SIGGRAPH2009 ORWATION AESTHETIGS SHOWGASE

Victoria Szabo Duke University

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INFORMATION AESTHETICS SHOWSASE JURY AND ASKNOWLEDGEMENTS

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SIGGRAPH 2009 INFORMATION AESTHETICS SHOWCASE INFORMATION INTRODUCTION

For over 35 years, the SIGGRAPH conference has been the premier venue for showcasing work in computer graphics and interactive techniques, and it has a long history of recognizing beauty in concert with technology. For SIGGRAPH 2009, the conference has developed Information Aesthetics: a new thematic area for talks and exhibitions.

The emergent field of information aesthetics combines a rich variety of technical and artistic disciplines. Designers and new media artists are joining scientific visualization, informatics, and medical imaging specialists to create purposive, predictive, and creative representations of information. SIGGRAPH 2009 is highlighting this field in recognition of the increasingly prominent role that information visualization and data graphics are assuming in our digitally mediated culture.

The 2009 Information Aesthetics Showcase includes 2D and 3D prints, interactive and presentational screen-based works, multimodal installation environments, and physical objects instantiating information. In keeping with this year's theme, Networking the Senses, the works shown here engage not only the visual, but also auditory, kinesthetic, and tactile modalities. The relationship to information expressed in these exemplary pieces ranges from straightforward visualization of data to fanciful re-invention and transformation of it.

Presenters include computational journalists, visual and material artists, biological and neuro-scientists, graphic designers, scientific visualization developers, historians, cultural theorists, and digital media center collaborators.

The Information Aesthetics theme extends beyond the exhibits themselves. Informal artists talks provide discussion opportunities to visitors in the gallery. In addition, within the main conference program we are hosting a formal, curated panel discussion on The State of Aesthetic Computing or Info-Aesthetics, as well as offering three practitioner-oriented developer talks. Finally, we are very pleased to welcome Steve Duenes, Graphics Editor from the New York Times, as one of this year's Keynote Speakers. His works remind us just why Information Aesthetics matters just as much in everyday life as it does in academe or industry.

It is our hope that by bringing this diverse community of innovators together at SIGGRAPH 2009 we can help establish connections that develop this interdisciplinary emergent community further within SIGGRAPH and beyond.

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24X7@PHL: Vectoring

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24X7ATPHL:Vectoring is an investigation into the novel usage of time-based animation software and procedural modeling as a method for visualizing time-based quantitative data via construction of a qualitative, two-dimensional rendering. Treated as an experiment that follows the most basic rules of time-lapse photography, 24X7ATPHL slows down and composites accumulated data on traffic (customer pickup and drop off) over seven days traffic at an international airport. The result not only notates the generations and changes in patterns, but also shows the beauty that can be found in data while unlocking the emergent potential for design. The second in the 24X7@PHL series, Vectoring is based on extraction of the resultant NURBS geometries as a methodology for understanding the specific conditions of movement created by the interaction of existing architecture and users, the results of which are currently being used to develop a new speculative masterplan for the international airport.

www.dis-section.com

A_B_ peace & terror etc. The computational aesthetics of love & hate

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A_B_ peace & terror etc. The computational aesthetics of love & hate blends world politics with the aesthetics of computational data to create a powerful, pertinent, and spellbinding view of the modern world. As an intriguing collection of data, A_B_ ... reveals the quantitative contribution each of the 192 member states of the United Nations has made toward peace and terror in the world. It is a functional information-design piece that uses computational aesthetic principles to compare complex and socially relevant data derived from researchers working in the field of geopolitics. The dual-sided overlay of the two graphs allows for a direct visual comparison of the peace and terror measures. The functional nature of the poster becomes poignantly relevant when one makes detailed comparisons among nations. Many of the results are quite surprising and stand in contrast to prevailing norms of collective national perception.

theluxuryofprotest.com



C-loc Software

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In recent years, geographic information systems (GIS) for consumers (Google Maps and Google Earth, for example) have become very popular, and many people enjoy collecting and editing memories using those media. These systems are well designed to visualize diverse geographical data, but they can not present geographical and chronological information at the same time. Some GIS systems have a chronological function, but only as animation.

C-loc Software offers a new way to visualize time and space using a time layer-scheme and interactive three-dimensional graphics. It is suitable for people who want to investigate the relationship between the geographical and chronological information of archeology, ethnology, and history such as an archive of earthen vessels. An editor can import chronological maps and define year, month, day, hour, minute, and second. Any type of map can be used, depending on the editor's purpose. Time's arrow goes from the bottom to the top of the interface. It is the layer of time.

