headlights, jumps out of the way. She succeeds in communicating from her eyes to her legs more quickly that the car that is about to squish her. In the life of an entity, this principle is often strictly enforced: were Gary to have communication between her eyes and legs that was slower than the speed of the dangerous oncoming headlights, she would cease to be an entity. The status of entities can often be determined by comparing the speed of their internal communication to the speed of communication outside the boundaries of the entity.

Auto-Correlation

Entities are auto-correlative: the entity is more similar to itself that to other elements. This principle is similar to spatial autocorrelation for places. For instance, the cells in my hand are more similar to themselves than the cells in the stinger of the bee that just stung me. It is very easy for my body to identify which cells are mine, and which cells belong to the bee's, and swell up painfully all around the foreign cells.

Entities have Borders

At the edge of the expression of an entity's unique identifier, where the expression no longer persists, where the influence of the identifier is not observed, we find the border of the entity. The entity's borders are identified by the difference between the inside of the entity and the outside, or the difference between elements which are influenced by the presence of the entity compared to those which are not.

In determining the borders of the entity from its expression or elaboration of a unique identifier we can attempt at least two methods:

1] Follow the growth of the entity (autocorrelation of the entity begun from a center or birthplace). We can call this lineage.

2] Determine autocorrelation according to other pattern recognition techniques. Determining precisely what is the entity, can be answered by discovering those patterns which exist in the entity which do not exist elsewhere. The more unique those patterns which comprise the entity, the easier it is to determine entity. This second method is sure to yield surprising results atypical of normative social traditions of self and personhood. We can call this pattern matching, which should hope for pattern recognition.

Comparison facilitates difference and creates elements

Seeing only difference

We can only experience differences. When we observe the same thing for long enough, we stop seeing it. If you stare at an object for about 10 minutes, it will disappear as the retina bleaches and the brain receive no signals by which to differentiate elements from each other; a temporary blindness occurs.

Difference

The ideas of difference and change can be elementary tools for dealing with things, which are defined in terms of, and manipulated by, these ideas. Difference is discrete and fundamental. It is the smallest unit by which all other units can be made. All differences are equal: a relative difference compared to another difference is a compound comparison. This compound comparison can be understood as a sequence of discrete differences.

All relationships, structures, including entities, are composed of differences which exist in comparison to each other. Each difference substantiates other difference. For instance, the number two exists relative to the number one – two ceases to exist without one.
For a person attempting communication, as perhaps a person in a society might do, description is useful. Description very often uses comparisons, which may be discreet or obvious. For instance, if I am to describe, using the phrase - "He has an orange shirt", a simplistic analysis of the phrase reveals that each element in the communication becomes what it is meant to be (as determined by the intentions of the communicator) when interpreted in comparison to other elements. Orange is tacitly compared to all other colors; it is orange because it is different from other colors. A shirt, as well, is a shirt because it is compared tacitly to other things.

Elements

The relationship of a difference to another difference can be interpreted as an element. For example, in this space: " J ", we find the element "J", which is determined to be present by comparing its presence to the lack of any J previous to, or following, the J's incidence. We find a difference both preceding, and following the J. To further illustrate the identification of elements by the opposite example: in the space " ", there are no obvious elements. There should be no obvious difference inside the space.
Difference, as an idea or result of analysis, can be understood as non-continuity, in the case of description, non-continuation of elements.

Comparison

Measuring differences quantitatively requires comparison (for instance, this is six times the size of that), which can be used to devise elements, which can be used comparatively to form units. For example, consider the unit "centimeter", which in its most primitive form might be interpreted as a unit consisting of one element, against which other elements might be compared.

Inside, outside, place

To be inside, is to observe a collection of differences, which performs sufficient complexity to allow observation only as the observer is entangled in, and affected by the collection. To be inside, is to be affected by a place. To be outside is to not be inside.
Difference exists when an observer finds it primarily between elements that are outside the observer, or between elements – one of which is not the observer, or internal to the observer.
Place is composed of interrelationships which affect observation of other places. A place is a collection of differences, in,

through, or upon which, observation can be carried out. The form in which the relationships between differences exist (compared to other differences) can be understood by an observer as a place.
The first difference is the beginning of every difference.

Change

Change is generally considered to happen in "time", where an element which has been identified becomes different from what it was "before", implying time. Difference generally is considered to involve comparison between simultaneously existing elements. There are relationships of changing elements to other elements. The transaction is a change where two elements are observed to become different simultaneously, this kind of change is generally considered to be the result of their mutual interaction.
Change can be discussed without resorting to time: change, for an observer, occurs when difference is measured primarily between an observed element, and the observer's internal representation (model, interpretation, or memory) of the element.
Change and difference are similar ideas. They differ primarily in the observer's point of view. They differ in the domain in which difference occurs. Both require observation, both require an observer to compare observed elements. Change requires that an observer compares observations to an internal model, memory, or interpretation. Difference allows compared elements to be compared while they are outside the observer, and requires no internal model or memory in order to determine them to be different.
The first change is the beginning of every other change.

Patterns

Reproducing patterns may require a framework. A pattern is a sub-set, a component of a structure.

Finding patterns

Manhole covers, which repeat, are indications of a system; a water drainage system. The outward indication of the system is manifested through a repeating element in observable territory, though the system that created the repeating elements is hidden. This can be taken deeper to show the system that created the water system: the repeated manhole covers are an indication of the addressing of elements by a water system, and the water system is an indication of the addressing of elements (pipes) by a water authority. The repetition of behaviors (installing drainage pipes) is an indication of the agency of the system that controls the water authority, a government, the repetitive behaviors of which are indications of its governing system, the human communication and

economic structure. And on to the human person interaction structure, the biology of the person, the chemical and molecular system which comprises the person, the atomic and subatomic, and on. Maybe to energy, and then, eventually, the seed of it all, difference. The difference between one and another. The first difference was the beginning of it all.

the Observer

The observer is interested in determining a territory in which comparison might take place. Observation creates territory. When comparing potential patterns, the observer can determine two patterns to be identical, when the observer determines that all choices about interpretation of the observed patterns result in the same decision made in regard to the patterns. This determination importantly does not incorporate features of the observed patterns which are not observed.
For instance, in determining the status of a pattern match in the case of two snowflakes, the observer might note that a flake has eight radiating crystals and ask, does the other have eight radiating crystals? And upon find that that the flakes all have eight, do each of the radiating crystals have eight sub-crystals? At this the observer might note that the decisions that they have made about the structure of each crystal are the same. This observation might lead to the conclusion that the snowflakes are identical; that a pattern match has been successful.

Change, difference, and repeatability

Underlying repeatability is quantification of difference. Encapsulation and object level interaction are important tools for change as they operate on multiple elements simultaneously, allowing complexity.
Repetition happens in time, territory - seemingly - but repetition is interpreted to occur in time or territory, neither of which (time and territory) exist without the interpretation of elements as performed by an observer, and maybe not without observation by the human person.

Reproduction indicates structure

Indications of pattern
Equidistance is an indication of pattern. Cyclical instances are regulated by a structure which makes them cyclical. The quality of such repeated instances possess which can be observed to be cyclical, illustrates the structure which contains them.
Reproduced structures indicate that a framework exists, inside of which, patterns, and so reproduction, can occur. This may be an indication of agency at work. That there are reproduced structures shows that structures exist, which shows that there is a structure

inside of which structures can exist.

