

# Subtract the Sky: mapping the database of a collaborative system

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## ABSTRACT

A demonstration of the database visualization and contribution interface for the *Subtract the Sky* – an online collaborative system designed to allow classifications, categories and associated data structures to emerge from the “bottom up” through collective usage.

## Categories and Subject Descriptors

H.5.4 [Information Interfaces and Presentation]: Hypertext/Hypermedia – *architectures, navigation, theory, user issues and J.5 [Arts and Humanities] - fine arts and E.1 [Data Structures] - graphs and networks*

## General Terms

Design, Human Factors, Theory.

## Keywords

Collaborative Systems, classification, emergence, mapping,

## 1. INTRODUCTION

*Subtract the Sky* takes its name from a method used in astronomy. Astronomers must eliminate the light of all the stars they do not wish to see in order to capture the light of a single star. Effectively, astronomers must define what “sky” means for every observation. In other words, there is no single meaning for “sky,” but many, given the perspective of the observer. To “subtract the sky” is to interpret data from a subjective perspective. Here, the phrase is used as a poetic metaphor for the process of collecting, authoring and contributing data.

## 2. PROJECT DESCRIPTION

*Subtract the Sky* is a collaborative system that employs the notion of “mapping” as an interaction metaphor, providing an on-line environment for collective and emergent methods of mapping. It is a tool for intersubjective communication, and self-representation.

*Subtract the Sky* invites participants to become cartographers, enabled with the tools they need to produce an archive of maps that trace their own histories and re-map their own social and political worlds. The definition of “map” in this context is inclusive across a broad spectrum, from geographical maps employing Geographical Information Systems (GIS) data and Global Positioning Systems (GPS) data to purely conceptual maps. In other words, maps contributed to the database need

not have any geographical reference but may be representations of concepts, emotional trajectories, political strategies, biological processes, historical traces, etc., ad infinitum. *Subtract the Sky* participants will map their worlds by contributing and classifying new data (images, texts and sounds), creating new categories and associations between data objects, and re-interpreting existing data using a real-time visualization of *Subtract the Sky*'s evolving database. This interface itself provides a map of the current state of the database that dynamically expresses changes made by participants collaborating across the network in real time.

To map is to locate, to delineate to assign a correspondence. A map fulfills the function of record and statement — it is a history of the subject, or mapper, in relation to that which is mapped and an act of communication with the other(s) who will interpret and use it. “We need maps not just to navigate but to define and control new territory,” said Martin Dodge, a researcher in the Center for Advanced Spatial Analysis at University College London. “Simply having a map allows a new perspective, a new way to orient yourself. Relationships otherwise obscure may be revealed.” Science fiction author Bruce Sterling, says that maps of cyberspace can alter our experience of the online world....“The best maps won't be true to our experience -- they will serve to refigure and change our experience. ...What makes the invisible visible? New metaphors, sometimes, but I'd be betting on better instrumentation. A picture of the Earth from space did more for environmental awareness than any number of ecological urban legends.”

Networks of any kind - made of molecules, Web links, or people - grow into similar hub-based structures. Such structures can be mapped as interconnected systems of nodes. The node system is both instrument and metaphor. The node system is a metonymy or trope both for that which it represents – a network structure - and the instrument (usually a java program) used to create the figure or visualization of a network. Node systems are networks used to map relations of data in networks. The open source project Touchgraph (<http://touchgraph.com>), which has been the basis for development of numerous online data-mapping systems is just one example of the kind of “better instrumentation” Sterling imagines. TouchGraph is a set of interfaces for node-graph Visualization. The TouchGraph visualization was used as a point of departure to develop an interactive data map, contribution interface and set of mapping tools for *Subtract the Sky*, an “instrument” or interface that can be used to, in Sterling's words, “refigure and change our experience, ...