Objects can be created and categorized. Text, image, sound, or movies are registered as objects, and the size, color, and alpha of the object is customized. In addition, lines that connect objects in the same category can be customized as well. The position of the camera is registered as a button. Pressing the button moves the camera to a target point. Furthermore, there is a function for importing and exporting a CSV file so that an existing database can be easily converted into data for C-loc Software. In addition, GPS data can be imported into the software. If users' photos include location data (for example, latitude, longitude, and time) as EXIF data, those photos are automatically imported and placed in C-loc Software.

r-dimension.xsrv.jp/projects_e/cloc



Cultural Analytics Research Environment

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Our team of specialists in visual arts, communication, cognitive science, and structural engineering produces interactive visualizations of cultural flows, patterns, and relationships based on analysis of large sets of data comparable in size to datasets used in sciences.

Contemporary science increasingly relies on computer-based analysis and visualization of large datasets and data flows. The availability of large cultural datasets (through the web and digitization efforts by museums and libraries) and tools already employed in the sciences to analyze big datasets makes feasible a new methodology for the study of cultural processes and artifacts. Whereas humanities specialists have typically relied on manual analysis of a small number of cultural objects, we can now create information visualizations of large cultural datasets to discover patterns that have not been visible previously. We believe that we can make field-defining progress in this area by bringing together people who study and create digital cultural artifacts, people who study distributed human cognition, and people who are developing computational tools for analysis, display, and interaction with large datasets.

Our team creates new kinds of multi-modal interfaces appropriate for the study and experience of large sets of cultural artifacts in different media. We will also combine the visualization techniques normally used in science with the techniques developed in digital design and new-media art. The practical outcome of our research is the Cultural Analytics Research Environment, an open platform that supports analysis of different types of visual and media data and a variety of visualization and mapping techniques. We believe that such visualization environments will be used by social scientists and cultural theorists, students in art history, media studies, and communication studies classes; museum visitors; and cultural creators who want to better understand how their work fits within a larger context.

lab.softwarestudies.com/2008/05/visualizing-cultural-patterns.html

decibel 151

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What happens if you become the search engine? If your participation creates the content? If by entering a space you become the entry?

Inspired by Ray Bradbury's Fahrenheit 451, decibel 151 uses spatial audio technology and ideas of social networking to turn individuals into "walking soundtracks".

decibel 151 creates a virtual reality environment where participants physically move around each other in a shared real space as they listen to a shared virtual space. The virtual space creates a community of listeners and an interactive way to explore a collection of music.

Upon entering the physical/virtual space, each participant is assigned a specific music track in the virtual space; when they move, other participants hear their song move. Participants do not hear their own songs, but they can hear the other participants's song moving in the space in surround sound. Each participant can move freely and explore the space and the songs representing other participants. As they move and explore, they are tracked, and their graphical "ghost images" are positioned within a projected interface with metadata attached, giving information about each musical track. The use of recordings of folk music collected by Alan Lomax in the southern United States geographically anchors the experience.

The interface runs simultaneously on the internet, allowing participants to enter the space online and contribute to the virtual experience. The online interface can generate environments for music recommendations on social networking sites, where members enter the virtual space in order to hear what other participants are listening to at that moment and instantly capture the zeitgeist.

Height Restriction

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Information visualization affords us the opportunity to view subjects in a way that is not possible by a 1:1 interpretation, with new toolsets and techniques providing a springboard for discovereing new and emergent patterns that are not visible to the naked eye.

This work uses techniques in procedural modeling to visualize the density of tall buildings in central Philadelphia, Pennsylvania. The rules for the work's execution are simple: Notate the heights of existing buildings within the limits of Center City Philadelphia using procedural modeling to quickly reach an analytical result. While this is possible with more conventional analog means, the use of procedural modeling (specifically the Grasshopper plug-in for Rhinoceros) allows quick and precise visualization of large fields of data. In this case, 24,000+ circles are used to notate the building heights of Center City on a block-by-block basis, using "distance" and "division" objects to generate a field of generic circles, one field for each building, each building "field" composited one atop the other. The emergent patterns formed by densities and gradients begin to notate gaps in building heights while providing information on potential locations for new large structures.

www.dis-section.com

I'm not there: extending the range of human senses to benefit wildlife corridors

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How many experiences do we miss – either through inattention or our own limitations – when walking through the woods or diving with scuba mask and flippers? All around us, animals communicate and perceive with senses quite different from our own that have evolved from particular needs. Just as humans have employed technology to overcome limitations of physical strength, dexterity, and distance, so can we imagine technologies that enable us to extend our senses by taking cues from birds, whales, and other animals.

In an immersive environment, users experience extended senses of sight, sound, and locomotion in ways normally perceived only by other animals. This is a prototype for a real-time project that provides freedom to roam through remote places with enhanced senses and, as a result, benefit wildlife corridors around the world. It uses scientific research as the basis for a study that will ultimately result in a real-time application.