The orbit of a house plant around the sun (seen in time lapse photography perhaps as it happens so slowly) can be thought to be cyclical – it occurs in a particular (approximately the same) position every so often. The repeated quality, its regularity of position, shows that a structure (orbiting) exists, which controls repetition of the instance of its occurrence at a position.
Reproduced elements show the pattern in which they are formed, the pattern by which they are controlled- the pattern which may be used to address them. This pattern may illustrate agency. Reproducibles indicate in the pattern of their reproduction, the pattern of authority which operates to effect their arrangement in a system which is addressable. Continuance increases probability of reoccurrence, increases probability of existence. Because it exists, it is more likely to exist in the future, and was more likely to exist before it existed. The continuance of the frog makes it more likely that those structures which support the frog (hemoglobin, for instance) will continue to exist. Likewise, The frog's existence is substantiated by hemoglobin.

Reproduction requires structure

The country does not reproduce because there is no bigger structure than it. Political structures, which are smaller than the country, can reproduce, because they can be put in a superstructure which is the nation's landscape. For instance, democracy can reproduce in several countries, as the super structure of nations is bigger than the smaller pattern of democracy.

What can not reproduce can not survive

The individual must reproduce for the species to survive. The entity which constitutes the species requires as components, individuals which are of the species. The species exists as components are observed to exist, but is doomed so long as the species, as an entity, does not reproduce. The evolutionary chain must continue if any one part is to survive. The demand for components will remain low, until the species as an entity reproduces, at which time, demand for components can increase exponentially. Probability of existence for components can expand as demand for them expands.

Patterns are local

Locality is determined by observation

Locality is the shape of the limits of perception. For example, what I "see" are those things which are in my "local" area, those things in my range of sensory perception, which influence my apprehension. It is the territory within

which elements can be distinguished (by observation).
Diagram of Observation Propagation [Image 18]
There is a difference between those events which I (my mind) apprehend, and those events which affect me (my body and my self). All things affect me, only some of which I apprehend.

Territory is local

Locality is the scope of competition territory. Both success, and failure are local events, meaning that failure occurs relative to something that is not failure, and success relative to something that is not success. The determining conditions of failure can be changed, and are generally portable, offset-able, and otherwise malleable. The borders of locality determine the scope for comparison territory wherein inferiority as a result of tournament can be found. An evolutionary consequence of inferior results in tournament might be catastrophe.

Addressing Shibuya

I was looking down at the courtyard of the JR station in Shibuya. I liked coffee at the time, I was into mochas. They are expensive, but they are really good. I'm not into coffee so much anymore because I think its not good for my heart.

So I was in the Tsutaya Starbucks, looking across the street. You can see a lot of pedestrians walking through the courtyard. The tiles of the courtyard form a grid, so you can get the idea that they are like video game characters, moving through a grid world. Each tile they touch is addressed, changed by their presence.
The pedestrian traffic is pretty chaotic. If you are looking at the tile framework as it is moved through by people, you can't see much of a pattern, except for entrance and exit patterns through the courtyard. This is in pretty sharp contrast to the facade of the building that I was in, which has a similar grid across the front, which is addressed to show patterns all day long in car commercials, music videos and such.
I thought I should try to address the JR courtyard. There are various ways this could be done. I could train people to stand in place, on a tile, so that they could be seen from above as a pattern. Or I could walk through and drop things on each tile I wanted to address. Maybe a piece of gum. I could walk through the courtyard every morning on my way to work and drop a piece of well chewed gum. One yen coins of course won't last, other sorts of commonly dropped items (they must be common otherwise they will attract too much attention) would be swept up. I had, the night before, come back from a bit of partying at club asia or P or something, and had opportunity to see the early morning sweepers cleaning the courtyard. Nothing lost there would last

a day.
So gum. The tiles are white, and I can use white spearmint gum. Of course ground based gum turns black quickly. So it can be dropped, and it will blend in. It will stick, and can't be swept away by the sweeper women in the morning. And then after a day or two of being stepped in, it will turn black. So I will buy a lot of gum. Sugarless. On my way to work I will count the tiles as I walk. Twelve straight, two down. Drop. On my way back from work I will count the tiles as I walk. Two up. Drop. It will take years.

Addressables

Addressable systems are composed of replicated nodes. A node must be at least one replicated pattern. Because the pattern is replicated, and each element will behave in some same way, it is addressable, programmable. Once the behavior of one node is known, all other elements in the structure are known, because they are all replicants and exhibit the same in behavior. A pattern (or program) can be entered into this addressable system by altering the observed, interpreted properties of a node, and the observer can read it back from the programmed system, and interpret it.
Nodes are made by forming smaller patterns together, until a larger pattern which behaves as designed is created. The behavior or interpretation of the resultant node is the determining factor in whether the result is a replication of a pattern. If it is, then an addressable system can be made. The more elements in an addressable system, the more you can do with it. An addressable system and its observer make a great pair.
My name, “jes” is an address. From all the people in the world, if you call my name, jes I will respond. The addressable system here is “all the people in the world”, the addressed is me, I am a node composed of several parts, ostensibly a body-mind, liver, feet and such. Another type of address is jesse.org, wherein the addressed is my internet domain, and the system is the internet.

Dimensions

A series of nodes can be called a dimension. Some people know this structure as an array. A dimension is the first level of repetition. A second level of repetition makes another dimension. Dimensions can be created by an interpretation of elements which are not exactly repetitive, but through the interpretation can be used so. Nothing is ever really an exact repetition of anything else, and so it requires the agency of someone to interpret things as repetitive. The interpretation of things as repetitive is the advent of the capability to address the repetitive things as a system of relationships, where elements are on some dimension equidistant from each other, or can be

made to be interpreted so.
An example of the use of a dimension in portableroad looks like this: 10000000
You can see the elements which are internal to the dimension (the “0”, and the “1”). This particular dimension is finite, and so the entire thing can be observed as an entity. Portableroad interprets this demension as an element which means “up”.
01000000 means “down”.

Interpreting

Addressing, and interpreting happen through the agency of an observer. For instance, if I write my name on an old Petri dish with a pen filled with nutrient solution, the resulting bacteria and fungi will grow to fill in the characters I wrote. But the fungi might not know anything about the pattern they make as they live out their little lives, they can’t see the word they form, only I can, when I shine a UV light on them and they phosphoress as “jes”.
Procedures, functions, behaviors, are the interpretation of addressed territory, the enacting of instructions which are encoded in addressed territory
Elements at a small or "local" scale, can be determined through the use small addresses, and at large or "global" scale, large addresses. For instance, instructions for finding a house in a local neighborhood can be short: "second house on the left". Assuming that the addressing method is understood (assuming that we understand the instructions and conventions for addressing - say we begin looking for the house by searching from the top of the street, not from the bottom), we can find the house with little trouble. This allows one to use small addresses for small numbers of elements, and large addresses for large numbers of elements. The result will be a list of directions which grows according to how far away the target is.
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Addresses can grow in length as long as the system is expanding or is infinite. As soon as it is bordered to become finite, compression can begin, for instance, data compression, or shortcuts. Often, in practice, sections of expanding systems are bordered so that compression can begin even which the total system is still expanding. For instance, in New York , which is can be an expanding city, the 212 calling code is a finite bordered addressing structure, even while New York phone numbers continue to increase in quantity. The result of having the 212 exchange unchanging is that within the 212 address structure, compression can take place – inside the 212 calling area one could conceivably elete 212, yielding a compressed address, a shorter phone number.
But the universe hates sort-cuts:
"To avoid spurious address matches it is recommended that the address length be 24 bits or higher in length. Small addresses such as 8 or 16 bits can often

lead to statistical failures due to the address being repeated as part of the data packet. This can be avoided by using a longer address. Each byte within the address should be unique. Repeating bytes within the address reduces the effectiveness of the address and increases its susceptibility to noise hence increasing the packet error rate. The address should also have several level shifts (i.e. 10101100) to reduce the statistical effect of noise and hence reduce the packet error rate." (Nordic Semiconductor:2004)
1] For people, long addresses are fun: successfully accessing the element at a long address, in the context of a competitive territory, is fun.
2] More precise addressing creates more territory.