mak[ing] the invisible visible". Participants use the node-graph interface to connect their images, texts and sounds to data contributed by others in order to collectively map, remap their worlds. The node system, "connects the dots" between the objects in a database and their contributors. It provides both metaphor and instrument. The code from Touchgraph was altered and further developed for *Subtract the Sky* by programmer John Jacobs. The interface fills the participant's screen, creating a complete desktop environment in which multiple windows may be opened simultaneously to view *Subtract the Sky's* database from a variety of perspectives including; an overview of contexts or categories that connect data objects, a view of image thumbnails and details returned from a keyword or category search of *Subtract the Sky* or the Internet (or both), a collection of data objects contributed, mapped and linked to the database by the individual participant (including weighted associations and maps created by connecting nodes into clusters), and a view of the network of participating contributors linked by associations established between the data objects they have contributed. The node cluster provides an intuitive, simple and consistent interface for un-initiated users. At every level of interaction a clusters of nodes, in which each node will open a new window when selected, provides access to tools and data. Simple forms for text input and sliders for navigation supplement this type of interaction, as necessary. Participants learn through exploration that they can create their own node clusters to build maps and associations between nodes dynamically by dragging the mouse from one node to another. The main "menu," a graph or node-cluster, is used to launch navigation tools (zoom, rotate and "sky" sliders used to customize the background and current view of the database) and the search tool. The search tool allows the participant to select or combine categories (contexts) and type in keywords (descriptions) then choose a source and display the 'map' returned either in the current window or in a new window. The map of search returns is a graph or node-cluster that displays thumbnails of images or icons for text and sound files in *Subtract the Sky's* database, and the titles of web pages returned by Google.

Participants may view this map from several different perspectives---through the filter of classification and categorization; by tracing connections in a map of the community of users or network of contributors or by creating a map or visualization of associations between nodes in the database for their own use that is tied to their own participant/contributor identity. Each node can be selected to open a detail window that contains an image text or sound along with the contributor's information and any keywords or descriptions added by the contributor. (Or, in the case of an Internet search, a link to the web page, which will open in a separate browser window when selected.) Participants may search the project database (or the Web) by category (contexts) or keyword (descriptions). They may add selected images, texts and sounds found in their search results to their personal view of the database then build maps by creating links between new data objects and/or connecting them to existing objects, keywords or categories. The participant's personal view of the database and the contribution sub-panel allow the participant to add an image, text or sound file with a description and label to her personal view. In the window that displays her personal view the participant can then create a map by connecting her own data objects to each other and

assigning relative "weights" to their various associations. She may add her nodes and node-sets to the collective map of the database by connecting her nodes to existing nodes in the database (images, texts, sounds and/or contexts). A new node or node set is added to the database when the contributor "drags and drops" a new connector from a new node to a context label or an existing node. Mapping in *Subtract the Sky*, which includes adding new data to an evolving database and creating new links and associations to existing data, is thus a collective and collaborative act.

The initial classification system, or list of possible "contexts", consists of highly contested terms such as *nature, culture, aesthetics, public, private*. It is my hope that the maps contributed under these categories and the keywords used to describe them will begin to inflect the meaning of the terms themselves and create new associations for them---relocating and re-mapping language, multi-vocally.

The network of participating contributors is visualized by another node-graph. Node labels display the login identity of each participant in the network. Connections between nodes express the relations between participants based on associations between the data objects they have contributed. Each node links to a "detail" window that gives information about the participant, her contributions and their detail views. The contributor network includes a synchronous communication space for direct communication and collaboration. Potential for synchronous communication is meant to enhance remote collaboration between participants with shared interests and intended to assist in building community.

*Subtract the Sky* is a tool. It is designed to give voice to communities and individuals on issues of relevance within their own social worlds. When development is complete, it will be available globally for users on-line but will also be employed in specific local contexts as a tool for constituencies who do not generally have access to communications technologies and whose voices are not heard in information space. Worlds should not be mapped using only the data available in the dominant, mainstream of culture. The field of data must be open to additions and reconfiguration from every perspective, without hierarchy or restriction. A map is always perspectival. It locates, but it is, itself, already located. Grassroots networks, non-profit organizations and disempowered, often technologically disenfranchised groups need a context, access to the field of data, and tools for developing collective and emergent methods of mapping and visualizing data---this is the premise underlying the development of *Subtract the Sky*.

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