In the prototype, the user embodies the creature and experiences the world through a simulation of the creature's audio, visual, and spatial sensations. Audio is manipulated to give a representation of the sensation experienced by the creature. Visual information is analyzed and re-represented to perceive spectra outside human range. Navigation through the world mimics the locomotion of specific creatures (flying, climbing, or swimming, for example). The project explores fundamental questions about our own mental, physiological, and technical interpretations. For example, it's possible to imagine sound translated from beyond the ear's frequency range, but what would it be like to sense electrical fields like a shark?

The motivation for our study is a wish to encourage empathy with and curiosity about other species, the environment, and our place within it. Our larger ambition is to build an interactive real-time, global "nature channel".

The Katrina Project: NO-LA

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Spring 2006 Print Class of W.H. Lucas

UCLA Center for Community Partnerships The Katrina Project: NO-LA involves collaborators from art, design, behavioral science, journalism, and community outreach. A database-driven, activist web site explores the psychological and social effects of the storm and its aftermath through interviews with, and works by various artists in New Orleans and Los Angeles.

The Katrina Project was initiated immediately after the Katrina disaster by Kenneth Wells, professor-in-residence of Psychiatry and Biobehavioral Sciences at the University of California, Los Angeles, who studies environmental effects on mental health. He approached Victoria Vesna, then chair of UCLA Design | Media Arts to help devise a communication system that would prepare victims for the psychological impact of the storm. She turned to Henri Lucas, an activist designer who teaches in the department and led a class of student researchers for this project. After a few permutations, the project reoriented to look at the connection between Lousiana and Los Angeles, with a focus on the creative community that works on raising consciousness around issues raised by this tragedy. The team was joined by Claess Andersson, a reporter for NPR who conducted a series of interviews with filmmakers, artists, dancers, musicians, architects, and cooks, including filmmaker Wendy Gary Berman, film director Laura Beesley, and Sam Durant, artist and co-founder of Transforma, who worked with local organizations in New Orleans. The web site extends beyond Los Angeles to become a database of works by moviemakers, photographers, and others in the creative community. It is designed by media artist Jay Jiacong.

http://artsci.ucla.edu/katrina



Landmark Status

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Travelers and dwellers often use landmarks to navigate within an environment. In the planometric mapping of landmark prominence, emergent patterns and networks articulate not only existing situations, but also future connections.

This study seeks to expose the virtual network connections of visual landmark buildings within Center City Philadelphia through a process of NURBS Surface "pulling" and "contouring", extracting the resultant information to display emergent patterns of tall building development and unlocking potentials in the locations of new tall buildings in such a way as to form a more cohesive network.

www.dis-section.com

The MBTI Map

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The MBTI Map represents relationships among the words that describe people's personalities using the methodology of knowledge visualization and a subway map as a metaphor.

MBTI (Myers-Briggs Type Indicator) is a questionnaire designed to identify certain types of personality characteristics. A total of 16 types can be identified by the test. This project proposes the MBTI Map as a way to signify relationships among the words that describe people's personalities. We asked a sample of 80 individuals to rank the degree of closeness between a dyadic pair of words, to determine how these concepts are congruently clustered together. The result showed that a total of 39 representative words were extracted from 161 words that are used in describing personal characteristics in the 16 MBTI types. We also obtained distances among 39 representative words through the MDS (Multi-Dimensional Scaling) method.

The visualization represents the relationships among the 39 representative words and 16 types of personalities. The "subway lines" indicate 16 MBTI personality types. All "stations" are arranged based on the semantic distance from the MDS analysis. The x-axis represents warm to cool, and the y-axis dynamic to quiet. In addition, 161 words used to describe personalities in the MBTI are hierarchically arranged at the outer circle.

The MBTI Map helps viewers intuitively understand the overall picture of cluster relationships by minimizing the repetition of colors and intersecting points of connection among words.

design.ajou.ac.kr/~thembtimap



The MBTI Map

Visualization of personality Relation by Integrated Design Laboratory, AUOU University

The MBTI map represents relationship among the words that describe people's personalities using the methodology of knowledge visualization and it conceptualizes the subway line as a metaphor.

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MSNBC Hurricane Tracker

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Stamen Design worked with MSNBC and Hurricane Mapping to bring hurricane tracking data from the National Hurricane Center to a larger audience in an interactive, visual form. The data include the past, present, and forecast location of the storm; contours for areas affected by high wind speeds; and the probability of hurricane-force winds throughout the United States.

An introductory animation shows the progression of the storm with an animated hurricane icon moving at a speed proportional to the ground speed of the hurricane. The animation is dynamically generated using the latest hurricane data – a significant improvement on early online hurricane maps, which were either static or generated by hand.