Community

People tend to (their) local territories, attempting to make competition less catastrophic.
The Jones' are neighbors to Sven and Jim. It's a small neighborhood. The Jones' have 5 nice cars and 2 pools. On either side of them are their neighbors, Jim on the left, and Sven on the right. Jim gets it in his head that the Jones' are cool, and he replaces his Toyota "Hachi-Roku" with 5 nice cars, and replaces his backyard with 2 pools. At this moment of tension, Sven, who is now in the minority, might feel that he should upgrade. This tension must be minimized for community to exist. Sven must upgrade, leave the community, or manage his unease.
In a community of distinguishable elements, which we can call a neighborhood, competition occurs until participants are at about the same level. When competition is no longer yielding winners, competition becomes less intense. For instance, neighbors improve their lot until their lot is similar to others'. Neighbors which can not match the lot of others fall out of the community, neighbors which surpass the lot of others set a new standard for competition.

Apprehension becomes structural

That an alive entity participates only in one event, which is not cyclical, for instance, I only go fishing one time in my life, and never again, is not a counter example to the idea that structured events (controlled events) repeat: in the person’s life, upon being faced with possibilities which might allow expression of singular behaviors, the person can pursue identity through singular behaviors in the thought that, were they faced with the same opportunity again, they could again make a choice (though not necessarily the same choice); they could apprehend the same situation again.
In this way, a person carries inside of themselves self referential and determining structures, which may externally be expressed only one time, but may be internally be reproduced

more often (dreamed, remembered, learned from). It may be that the most important thing an entity does in their life occurs only once. Externally this is not repeated, but all preconditions and ramifications are played out to support the event, and the structure which is the person repeats the components which make the event possible. As in a hierarchical structure, the single element at the top is not repeated (necessarily), but everything which makes up the hierarchy is repeated increasingly as one moves farther from the singular top of the hierarchy, repetition of lower levels increases.

Behavior reinforced behavior

Belief fits as a repetition of structure. As belief re-manufactures itself, a pattern of repetition occurs. As behaviors occur, they can propagate to be experienced, and reflexively affect the performer, so that they are more likely to commit the same behavior. Awareness of behaviors can make them more possible.

Modeling entities in the human domain

a model for human entities
An entity in the human social world can be geometrically modeled in a small number of dimensions.

Initially, the outward shape of the entity is normalized to be spherical in any number of dimensions; that is the border of the entity is equidistant from the center of the entity at all locations. The radius of the border of the entity is discovered by transactions; single interactions between the entity and that which is not the entity. Each transaction is a single exchange.
Upon interaction with other entities; the border of the entity must change, expanding or contracting so that it is closer or farther from the center of the entity. Entities interacting with other entities deform their borders. Stronger borders deform less.

Modeling reaction, awareness

All actions are reactions.
Awareness, for the entity, is composed of transactions. This awareness is discrete, not continuous but sampled, composed of transactions which cross the entity's border. While there are no transactions there is no awareness, no experience, nothing, no "time".
Awareness in this transactional form can be exemplified in the seemingly smooth rotations and translations seen in movement on the television screen, discrete positions, resultant of discrete changes, seem continuous. The only continuous presence is the entity which perceives. Processes which are instinctually thought of as continuous and smooth are thought to be that way because the entity is built to behave as if they are continuous and smooth. They are interpreted as smooth.

A schedule of awareness (my own, possibly representative), which we can call the stack, might work like this:
The border of my awareness begins at me. Then it is me and the next thing I know: the floor. Me and the floor. Then me and the table. Me and the floor and the table. Prioritize the table because it is more dangerous. Me the table and the floor.
And simplified for use in software: 1] Me. 2] The table. 3] Me. 4] The floor. 5] Me. 6] The table. 7] Me.
In my case, this awareness repeats, until there is something new. Each apprehension is discrete, while the sequence presents something like a continuous reality.
The stack represents the products of a mental metabolism insofar as the mind is a metabolism that feeds on structures of sensory input as the body feeds on structures of chemical molecules, not so say that they are separate, but their respective preferences in food supplies can be conveniently categorized. The mind works and exercises as the body works and exercise.

Relationships of procession in agency

The entity makes transactions; not the components of the entity. My stomach does not eat, though it may be affected by my eating. The reason is that change occurs only for the observer. If the entity is observing itself, then it observes its own changes – when my stomach observes itself, it discovers itself digesting (if not "eating"). Transactions occur at the level of observation.
A car is composed of many parts. When they crash, I say the car crashes (though the parts crash too). The car is the entity which is involved in the transaction, because I am observing the car. From the point of observation, all components of the observed are observed. Gottfried Leibniz hoped that x is the same as y if and only if every predicate true of x is true of y as well.
The observer is a comparison platform: "If I am stationary, all action must happen outside of me". When I see a car speed past me, it is speeding because I am slower than it. Determination of change occurs relative to the observer's facility to be less changing than that which is observed.

Social interfaces

The private person must be acceptable to the public body, or it will be destroyed by the public body. The ability of the private individual to stand against the public body can be improved through the use of technological and social tools, however the use of these tools requires resources and energy, as well as execution of a plan of behaviors. Easier perhaps is the interface of the individual to the society through negotiation and matching of the individual to the expectations of the public body. Those patterns exhibited by

the individual in the public space must match reasonably the patterns expected by the public.

Social license

Making public the life explains and digests the life for use by the public. The public life is made safe for consumption by the process of consumption; actions in the public life are brought into the realm of the realizable in the public mind.

Event architecture

Observation platforms

When you are the size of a tree, you assume treeness, but when you are the size of a branch, the structure of a tree can bee seen and re-evaluated. As a smaller person, one can explore, evaluate, and re-evaluate architectures which are larger than the person.

Comparing events

Reducing the size or complexity of the event (to the discrete change), allows re-evaluation of what is. People can experience events at many levels of complexity. We may experience a breath, or a month of Sundays. We may experience a seven year journey or a hiccup. At their full size, and in their full range of complexity, the hiccup and the journey are incompatible, incomparable. But broken apart into discrete transactions, comparison might be made. From this perspective one can evaluate the huger scale events that they have experienced, and compare these event to other events. From the raw material of comparison, event architectures can be made and experienced; campaigns, lifestyles, parties.

Notable patterns

Predator

A predator is often smaller than the patterns it consumes.
For instance, a tiger is smaller than a zebra, and because the zebra is physically larger that the zebra, perhaps the zebra is more complex. Making a generalization, the zebra is a bigger system, it has more parts. Our tiger, by performing several patterns such as running, jumping, attacking, is able to acquire patterns that the zebra contains. At that point it can incorporate the patterns that are the zebra into itself, those proteins that make up the zebra. Unfortunately for the tiger it can not incorporate the larger scale patterns of the zebra, like eating grass (what tiger wants to eat grass?). It must digest the zebras huge patterns into patterns that are much smaller than the tiger. The smaller digested patterns can be incorporated into the tiger.

Consumer

A consumer performs patterns so that it might consume patterns. For instance, a mole performs foraging to consume worms. A person performs drinking to consume tea. A consumer is probably bigger than the patterns it consumes. A

society is a consumer of people. A government is a consumer of social structures. Society is not government (though they could be enforced to be the same).

Virus

A virus pattern is smaller than the organisms that it inhabits, it reproduces as allowed by the structure it inhabits, using the materials it acquires from the superstructure. A virus is a predator. A cyborg pattern might exemplify the virus pattern, in which case a nonliving technology pattern is attached to the biology of a person. The virus pattern is interesting because of its apparently weak entity borders, and bare simplicity.

Impression

The experience of artifacts can be an assertion of patterns when the experience is the same for different experiencers. For example, as Sven and Jim both experience seeing a stop sign, The experience of seeing the sign is replicated, once through Sven, and once through Jim. Some experiences replicated prodigiously through communication channels or physical media. For instance, the experience of holding a bowl has been propagated and replicated billions or trillions of times as the idea of the bowl came into being, was formed, and communicated.

Internal territory

The lifetime is the first reproducible territory, then the events inside the lifetime: birth, lunch, dinner, death. We can continue categorizing sub-events in the lifetime: seeing the first light of birth, chasing the cheese of the lunchtime sandwich, a glass of Château Latour at dinner. And on, breaking down large events to smaller events: tasting the first pinch of cheese, absorbing the first C76H52O46 of wine. Further, subatomic, elementary particles, then getting wavy. Metabolizing experience, so that it may be believed, so that it may be reproduced.

Symbol objects

Symbol objects (which might be physical objects, displayed symbols, software tools or something else) are employed in portableroad as active participants in a person's life, actively making decisions which affect a person's life.

Universes

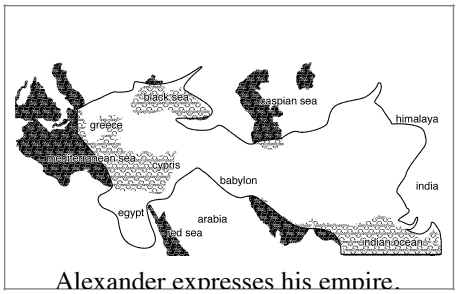
As entities are more connected to themselves than they are to other things, a universe is connected to itself more than other entities. To stand defiantly asks that the universe destroy the defiant as long as the defiant stands against a universe.

Expression

An expressor, or an expression space, is a collection of differences large enough that other collections can fit inside. An

expressor is a place. It can be a framework allowing differentiation for its components. An example of a simple expressor might be the grid framework that is used in developing cellular automata. This is a structure inside of which comparison can take place, and as it is run, processes of change occur, which express and elaborate initial conditions. In this example, the initial conditions are our unique key.

Unique key + expressor



Alexander expresses his empire.

A unique key, in an environment, will find expression, like a seed in soil. Perhaps the expression is modest – perhaps the seed dies. Perhaps the expression is strong, like atomic structures, permeating a universe, or like RNA, enveloping a planet. The process of expression is a vector, a path of motion, a way. The process of expression creates territory, this is expression space that is known .

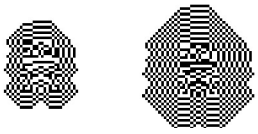
Vector

A vector is the comparative direction, the motion of expression. If the expression is growth, then the vector can be easily understood as the path of growth.
An observed vector, a static vector, can be interpreted as an entity, having a border which is the edge of the expression, and a center which is the entity's unique key, from where it grows.

Vector + recursion

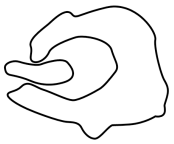
When a vector becomes recursive, when expression causes re-expression, the possibility of observing a pattern of entity persistence develops. At this occurrence, entities can react to themselves, which we can call self

elaboration.



One way that entities can react to themselves, is when entity borders collide with themselves during growth or change.

Encapsulation

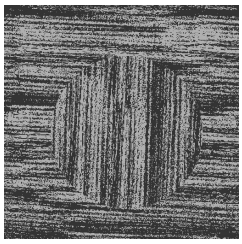


The border of an entity encapsulates it. For an entity, the border is the area inside of which probability of the entity increases dramatically. Outside of the entity, competition for identification of the entity begins, and expression of the unique key of the entity becomes low. An amoeba engulfs a paramecium. The borders of the amoeba entity will collide

as the entity engulfs the paramecium, and it will encounter itself.

Lineage and pattern recognition

Growth by Extension



In the construction of new things, it is easier to create self-similar elements by extension of what already exists, than using patterns which are not in existence. When following patterns which already exist, it is easy to recognize, or comparatively easier to recognize, the new patterns. For instance, when following the lines of wood grain in wood, it is easy to identify a single piece of wood. In this way it can be possible to identify borders of entities.
Lineage
In some domains, like human legal and social domains, the problem of determining entity borders traditionally is resolved by proximity. Ownership is most primitively defined by occupation, where an entity owns something by occupying or controlling a spatial area that is owned: my hand, my house, my breakfast, my dream.
I was looking at a rocking chair (which is not true, but it helps the story) that was quite antique. Originally the chair had been covered in a hard thick skin of black lacquer, but its owner had sent it to a furniture factory where they had removed the coat of lacquer and polished the wood underneath. The result was a beautiful light colored wood chair.
Wood has a pattern, a grain pattern of lines, from which one can understand the pattern of one part of the wood, by looking at a different part. The wood grain extends the previous wood grain. The line extends the line. As the tree grows, the new good grain follows the path of the old, as an extension of the old pattern.
The wood grain of the armrests and posts of the chair was easily visible. The path of the grain can be traced from edge to edge, end to end. When one piece of wood was wed to another, the grain was ended in a sharp line of contrast between one piece and another piece.
When looking at the chair, I see different pieces of wood, fit together. I see different pieces because of the change in the wood grain. Though the pieces fit close, and perfectly, the pattern of the grain is changed when one piece meets another. Together, the chair is made of many pieces, each which ends where another begins.

Things which are alive are entities

The entity is the precursor for social exchange, the precondition to culture. An alive entity may require little or no external observation to perform

identification of itself, it may be highly self referential.
An alive entity can observe itself, affect itself, and perhaps effect itself. If an entity is alive, this entity must be able to determine itself in some way – its form, its borders, from inside, relying on itself.
Entities which are alive have the unique ability to colonize, to take over patterns, and change patterns, internal to themselves, and external to themselves. Alive entities propagate themselves and reproduce patterns, which might be done at a cost to the patterns of other entities

Environmental entity

When the environment as an obvious source of personal change in the person, the environment can be felt to be an effective entity, in the way that a river might be an entity, or a mountain.
Portableroad is a system that has been designed as the extension of the entity which wears it. The system's agency and embodiment are flexible, partly localized in a wearable computer, and partly residing in distributed microdevices and internet locations. The effects of the agent can be visualized in a computer, or on a wall, or economically as the effect of the transactions that it makes. The effects of the agent can be physical, economic, social.

A dynamically constructed environment was built with the objective that reality may be consensual while being dynamic and temporary. Several people may be able to experience aspects of the built reality at the same time, in various domains including visual, territorial, and financial domains. As a portable environment, portableroad functions to administer agency in an environment. The reverse of this situation, where the affected environment is experienced, makes apparent the environment as a source of personal change.

Entity elaboration

Entities which have a recursive vector can elaborate themselves with each recursion (each time they discover themselves and react to themselves). Vectors of growth can be determined to be recursive or less recursive. For instance, fire, when compared to the pileated woodpecker, might be determined to be non-recursive. Both can be seen to grow, and both have easily observable borders, however, the Dryocopus Pileatus can be observed reacting to itself, and engaging in long trains of recursive reactions to itself, whereas the fire reacts primarily to its environment. At this point a discussion of entities in terms of cybernetics becomes possible.
Entities might elaborate their borders, patrolling and enforcing them. In this way, expression can be focused, so that inside the borders of the entity, the entity is highly probable. Entities might elaborate their identity, by modifying

those elements which are in a closer relationship to their unique key. Entities might elaborate or modify their capabilities, by modifying those elements which have a close relationship to their recursion.