The hurricane data are presented in both chart and map form, and the chart and map are linked interactively so that using the mouse to explore the chart highlights the appropriate area on the map, and vice-versa. This original approach ensures a closer understanding of the relationship between the chart and the map, reinforced by the introductory animation.

The map itself was desaturated and inverted to give a solid dark background to the data, an unusual approach for online maps. The hurricane path and contour data were colored by the strength of winds, with point positions using the standard Saffir Simpson scale and windspeed contours using solid and textured fills to indicate the difference between known and predicted information.

Stamen's approach was ultimately focused on bringing together two commodity data layers, Microsoft's Virtual Earth and the NHC storm tracking data, and making them appropriate and useful in a web context. There are many credible alternatives online, but this unique approach produced a map that is informative, timely, and visually appealing.

hurricanetracker.msnbc.com/

Multiscale Meta Shape Grammar Objects for "...a grain of sand turns the balance" and ATLAS in silico

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This aesthetically impelled work explores the use of dimensional glyphs generated by a custom meta-shape grammar algorithm to visually differentiate individual records from a massive meta-genomics dataset comprised of 17.4 million sequences and place them in a human context to reflect on the digitization of nature and culture. The Global Ocean Sampling Expedition, conducted by the J. Craig Venter Institute, studies genetics of communities of marine microorganisms throughout the world's oceans, which sequester carbon from the atmosphere with potentially significant effects on global climate. The vast dataset contains DNA sequences, 17.4 million associated, predicted amino-acid sequences called ORFs (Open Reading Frames) along with a series of metadata descriptors.

These images and sculptures are a subset of a vast aesthetically impelled in silico atlas. They were created as part of an artscience collaboration developing ATLAS in silico, an interactive installation where they take on different forms to function as scalable interactive data objects within a virtual environment. Two-dimensional projections of the scalable interactive objects are combined with a second distinct format that places each algorithmic object in the role of natural specimen. The result is presented in stylistic conventions that illustrate linkages between art and science in the 19th century.

News Knitter

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News Knitter materializes ephemeral online data through wearable garments. Large-scale data gathered from online political news is used as a source to generate patterns for a fully computerized knitting machine. Knitting, a very conventional mode of physical production, is preferred as a medium to embody digital information and to produce daily, wearable, washable sweaters. Digital bits are transformed into physical stitches and the information is visualized through three-dimensional, tactile, personal belongings. News Knitter proposes an innovative workflow and production pipeline as an alternative for the common methods of fabrication of knitted garments. It translates the individual design process of patterning into a worldwide collaboration by utilizing live data streams as a source for pattern generation. Due to the dynamic nature of live data streams, the elements of worldwide participation and unpredictability are introduced into the design process. Situated at the intersection of digital data visualization and analog knitting, News Knitter offers a fresh insight to new modes of industrial production. It brings two controversial concepts, unique design and mass production, into discussion.

casualdata.com/newsknitter/

Oakland Crimespotting

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Tom Carden Stamen Design



Oakland Crimespotting is a research project of Stamen Design developed as a response to the existing Oakland, California Police Department crime-reporting application, CrimeWatch. It is an instance of the now-familiar "mashup", an online application derived from multiple input data sources. Many works in this genre stop at placing colored pins on a map, but we looked at ways to expand the typical functionality of the ubiquitous crime map to make it more useful for local citizens. As with many projects, Crimespotting didn't start with a concrete goal in mind; it was born out of frustration, matured through basic technical research, and finally made public after a traumatic crime in Oakland focused national attention on the city.

We paid special attention to the ways in which such data can be more web resident, by providing every view, list, police beat, and individual report with its own permanent URL. Locally useful information of the kind published through Crimespotting is a form of community property and must be available for linking and conversation in order to be optimally useful to the population affected by the data.

As the project has matured since its launch in September 2007, we have expanded it into newer forms of data representation. Individual policebeat pages were added in 2008 after feedback from our users suggested that these administrative boundaries were an important point of communication with the police department. Currently, we're extending the beat pages with maps that we believe address critical shortcomings in existing implementations of the concept.

oakland.crimespotting.org/

OpenStreetMap 2008: A Year of Edits

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OpenStreetMap is a wiki-style map of the world. In this animation, each time a feature is entered or updated it flashes white and then decays through yellow and red to purple. Some edits are a result of a physical local survey by a contributor with a GPS unit and a notepa. Other edits are done remotely using aerial photography or out-of-copyright maps. Large areas of simultaneous edits are the result of bulk imports of official or donated commercial data.

OpenStreetMap started in 2004, and the rate of contributions is accelerating. Four times more people contributed to the project in 2008 compared to 2007. During the year, edits were made by over 20,000 individuals, and there were bulk imports of data for many places, including the USA, India, Italy, and Belarus, which are clearly visible in the animation.