Border elaboration

Entities might perform elaboration of their borders. This changes their outward appearance. This elaboration can be a process like growth, as a puppy matures and becomes larger. It might be a process like complication: a coral multiplies its cells and makes a reef.

In addition to these perhaps more natural elaborations, we might find seemingly more direct self-reflexive border manipulation: a person gets earrings, or a tattoo. These changes are personally planned (hopefully) manipulations of the state of the person's body, as opposed to less personally planned manipulations. For instance, the less personally planned elaboration "growing up", just happens, no personal planning necessary (if you are a puppy).

Regardless of how directly self-reflexive, these changes modify they way that the entity is interpreted by their environment.

Principles which led the implementation

Evolution happens when the things that you stand on change

If buildings are constructed over liquefiable soil deposits, total building collapse can result. (Utexas.edu:1999)
If a thing below you is down, you are down.

It is necessary for us to use small patterns to compose ourselves, our bodies. We employ patterns to compose our homes, our attention, our fashion, our past and our future. We also use small patterns to make patterns larger than ourselves: our societies, our governments, our businesses, our cities. Patterns evolve because of their existence within a framework of other patterns. Bigger patterns enforce smaller patterns, but without the presence of the smaller patterns the bigger patterns can not be built or rebuilt. We remake our world from those patterns that we create. We are controlled by the things that are smaller than us. If we can not sustain the patterns that are components of us, we die, and everything larger than us that we make dies. When those things that are smaller than us die or change, we must die or change. Smaller patterns are consumed to make larger patterns. When the available smaller patterns change, we must change.
High level predators are enabled by lower level (smaller) predators. The behavior of lower level predators enables higher level predators (big fish eat little fish).

Design for surviving the catastrophe of evolution

If the foundation goes deeper than the shaking, the structure can survive the earthquake.
In a hierarchy of experience, it is not important how far you can go or how advanced you can become, how complex, how evolved. It is more important how advanced you can become while being able to make what is needed from low-level component patterns.
Whatever is able to consume from lower level, or smaller patterns can better survive when medium size patterns become unavailable.
When the ground shakes and causes high things to fall (or when 747s go off course), the building with the deepest foundation and strongest structure survives. The tallest building crashes hardest.

Ability to make and replace its food supply, its elemental pattern supply

Humans have an interesting position in the food chain because we are able to eat vegetables, which are our food. But we can also eat much higher in the food chain, we can eat (if we can find them) the highest predator. In this way we are both highly resistant to catastrophes occurring in the food chain (if the predators that we eat all die we can eat what they ate directly, or in some cases go below them on the food chain).

Humans have replaced many animal's positions in the food chain (or in the evolutionary chain) with humans. For instance, the position of Horse, Wolf, and peacock have been replaced by people.
1] All competitors for food have been replaced with people
2] Most competitors for labor have been replaced by people (unless a machine is a competitor)
3] Most competitors for beauty and entertainment have been replaced by people
Humans have mastered making the elemental patterns that required for survival, in strategic specific instances. For instance, we can design agricultural systems, however we still need soil. We can manufacture soil, but then still need molecules, we can manufacture molecules, but then need energy and industry, and on and on.

Complexity: the universe hates a straight line

At the end of its lifespan, the tomato decays or is eaten, this deconstruction increases complexity because there is a lack of an architecture for the components (when there is a finite territory, as in an entity, addressing can take shortcuts, reducing complexity, 212, page 18), increases the profusion of patterns smaller or less complex than itself. Recursion creates agglomerations, and the ceasing of recursion disperses them. Human metabolism makes simplicity into complexity, while the minds attempt to reverse the process.

Although human entities are more ordered internally, they make more disorder, more complexity, externally. Humans often make more disorder around them and more order inside of them.
Complexity can not grow beyond its finite container. Complexity is limited by the structure which contains it, and the availability of resources to allow change.
Molecules act complexly when allowed energy, and are stopped in action when denied energy.
Dearth happens consequentially when the distribution of resources occurs in patterns which do not reach the observer. When there is too much resistance in the path of resource distribution, resource distribution is ineffectual. Growth is halted when resources for growth are not present.

Resurgence of the uncatagorizable

There is a limit to the usefulness of tokens, when signs are no longer useful as signifiers.
In human history, at one time, methods for categorizing and vetting possible things were less than able to quantify available things. There was magic and mystery in the air. Maps had showed that the end of the world was present, and unknowable.
Presently, tools for quantifying data are flexible and heavily invested in. There is no geographic end of the world. The profusion of modernity is caught in databases and mapped in Geographical Information System software, extracted, refined, mined, designed, manufactured, hyped, branded, recycled, made into carpet, bar-coded and resold.

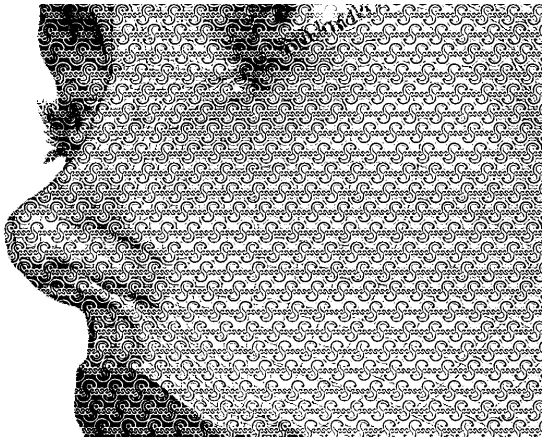
Non-cyclical, non-repeating events

Non-cyclic , non-repeating events are otherwise un-catagorizable. Such events are 特別, tebie, special, singularities.
Despite the strong catagorizational cultural imperative that exists and assimilates publicly known things, non-cyclical events persist. These events might include birth, and death, invention, destruction. The most important non-cyclic event is considered here to be birth, and is discussed in terms of the character.
Non-cyclical events can break patterns and destroy artifacts of agency. These events are special, and must disrupt whatever systems they interfere with.
Non-equidistance might be an indication of conflicting agencies. It is experimentally obvious that systems (such as people) without a common denominator, a common base, a common word, might never speak.

the Character

A character is a preparation of materials for interface to a person so that the person will to some degree believe that the interface presented by the prepared materials is or is similar to a person.