The goal of this animation was to show how the OpenStreepMap community had become truly global from its roots in the United Kingdom. It was designed to celebrate the combined work of the community, most of whom are working on a much smaller scale.

www.itoworld.com

Out of Statistics: Beyond Legal

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West Virginia

With an aesthetic approach, Out of Statistics: Beyond Legal produces a series of abstract drawings based on US crime statistics as archival-ink digital prints on rice paper. Each image represents the crime status in one of the states, with the seven most significant crime-conviction statistics of each state embedded.

In order to bring a fine-art quality and a natural, hand-drawn feel into the data visualization, the artists developed an algorithm based on their experience and analysis of experimental drawings. The algorithm was implemented using Python programming and SVG (Scalable Vector Graphics). As demonstrated in the legend of this work, each type of crime is mapped to a unique drawing stroke. Images are then created using these patterns, following a set of composition rules defined by the artists. The visual style of the project is influenced by Minimalism and traditional Asian art. Rice paper was chosen as the medium because its delicate texture and translucent quality can add grace to the images.

The images can be viewed and judged solely as abstract artworks and still serve the function of visualization. Decoding the embedded information would then become an optional and additional interesting experience that viewers may potentially find rewarding. An observant viewer may discover that the interplay of black and white reflects the density of unlawful incidents in a particular state. Darker areas of the image represent places with more crimes.

This project attempts to raise awareness of the current social conditions in each US state. Paradoxically, it visualizes crime-related data as elegant compositions and visually pleasing images. In this way, it questions the impact of data visualization on human perception of information.

floatingcube.org/beyondlegal/

Passing "Place for Games"

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Passing "Place for Games" visualizes the world famous Kizhi site as high-resolution 3D environment. The goal of this project is to create a virtual prototype of the current state of Kizhi wooden architecture. Kizhi museum preserves a concentration of masterpieces of the Russian heritage and protected by World Heritage List of UNESCO. It is located on an island in Lake Onega in northern Karelia in Russia. Word "kizhi" is translated from Karelian as "a place for games". In ancient times people gathered here and performed their religious rituals. The visualization reconstructs the original architecture of Kizhi island based on the detailed photographs, architectural and geometric measurements, textural data and video surveys taken during the visit of Kizhi as well as geometric analysis of the surviving structure. The project strives to advance the development of historical restoration in an artistic direction. It is being developed using latest concepts in real-time graphics, including complex illumination with dynamic irradiance environment mapping, shadow mapping, and complex materials containing normal and gloss mapping.

Rhythm Analysis; A Temporal Stereopsis of Urban Telecommunication Data Topography

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This inspirational installation reveals a stereoscopic representation of temporal and spatial telecommunication data, an urban communication indicator of everyday life, for 24 hours in a central area of Seoul, created by "transparent LED display sheets" of conductive carbon nanotubes.

We live in electronic surroundings that are invisible and intangible, though they are very powerfully influential in our lives. Communicative devices such as mobile phones are becoming more and more dependent on digital technology. This urban telecom data visualization in stereoscopic displays on layered, transparent LED sheets reflects data changes hour after hour, so we can recognize telecommunication transitions in urban space over time, which makes it possible to deduce the rhythm in everyday life. In addition, this urban telecom datascape conveys an inspirational insight on a new cognitive communication domain in urban space.

By adopting one of the most notable and futuristic high-tech inventions, this combination of conceptual design and advanced technology suggests the future direction of cross-disciplinary work.

The Sky Oracle: Immersive Flowchart Representation for the Annexation of Tibet

Paul Fishwick Julie Henderson Elinore Fresh Rasha Kamhawi Amy Jo Coffey University of Florida **Benjamin Hamilton** SAIC Corporation



The Sky Oracle on the University of Florida's Second China Island in Second Life applies an interactive, immersive aesthetic to the representation of structured information in the form of a controlflow diagram (a representation of both information and software). The diagram captures two different time periods in the history of Tibetan annexation, with a two-way branch flow indicating two different perspectives labeled Chinese vs. US. An example of aesthetic computing, this "walk-through" flowchart presents a novel approach for interacting with behavioral information by combining a sense of audio, and visual presence to explore the concept of cognitive dissonance.

What are the effects of interacting with software in this way? Can flow charts be effective in presentation of complex news stories or public affairs issues? We are in the planning stages of a humansubject experiment along the lines of a channel study where modes of information delivery are compared and contrasted to see what benefits emerge from each form of representation.