It is teasing the expectations of the observer into triggering belief that a personality exists; or instantiating a system for recognizing a non-existent personality. The seduction can be simple or complex, relying on the observer to make up larger or smaller parts of a reality. In some cases, the echoes of real people and their personalities are used; in films and videos which employ actors to demonstrate the behaviors of a character so that a person has a lush sensory approximation of a characters behaviors - little interpretation is required and much of the necessary components for instilling illusion and so belief are present in the recorded actor. In the case of a synthetic actor, the cartoon character, the animated character, the plush toy, the stuffed animal, where a system for stimulating belief is not already pre-made as in the case of the actor, belief must be manufactured through the use of component "behaviors" which are interpreted events. The component behaviors of a synthetic character, emotion, actions of life, characteristics of meaning; or simplified - facial state, body state, and the facial movement and body movement, reaction, interaction, speech, subtle and obvious communication, must be fabricated according to the interface presented by an observer. The interface is satisfied by assembling components into a form which expresses a communication overture as interpreted by the believing interface. That the character has capability for instilling belief is unique in art, in opposition to concepts like abstraction, or impressionism, which do not define explicitly or make attempts at pre-formed and tradition input processing mechanisms in the observer, makes it uniquely suited to becoming independent. Independence for a character property is attractive to people who think of the character as a responsive thing. The inherent nature of the character as assemblage of parts which satisfy a human desire to interpret components into life allows it a tendency in human cultures to move away from categorization with other forms of art, as it is interpreted as a personality or as like a person, as unique as a person can be, and having similar traits of aliveness and similar capabilities in its ability to instill feeling, make effects on lives, and participate rather than be manipulated. The uniqueness allowed a character is a basis for fomenting independence of the character; which can be allowed for in



typical human fashion by defining it in terms of property, and by removing the constraints of property by making it the opposite of property, which is to make it the owner of property.
Pierre Huyghe & Phillipe Parreno expiramentally created a basis for the independence of a character property, called Annlee. It used the most sacrosanct and protected form of legality, corporate law, to define property as the owner of property. In so doing they defined a corporation (property) as the owner of a property (the character), and then to bound the corporate entity (under French law) to internal mechanisms that prevent the expression of manipulations of the property owned by the corporation.

the Character in portableroad

The use of the corporation to hold assets which may be character assets, which may indirectly own themselves (through a corporation with no real shareholders), and which may operate themselves (by directing the action of the corporation through software interfaces and Internet and other media outputs) is an expiriment undertaken here (Money, page 8).

Competition

Competition is necessary for the existence of entities, as identity is the result of difference, which occurs through observation of competition territory.

Attention

When the point of interest of an entity is in conflict with that of another entity, competition can result. All entities must focus attention on different things, lest they fight.
With two entities, the functioning of the entities will be affected if the entities interfere with each other. If two entities are collocated in a territory, these entities are competitive for functioning (functioning as observed to function correctly). For example, when cars are collocated in a territory, then the cars will be competitive for observation as being a functional cars. Whichever cars are successfully observed to be cars will be such, and the loosers cease to be cars (they probably become “junk”). Such re-identifications, disasters, accidents, can be avoided when the patterns which compose the entity can co-exist.
The expressed behaviors of an entity can be observed to be the expression of its unique key as affected by its environment. When the expression of the unique key of the entity is collocated in a territory where another unique key is expressing, competition ensues. Portableroad might resolve some competition by managing the point of interest of entities so that their interest points do not inhabit the same competition territory. Points of observation are continuously coincident, they are made portable across people, points of view are broadcast and so

incorporated into a macro-entity. All participants can view all participating observation points, you can see though everyone else's eyes.
To the extent that entities can observe, and not change what is observed, the entity is constrained. When the entity can change what it observes, the entity has freedom. Entities unable to carry out expression of their unique key, can be understood as identities with a lower probability of existence, as well as vaguely expressed entities. We might think of 1980's McDonalds as a strongly expressed entity, and a 1980's Model-T Ford as a weakly expressed entity. My dead grandmother is a weakly expressed entity.
Entity's behavior can be interpreted as observed by other entities, in which case, the interpretations of behavior can be in competition with the entity's intentionality.

the Territorial impacts of symbol projection from the person

This section describes the extension of the person's ability to communicate to their environment, and administer meaning to places, locations, and objects. It discusses the extension of the person's interaction capabilities in behaving in social and non-social circumstances, and evaluates the use of the theories of realism and post-modernism as frameworks for socially embedding prototypes of symbol projection from the person.

research and methods

A system, portableroad, which can act as a test platform for developing communication methods and discovering behaviors that result from the methods has been realized partially as a wearable laser projector, dOut (for display Out). The projector draws simple information into and onto objects, buildings, and landforms.

Functions of portableroad

Several uses and functions of the system have been demonstrated. In one situation, a network of physical locations sensed by radio beacons is matched to a database of symbols. The appropriate symbol is projected at the associated location when the wearer of the system is in proximity to the location. In another situation, the wearer of the projector communicates by drawing through the projector. In both cases, communication occurs through the placement of symbols on objects; walls, ground, trees, or smaller objects like paper or household objects. Projection of the image over-top of that which is shown on a television screen also works well.

This section discusses the impact of the system's display methodology. Other functions of the system, which are not discussed here, are the matching of GPS coordinates to symbols, functionality which allows assignment of symbols to locations from a website, and a monitoring and feedback use which interacts with the wearer's nutritional state (suggesting what to eat, as determined by time since last meal and contents of last meal).

a Portable home

Portableroad presents an opportunity to develop a portable environment in as much as symbols can be presented so as to fill the visual perception of the person who wears it (in the tradition of virtual reality or artificial reality). In addition to those objects which are perceivable in the wearer's local environment, symbols which represent (or are) objects that make up the wearer's home can follow the wearer of the system. The symbols projected can be ever-present, can overlay visible objects, can interact with real objects, and can be turned on and off on cue and stored, transported and retrieved.

History of the project

The display system that portableroad uses was initially put together in 1998. The first system fit in a backpack and had the unfortunate problem that it could not be very portable and display symbols at the same time. It ran on 220v of electricity which is available easily only from heavy-duty or industrial electrical outlets. Because of this limitation, its portability range was limited to the length of its electrical cord. Initially the system displayed images that were drawn on a tablet computer.
A second version was used in the summer of 1999 in areas of Manhattan. As a platform for eliciting reactions to this method of addressing territory through symbol projection, the system displayed symbols at Bryant Park, Union Square, K-Mart near Cooper Union, on the subway lines, and along Broadway on the road itself. It was adapted during this time to run off batteries, and without need of the computer. It had no location awareness, and was housed in a video-camera case.
The third version was put together to fit into very big (theatrical) headphones. This system was more portable, intended to be wearable without the impediment to movement that the previous embodiment caused.

Similar Systems

There are are at least two prototype systems which are similar to portableroad. Symbol Technologies has developed a system which can behave similarly (Symbol:2006) but which uses a raster image (picture made of flat horizontal lines). The Symbol device

reads barcodes, which can identify objects and locations, and then can present a television sized picture at that location. The Basic Research Laboratories at NTT (Nippon Telephone and Telegraph) put together a similar wearable system in 2005 (Ando, Amemiya, Maeda: 2005).

Use

Portableroad's dOut display becomes an ability to address the wearer's entire environment; able to place symbols anywhere in the the wearer's visual range, at very large sizes (dependent on laser power). Being worn, rather than carried, it is a minimal obstruction to wearer's behavior. Portableroad allows a person to address space visually, allows space to present dynamic information, and can become a new form of communication where drawings and symbols are as easily presented as on paper, but allows the communicator to be free to draw temporarily on anything within view. Portableroad can be a stylus on the world.

Using realism to conceptualize portableroad's relationship to territory

Portableroad as a device knows nothing of territory. Its wearer, through its use, has capability to impinge the personal space of others, or address other entity's territory. In an urban environment, dominance and power can be exhibited through the addressing and territorializing of space, and here portableroad has been experimentally tested.

Portableroad's components have been constructed in a realistic manner, that is to say, they follow the theory of realism whereby they draw from a number of sources in their design, conceptualization, implementation, socialization, and use. Given the social challenge of extending the capabilities of the person, one finds oftentimes that the disorientation that comes with mutating the role of the human person in space and society because the person is augmented with new capabilities, results in damage to the assumed superstructure that contains the mutation. Violating the maxim, socially, spatially, has consequences for the social fabric and the persons that comprise it. Portableroad requires instances of the violation of territorialized space to function. To be sure, the most elegant design would allow the functionality of the system to remain intact while territorial concerns are appeased. Nevertheless such a declaiming of space only transfers claim of territory to others at the same time that it makes unlikely the existence of portableroad. All space on earth has been made territory, use of any space generally must occur by negotiating territory.