STOC (Stock Ticker Orbital Comparison)

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STOC is an interactive data visualization, using the metaphor of a planetary system, that maps parameters of stocks in the S&P 500 to animated visual outputs. Existing methods for displaying large amounts of stock-market data do not easily allow comparison between companies, as the data are often presented in tabular format. Some solutions implement a price-over-time graph, with the option of layering on additional stocks or market indices for comparison. STOC allows immediate comparison of hundreds or thousands of stocks, by mapping various stock-specific parameters (such as price percent change, earnings per share, volume, market capitalization, dividend yield, moving average, and comparison to the group average) to easily observable visual outputs (such as size, color, opacity, stroke width, satellite size, orbital distance, orbital direction, and speed).

This visualization is particularly suited for comparisons between items, as users can immediately identify the largest, or reddest, or quickest item in the group. Users control the overall speed, zoom level, and clustering, and they can extract parametric details for each individual element in the group. This system is not limited to displaying stock-market data, and could be used in a wide range of statistical visualizations. For example, one could visualize the parameters of students in a university (such as grade-point average, credit completion rate, total credits, and student account balance) or the parameters of daily weather (daily temperature range, relative humidity, wind speed, precipitation, and comparison to record highs and lows).

Synchronous Objects for One Flat Thing, reproduced

Cue visualization

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Synchronous Objects for One Flat Thing, reproduced is an interactive screen-based work developed by The Ohio State University's Advanced Computing Center for the Arts and Design and the Department of Dance in collaboration with renowned choreographer William Forsythe. Pivoting on Forsythe's masterwork of visual complexity, One Flat Thing, reproduced (OFTr), the Synchronous Objects project seeks to enrich cross-disciplinary investigation and creativity by revealing deep structures of choreographic thinking through a vivid collection of information objects in the form of 3D computer animation, annotation, and interactive graphics.

Though dance is notoriously difficult to capture and document, Forsythe challenged our research group to develop a new kind of generative dance "literature" to stimulate the exchange of ideas and innovation in a wide range of disciplines. His choreography in OFTr is particularly exciting to analyze, due to the challenges it poses for visualizing a high density of interdependent relationships distributed across a network of 17 dancers navigating a landscape of a 20-table grid and resulting in a contrapuntal dance composition.

Co-creative directors Maria Palazzi and Norah Zuniga Shaw gathered a multidisciplinary team of researchers from architecture, cognitive science, computer science, dance, design, geography, philosophy, and statistics to apply and crosspollinate their disciplinary visualization methodologies in examining Forsythe's strategies. The research involved extensive work with The Forsythe Company to systematically analyze the material and systems of exchange that make up OFTr. As we parsed the dance into its hundreds of component parts, we were challenged to determine means of quantifying these data, using them to drive concrete and abstract interpretations, transformations, derivations, and interactive creative tools.

This work underscores the profound possibilities in collaborations between major artists and interdisciplinary research teams using innovative and interpretive information-visualization methods in making meaningful visual literatures that have relevance in contemporary society.

Touch the Invisibles

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Eisuke Kusachi Hideyuki Ando Osaka University



This novel interface superimposes tactile information onto the images displayed on a computer monitor (see also Ando et al., SIGGRAPH 2002 Emerging Technologies). A small vibrator is attached to a user's fingenail, and when a vibration is presented during a finger movement, the vibration can be perceived as the stimulus from a finger pad, instead of a stimulus from the nail. This illusory percept of tactile information is the basis of this interface technology.

The vibrator is attached to user's nail with double sticky tape. The timing and magnitude of the vibration are controlled based on the position of the finger measured with the touch sensor of an LCD panel. When the user rubs an image, tactile feedbacks is presented. With this interface technology, any kind of visual image can be displayed with real-time tactile feedback. We used it to produce an artwork on the subject of how humans perceive the real and digital worlds through the sense of touch.

In Touch the Invisibles, invisible Lilliputians are muddling on the computer monitor. When the user's finger encounters the invisible Lilliputians, vibrations are presented to the nail, and tactile information indicating an encounter is generated. The user cannot see the invisible Lilliputians but can touch them. On the other hand, the user cannot touch visible Lilliputians. The Lilliputians live in the area where modalities of human senses are partly separated. This artwork enables users to feel the association and dissociation of the two modalities, and demonstrates an application of haptic interfaces to art and entertainment.

www.junji.org/invisibles/

Towards the Memory Tower

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This digital installation explores the role of oscillatory brain-network states in memory consolidation. The aim of the work is to reconnect the science of the brain with the experiences that the brain engenders and to communicate complex neuroscientific understanding in a meaningful and stimulating way to non-experts.

At the center of the installation is a single memory encoded within the cortex. It takes the form of a highly ornate and fragmented tower in the process of being bound into a single, unified entity (consolidated). This memory is embedded within a framework of rhythmically positioned towers designed to represent specific types of oscillatory brain activity and timing functions. Individual components of the tower are held together through "ties" that connect them to specific oscillatory phenomena during SWS. This reflects the input from a structure called the hippocampus, which serves an "indexing role" for the new memory as it is consolidated. These SWS oscillatory states are represented as the two outer rings of towers in the installation.