Describing a person's will to territory

Territory can be the physical area in real space as experienced by a person, that some person claims as their own. Modeling a person's territory might be done following the ideas on page 18, modeling entities. In considering a person's territory, it may be important to note that territory can comprise all apprehension, as well as all environmental affects, and effects of the will.

Portableroad, as a media device & as territory

It has been traditionally the role of the communication medias to not take up space except in their small allocated areas; movie screens, posters, billboards, televisions. The draw and power of media has been traditionally that it does not need to function by aggregation of territory. Individual physically small instances of media territory have operated in another dimension largely separate from the spatial and territorial dimension of geography. Media has operated as a network in its most geographically apparent capacity; taken all in, the area of space it occupies on a permanent basis is smaller than other industries. Media operates in the dimension of time, among others. It is the concentration of resources in small physical areas, which acquire the attention of the person, that allows media its power. The configuration of media so that it requires less physical space may make the media animal more adapted to survival.

Media nonetheless operates through exercising power over territory. The assumption that the important dimension to use for quantification of its territory is time, while disguising the location of its territory for some investigators, still leaves the careful one with an easy handle for its topological analysis.

Those who would experience media communication might choose whether or not they should allow the communication to invade their territory. Often, in public space, there is no choice. Communication is carried out according to weakly enforced social rules, and then it is survival of the loudest.

When a media device is acquired, it should be acquired in full knowledge that what it is now may not be what it is next year; mutation is an inherent property of media devices. The acquisition of territory in the form of the computer, game machine, DVD player, phone, MP4, may not result in the addition of a static piece of property, but may be a continuous dialogue resulting in the advent of territory acquisition by the next fashionable item.

Portableroad represents a new type of media device, which makes apparent in visual terms, the tendency of media devices to take over territory.

Portableroad becomes a device which

can lead the territory acquisition for media. It must use a realistic approach, as the terrain over which it projects symbols varies in meaning.

Realism as an aid to doing

Realism can be a conceptual aid to territory acquisition. In the collection of objects, the collector can be efficient when the rules for collection are simple and easily accommodated.
It is the prerogative of the individual to attempt a better life and to fulfill their needs through the exercise of those behaviors which their society allows. As this happens, the individual can be confronted by choice. An example, from the typical American society participant, in the throes of choosing from possibilities, is what kind of product to buy (a behavior very well endeared in its American context).
Let us allow shoes to be personal territory. As one shops for shoes, one might think of the characteristics of the suit that the shoes will be worn with. Some shoes will work well when introduced to the image of clothing in the minds eye; some sets of shoes will fail to delight. In shopping, the realistic approach must be to attach the shoes to those groups of clothing that one will wear most often; for practical reasons, to be realistic. Attribution to a higher design at this point will inhibit the ability of the decision maker to integrate new territory into the existing collection.

the Failure of realism for portableroad

Realistically created structures are less portable. Realistic structures are context specific. They exist as a collection of parts, perhaps even largely incompatible parts which have, per environmental allowance, connected. Territories, when programmed, can be compatible or incompatible with other territories. The more heavily programmed a territory is, the more problems with compatibility it might have with other territories:
I am in the habit of wearing diesel sneakers with a gray suit, something no person can be allowed to get away with should they be outside the academic setting. However, my combination of sneakers with suit was remarkably easy to decide to implement as there was little other option. I have a nice pair of Bally shoes that have holes in them, and a pair of snowboots, so its the sneakers or barefoot. The sneakers have their own system of design, quite at odds (yet oddly embracing of) the system of design that bore the suit. These systems are, incompatible in any real context outside the lab or the university, as systems of thought, incompatible as precursors to behavior, incompatible as estimators of financial viability, as indicators of social tack, even as they are elements of attire which can be joined together functionally.

Realistically, elements can be put together, which should not be put together according to the operation of a containing system.
Portableroad easily places symbols, acquiring and defining territory. As it does this, it can break every rule of territoriality, as well as other rules which would define what symbols should be projected at a location.

Avoiding the bomb in the elevator

While deploying lilStars for a demonstration of the portableroad system, I had opportunity to discover how the (even unintentional) assault on territory, at the scale of a building, can proceed, how it can be reacted to, and how territorial concession can be made acceptable.
LilStars were positioned at many locations throughout the building that was to be used for a demonstration of portableroad. Initially, they were positioned on the floor. The whole building was used, basement to middle floor, excepting the top floor as my attire (not wearing a suit) did not grant me entry to that floor. I included the elevator and the second-floor bathroom in the deployment of the lilStar constellation.
The lilStar in the elevator lasted approximately 7 minutes after deployment, before it disappeared, ceasing to be detected by my radio receiver. It showed up eventually when the gallery manager brought it back to me. Apparently the delivery man felt that the object was suspicious, and asked that security react to the bomb in the elevator.
The operation of the building has a grammar, objects in the building have a place, violation of this has consequences. It was suggested by the gallery manager that they would stand a better chance of survival (and incur less wrath from building security) if they were off the floor. He suggested pedestals. At the same time that the pedestals contributed to the chances for their survival by keeping them out from underfoot, an air of authority could be lent by the pedestal, through its traditional interpretation as being the carrier of the revered object. All lilStars that were placed on pedestals survived the show.
The protection afforded by the pedestal is more than physical. It protects the objects it holds from interpretation as competitors for territory. It protects a realistically created system (the lilStar constellation) – which is made in response to the topologies which exist in a space at a time, from being interpreted as such. Offenses are wrapped in compatibility. Without the cover, they are dangerous, with it they are acceptable.

Portableroad as a post-modern artifact

In the most obvious instance, portableroad overlays the modern world. It functions in reaction to it, by

reflecting symbols from it. In this way it is secondary to the modern world. Also obvious, is that modern technologies enabled the construction of the devices which comprise the portableroad system. This post-modern behavior, however, is circumstantial; portableroad can function by reflecting off any world - a post-modern, a pre-modern, a virtual world, a simulated world. As a portable system, it travels between eras well, as the material which it can use to exhibit its behaviors can be varied.
Its communication can be varied, its reaction to contexts can be varied. As it reacts to location, it can be a geographic information system, in other instances it can be a political tool, a communication tool, and a token allowing for social and other types of grouping, To build a reality from a design is the agenda of Architecture. Portableroad is accelerated architecture. At heart, it is a structure which manifests itself over top of things it encounters. Portableroad begins symbolically, from ideas, and realizes itself through the presentation of the symbol, and the acquisition of territory as the symbol is placed. Portableroad programs space as it manipulates the information available from objects and so forms interpretation.

the Duplication of symbols in space

From the perspective of the person who experiences the constant impact of projected images over all things that they visually experience, the projected images are more constant than the physical environment. In the same way that the impression of one's own existence is made by ensuring the continuance of the person while other experienced things are intermittent (and always are experienced to be less present than the self) those perceived elements which are more constant and more apparent become more reliable, and more integrated into one's life, and become environmental, and real.
".. the two WTC towers, perfect parallelepipeds a 1/4-mile high on a square base, perfectly balanced and blind communicating vessels. The fact that there are two of them signifies the end of all competition, the end of all original reference. Paradoxically, if there were only one, the monopoly would not be incarnated, because we have seen how it stabilizes on a duel form. For the sign to be pure, it has to duplicate itself: it is the duplication of the sign which destroys its meaning. This is what Andy Warhol demonstrates
also ..."(Baudrillard:1983, p137).
Symbols can be duplicated infinitely over real objects by portableroad at no cost to it in material resources. For this reason, it has mastery over the symbolic domain, and some control over the interpretation of the built environment, the landscape and the object. The replication of symbols over objects, from

the perspective of the object, changes the meaning of the object. From the perspective of the symbol, its own meaning is is extended.

" ... *C'est désormais la carte qui précède le territoire --- précession des simulacres --, c'est elle qui engendre le territoire et s'il fallait reprendre la fable, s'est aujourd'hui le territoire dont les lambeaux pourrissent lentement sur l'étendue de la carte. C'est le réel, et non la carte, dont des vestiges subsistent ça et là ...*"

" ... it is the map that precedes the territory -- precession of simulacra-- it is the map that engenders the territory and if we were to revive the fable today, it would be the territory who's shreds are slowly rotting across the map. It is the real, and not the map, who's vestiges subsist here and there ..." (Baudrillard:1981, p10).

Portableroad is a subsidiary of the current reality, it can act as the map so detailed that it covers the world that it maps, its storage capacity is unlimited when it is connected to the internet. But it does not statically group territory; as the map is made it must carve some area of the universe out to store itself as a map. It implements the wearer's world over-top of everything else. It constructs a permanent, "artificial" reality, only for the wearer. Portableroad temporarily implements itself over the world, remaining constant for the wearer, but being temporary and fleeting for everyone else. Beginning with the symbol, portableroad constructs a new real over top of locations, making its own places.

"in the postmodern society, reversed, such that the signifier, the image, the symbol, icon, and index, precedes the signified ... " (Raizman:1998).

A distinction in the degree of communication success allows the representation of portableroad's communication in the post-modern framework. Post-modernism shifts the burden of understanding; it becomes, "It doesn't make sense" instead of "I don't understand". It makes the burden of understanding portable and assignable, and so the value of understanding or having something become comprehensible can be negotiated, created, or assigned. Portableroad projects symbols from the perspective of the wearer, and so is (itself) responsible to the wearer in its communication of symbols. In a secondary capacity, its symbols can be presented to other people, interpreted by other people. To the degree that portableroad takes responsibility for communicating with fidelity, it is modern in its functioning. To the degree that it fails to communicate, it is postmodern.

Perhaps because the necessities are always in view, they dominate. It seems that post-modernism does not embrace the necessities of life, because it counts them to have the same value as non-essentials. Without necessarily having a relationship to more practical human

considerations like eating, or sleeping, or anyone's reality, portableroad can be based in post-modernism. These things are part of the modernist program, they are targets for the implementation of modern architectures. Portableroad takes on modernist programs in the form of attempting to have fidelity in communication, and by incorporating topics into its symbol library which are intimately related to modernist projects. Topics in its symbol library include the organization of nutrition and eating behavior, and the regulation of economic behavior, and locomotion. These symbols can be inserted into contexts to elicit behaviors from people.

"The outer world or physical reality (space, time, matter and their laws) is and remains an hypothesis" (Zanstra:1962)

In past systems, in other designs, possibilities had to be limited, because there was limited capacity to administer the profusion of successful modernity. As a reaction, profusion was limited because it could not be governed well; detailed information on the profusion could not be gathered and stored and acted up on well enough to allow the profusion to grow beyond whatever it historically was able to attain. Portableroad dynamically allows administration of the profusion of modernity, by labeling objects and locations, providing metadata on places, manipulating the meaning of objects through re-labeling them with new symbols.

How realism holds portableroad

Realism fails portableroad, and perhaps projects in general, when it is used as a social interface in a structured society. As a tool that is very helpful in the physical creation of devices that comprise portableroad, realism works. It interfaces to a universal superstructure governed by general principles (of engineering, science and so on) that do not react badly when called upon by disparate parts for unification into an acceptable system. The universe does not care when an area of engineering which creates a device integrates the device with an area of science that is incompatible with that area of engineering. The resulting device has no trouble working. In that case there is a common superstructure; the principles of the universe as it functions mechanically. In the construction of physical objects which are to perform a physical task, realism is a wonderful tool. One can put together most any component systems and with minimal modification, yield a new combined system.

"Just as the ice cube began getting smaller a new thing came into existence: a puddle of water" (Cortens:2002).

The success of realism as a context for the combination of things is dependent on the structure inside of which realism is operating. In the social domain,

realism works when the social structure allows the compatibility of components. Oftentimes, combination of components within a social structure is not permissible. This problem is generally solved in the theory world, by taking apart large things, so that compatible smaller things can be used acceptably. This strategy presents problems when the elements to be combined will not function as collections of (nonfunctional individually) components. Object-level conceptualization of the project works only so well. “If we can trace a continuous path from the whole tree to the tree minus one twig, then we can surely go on from that point to trace a continuous path to the tree minus two twigs; and then eventually ...” (Hirsh:1976, p12), eventually there is no tree. In real life, at some critical point, the tree's internal structure is incapable of determining itself to be a tree, and it dies. Cutting working systems apart results in destruction of the system at some threshold.

Portableroad can fail to be modern

'Post-modernity is not an epoch, but the ceaseless refusal, from within modernity, to silence and forget what can not be represented and remembered within modernity' (Doel:1999, p69)

In diligence, in the construction of representation of some things, in attempting to remove the observer from the equation, modernism encountered non-digestible things. Modernism reacted to that which can be understood through modernist methods. The incomprehensible, non-modernist things were tossed out of modernism. Modernism's "denial or effacement” (Clarke:2006, p119) of these things saved them from interpretation through a machine that could not interpret them. Post-modernism then got to work picking up the incomprehensible that modernism abstained from, and declared them sovereign territory. A world of symbols which build reality is post-modern; having exhausted the first real world, we construct another on it by the abbreviation of some areas and the extension of others.
Systems which are incapable of administrating profusion can not create post-modern places because they never reach modernity. Following from this, portableroad becomes post-modern, itself, only when it passes through modernity. Poor administration never creates post-modernism because it creates dirth, not profusion. Poorly addressing profusion results in perpetuation of modernism. A successful portableroad is a postmodern portableroad. It must be able to communicate successfully, after that, it may or may not do so, but it must be capable of doing so.

Finding a home

Portableroad as a device, benefits from the employment of realism, however, in portableroad's interface with social worlds, realism fails it. Social worlds evaluate it suspiciously as its strategies for the use of territory are incompatible with established strategies. It can not survive without an architecture, and can not survive through realism alone. The advent of modernism made attractive the construction of systems which facilitated transportation, communication of information and ease of storage and retrieval of things, people, ideas, and events. The systems that were created in the period of modernism allowed post-modernism. Those systems which allowed the structuring of profusion, so that it could exist (or not exist) as addressable, reachable places, allowed for post-modernism, which is what happens when one lives in the profusion allowed by the maturation of modernist systems. Portableroad can behave in a modern fashion, cataloging locations and applying identifiers to places. Portableroad is a system for addressing space. It is the culmination of modernity, as it is an ordering system for objects and locations. It is a post-modern system, as it addresses the complexity of a modern world. It is an abstraction mechanism which is permanent enough to re-generate reality through symbol placement.

Post-modernism comes from, results from, the profusion of objects, ideas, people, and everything, that we live in when we live in cities or other places where over-stimulation occurs. Portableroad's relationship with post-modernism is comfortable, as the post-modern theory is able to describe a place for portableroad which can support its existence, and situate its success or failure.