Also embedded within this network are related, but older memories. Each expresses a specific architectural form that shares strong visual commonality with the central tower. These memories are more or less fully consolidated, so they do not require indexing through other structures and are sufficiently bound together to form a perceptual whole. By varying the forms of these previously consolidated memories, different types of memory processes are modeled; towers, for example, may represent episodic-like events (information bound together as an episode), while horizontally orientated buildings capture events that occur in time (procedural or sequential memory). As the new memory is being consolidated,

a number of changes within the memory space occur, and these are reflected within the installation. Firstly, the central tower becomes bound to, or interleaved between, older memories, dictated by the similarities between architectural elements of the different structures. Secondly, and through this earlier process,

a new mnemonic context is created for the older memories, one that renders them labile and drives new forms of connectivity between them.

Visual Genealogy: Mr. PARK, Myrang-Hwarok Clan

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Gyuwan Choe Chung-Ang University



A human life is not generated spontaneously; our existence is a random combination of hazy vestiges of our ancestors. The idea behind this artwork is to compress half a millennium of data about people's lives into a single computer-generated image. Visual Genealogy shows the family tree of Mr. Park (Myrang clan, hwarok party) and reveals the cognitive meanings of a complex dataset (in this case, the data are life and death).

Information visualization is an interdisciplinary field that combines topics such as computer graphics and user-interface design into a cognitively plausible way of presenting information to enhance understanding. The Korean family tree, called a Jokbo, provides a unique theme for visualization study. In addition to the usual problems of information visualization, it requires display of a large database (sometimes containing over a million records). This artwork can be seen as a successful application of techniques for intuitive understanding of large datasets.

The brightest node in this family tree, right in the center of the image, is one of Mr. Park's ancestors who lived about 500 years ago. And Mr. Park himself is located at the very bottom of the picture. His grandfather and 20 generations of other descendants may never have read the Biblical sentence: "I will surely bless you and make your descendants as numerous as the stars in the sky and as the sand on the seashore." But the ancestor at the root of this family tree would surely be glad to know that 27,404 sons and grandsons (stars) sharing his surname lived after him in his world.

A preliminary form of this artwork was shown in the SIGGRAPH 2007 Art Gallery. Since then, the visualization has been completely re-programmed with more data.

www.jinwanpark.com

VisualPoetry - Generative Graphic Design for Poetry on the Road

CONTACT Boris Mueller Fachhochschule Potsdam boris@esono.com



VisualPoetry generates poetic and abstract visual representations of poetry. It is unique. Few other design projects embrace the concepts of generative design over such a long period of time. The representations are used for graphic design of the literature festival Poetry on the Road in Bremen, Germany, where VisualPoetry has become an integral part of the festival itself.

The highly interdisciplinary approach and the strong link between the input (poems) and the output (visuals) is unusual. as it bridges the disciplines of design, computer science, and literature. While the basic concept of VisualPoetry is always the same, the visual strategies change every year. The 2003 version was based on the concept of a drawing machine controlled by the sequence of the letters in the poem. In 2005, text was used to generate organic, treelike structures. In 2006, the visual resembled an information visualization.

In the context of the design discipline, the achievement of VisualPoetry is that a specific idea is the center of the corporate identity and not a specific form.

www.esono.com/boris/projects/poetry06/

well-formed.eigenfactor: Visualizing Information Flow in Science

CONTACT

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well–formed.eigenfactor presents interactive visualizations to explore emerging patterns in scientific citation networks. The Eigenfactor project calculates a measure of importance for individual journals (the Eigenfactor score), measures citation flow, and creates a hierarchical clustering. Moritz Stefaner turns this information into a set of four information–aesthetic visualizations, each highlighting different aspects of the data.

In visualizations of citation networks, both ball–and-stick–like network representations and maps are prevalent. This project extends the visual vocabulary on the one hand, by re-purposing existing techniques, such as radial-edge bundling and treemaps, and on the other hand, by inventing novel approaches like magnetic pins as flow indicators and an "alluvial" diagram to represent change over time in cluster structures.

Citation patterns: a clean, yet organic radial network visualization that gives an overview of the whole citation graph. The radial-edge bundling technique effectively highlights the cluster structure and interdisciplinary citation links.

Change over time: This stacked bar-chart diagram displays changes in Eigenfactor score and clustering over time.

Clustering: Based on the squarified treemap layout algorithm, this visualization features "magnetic pins" to indicate both incoming and outgoing citation flow for any selected journal.

Map: This map visualization puts journals that frequently cite each other, closer together. You can drag the white magnification lens around to enlarge a part of the map for closer inspection.

Data: A subset of the citation data from Thomson Reuters' Journal Citation Reports 1997–2005. For the visualizations, 400 journals with their approximately 13,000 citation edges were selected, ensuring coverage of the top journals in each field.

well-formed.eigenfactor.org

Curated Panel Discussion: The State of Aesthetic Computing or Info-Aesthetics

Monday, August 3, 3:45-5:30pm

PANEL

Michael Kelly University of North Carolina at Charlotte mjkelly1@uncc.edu **Victoria Vesna** University of California, Los Angeles

Paul Fishwick University of Florida Andrew Vande Moere University of Sydney Kenneth Huff Savannah College of Art and Design



Aesthetic computing is one of several related new fields: info-aesthetics, database aesthetics, network aesthetics, and software aesthetics. What are their similarities and differences? What are the aesthetic issues driving them, and how are they linked to technological developments? And what exactly is the role of aesthetics is this context?

In Paul Fishwick's anthology, Aesthetic Computing, Roger Malina outlines two claims about aesthetic computing (art and aesthetics applied to computing, not the other direction): "The weak claim is that by stimulating the flow of ideas and methods from the arts to computing, computer scientists and engineers will achieve their objectives more easily, quickly, or elegantly." The strong claim is "that by introducing ideas and methods from art and design into computing, new practices and approaches will emerge, responding to new objectives that would not naturally have evolved within the computing sciences and engineering."

In defense of the strong claim, we will argue that aesthetic computing is not merely about symmetry, elegance, optimality, and other properties that enhance the usability of computing artifacts. Rather, aesthetic computing is critical thinking about the cognitive and affective interactions between humans and computers where these interactions are not only between humans and computers but among humans and are occasioned by some form of visualization (scientific, data, or knowledge visualization, game theory, or the like).

How are we to identify and understand the aesthetic dimensions of these interactions, especially in relation to the technical, ethical, and political values embedded in them? Who gets to make decisions about, and is thus responsible for, these interactions? The answers involve good design, but lead back to earlier computational decisions constraining and enabling design, and forward to issues of the social-political impact of these decisions. In addressing these questions, we also want to clarify how aesthetic computing relates to info-aesthetics (the symbiotic relationship between creative design and information visualization -Lev Manovich), database aesthetics (the backbone of databases driving the aesthetic of projects - Victoria Vesna), and network aesthetics (the production of connections between people and data - Warren Sack).

This Panel is supported by a kiosk in the Information Aesthetics Gallery, which includes The Sky Oracle and The Katrina Project: NO-LA.

Juried Panel: Information Aesthetics: Designing Interactions

Monday, August 3, 8:30-10:15am • Auditorium B

SESSION CHAIR Nicole Coleman Stanford University



well-formed.eigenfactor: Considerations in Design and Data Analysis

This talk discusses the rationale, process, and mechanisms behind the interactive visualizations for the well-formed.eigenfactor project.

Moritz Stefaner Fachhochschule Potsdam

Martin Rosvall Carl Bergstrom University of Washington, Seattle



Synchronous Objects for One Flat Thing, reproduced

Synchronous Objects is an interactive screenbased work that illuminates, reinterprets, and transforms the choreographic structures in William Forsythe's dance One Flat Thing, reproduced through a vivid collection of information objects designed by a team of multidisciplinary researchers at The Ohio State University.

Maria Palazzi Norah Zuniga Shaw The Ohio State University



GreenLite Dartmouth: Unplug or the Polar Bear Gets It

GreenLite Dartmouth visualizes complex, real-time energy data using interactive animations to create an emotional relationship between energy use and its effects. When electricity use is low, for example, a polar bear is happy and playful. As more energy is used, the bear becomes distressed, and his well-being is endangered.

Evan Tice Tim Tregubov Kate Schnippering Yoon-Ki Park Ray diCiaccio Max Friedman Jennifer Huang Justin Slick

Giulia Siccardo Jessica Glago Stephanie Trudeau Daniel Gobaud Daniel Garcia Craig Slagel Lorie Loeb Dartmouth College

Keynote Speaker: Steve Duenes, Graphics Director, New York Times



A Visual Response to the News

Steve Duenes Graphics Director, *New York Times*

Wednesday, 10:30 am-12:15 pm La Nouvelle Orleans Ballroom

Steve Duenes manages a staff of 30 journalists who work as a team to shape and deliver visual information by researching, writing, designing, and programming information graphics for both the printed newspaper and www.nytimes.com. His team has received awards from numerous organizations including the Society of Publication Designers, American Institute of Graphic Arts, Society for News Design, and the Society of Professional Journalists. He is also a member of the faculty at the School of Visual Arts in New York and contributing cartoonist for *The New Yorker*.