

CityTagz: Collaborative Urban Archive

Mihai Peteu

USC School of Cinematic Arts
Los Angeles, CA 90089

mpeteu^ausc.edu

ABSTRACT

The relationship between geography, history and culture in the vast urban region of Los Angeles is explored through a practical, accessible, and expandable chrono-spatial visualization of its landmarks. CityTagz provides a means for residents of various ages to annotate and define their own communities through the identification of nearby resources. By uploading original media, providing spatial data, and contributing descriptive tags, participants provide a multidimensional dataset that can be queried and rearranged however they see fit.

Keywords

Collaborative resource mapping, geographic annotation, geotagging, spatial cognition, bionic software, mental maps, shared spaces.

1. INTRODUCTION

Textile factories become apartment complexes, movie theatres are used for church services, and decrepit newspaper office buildings are transformed into movie sets. For a city quick to erase its own past, CityTagz attempts to decipher and pass on its fragile identity.

Los Angeles is a city of many unofficial boroughs [1]. Depending on whom you ask, some may even omit some of the municipalities based on personal preference, bias, or sheer lack of knowledge. CityTagz attempts to assemble a visual narrative of this conurbation by studying the individual history of each sector. Since there are a multitude of placemark types that a landmark can be associated with, a flexible and consistent way to tag them must be introduced. Whether a user is adding information on Alvarado Street, the Chavez Ravine, the Civic Center or a renowned mural space, the experience will be similar.

CityTagz shifts the cartographic focus from numeric datasets to personal accounts of participants' surroundings. Furthermore, by allowing users to post various types of media (text, still image, video) this project introduces a new and more powerful way of tagging geographic locations. This project's main objectives are resource annotation, historical preservation, and enhancing spatial awareness.

Perhaps you have heard of a specific Los Angeles setting, and are eager to learn more about it. With CityTagz, you can either invest the time to travel to that place, gather media related to it, do some online research, and post a short blurb of your own. Or, you can simply tag that spot on the map for someone else to fill in the blanks later.

The most agreed-upon tags offer the best description of a certain landmark. Since new tags are continuously added by new

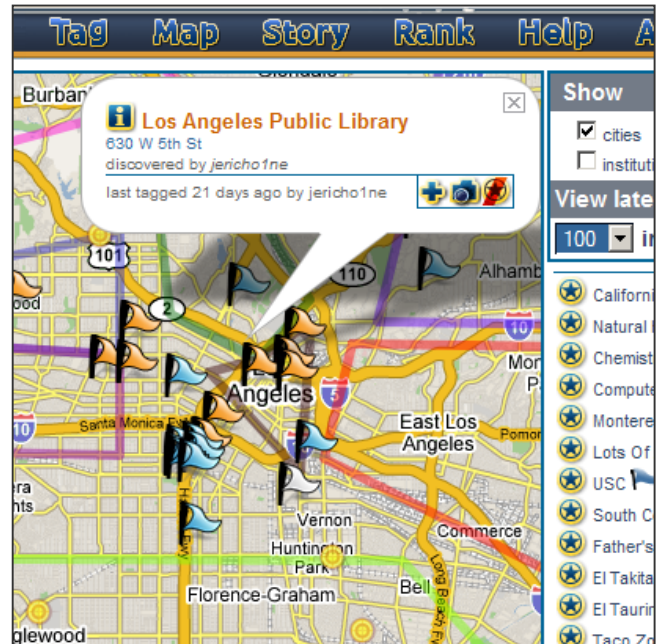


Figure 1 - Geographic annotation using GoogleMaps API

participants, this serves as a means to change the portrayal of a particular place.

2. PRIOR ART

A basic example of a user-maintained map of global resources is *Wikimapia* [7], which attempts to break down large scale maps into subsections before allowing the user to post new data. *Placepedia* takes this a step further by attempting to link every possible location on the globe with its related Wikipedia article.

The *Green Map System* [9] charts the natural and cultural environment in various cities across the globe while focusing on local interests. Another such example is a local PBS-sponsored project, *Rites of Passage* [6], exhibits Los Angeles area maps through children's eyes. The concerns and interests specific to this age group makes for a unique viewpoint. The freedom given to the participants allows for the creation of highly personalized mental maps of their neighborhoods.

Following this trend of empowering locals to illustrate their community, *London The Way We See It* [18] is a photoblog which encourages participants to collaboratively map areas of their city by submitting pictures and short descriptions of each place. Unfortunately, there is no visualization of this data, therefore there is no way of quantifying the volume of posts, where they originated from, or what areas of the city are most frequented. This project takes advantage of technological

permeation in today's society, as more of us own digital imaging



Figure 2 – Norman Klein's *Bleeding Through*

devices and have equal access to information.

Norman Klein's *Bleeding Through: Layers of Los Angeles* [12], recounts real-life stories that took place in the Downtown district in an elegant manner – the main fictional narrative is intertwined with seemingly congruent factoids related to Los Angeles history and culture. CityTagz emulates this style of storytelling by allowing individual participants to paint each locale based on their experiences.

Multiple well-established geovisualization tools exist: the Google and Yahoo Maps APIs (see Figure 1), which are web-based, and Google Earth and MSN Virtual Earth, which require the download of an installation package. Though their original intent was to facilitate transit, they have evolved into versatile “bring-your-own-dataset” authoring environments for data visualizations ranging from bike and run trails to mapping real estate values by zip code. These features are only scraping the surface of what is possible within a Geographical Information System.

The *ESP Game* [10] is a web-based 2-player experience disguised as a game which cleverly uses “human computing cycles” to accurately describe all the images found on the internet. Now known as the *Google Image Labeler*, this creation of CMU professor Luis von Ahn has successfully engaged users for prolonged periods of time. According to his research, 9 billion human hours were spent playing solitaire in 2003. Von Ahn attempts to reallocate these hours to a more constructive task such as descriptive image tagging, a very complex problem for today's computers. The *ESP game* takes advantage of human observation skills and stores user input which eventually benefits anyone who conducts an image search. CityTagz's emulates the game this system by reward system. While categorizing existing resources in their own neighborhood, participants not only become co-authors of local history, but also benefit themselves and others seeking to better their knowledge of Los Angeles's landmarks.

3. PROJECT DESCRIPTION

A Geographical Information System enables collection and real-time analysis of spatially referenced data, and it allows the user to manipulate such dataset through various mathematical operations. Simply put, it allows the user to map features and detect patterns [13]. Each set of features can be placed on its own layer (see Figure 1).

In such a system, exact locations are saved as decimal latitudinal and longitudinal values. Even if the user provides a street address to demarcate a specific location, the GIS will automatically convert it to a set of coordinates. This process is called geocoding. It makes tasks such as calculating driving directions between two points possible while the actual geocoding process is entirely transparent to the user.

The end result of a GIS task is usually a more digestible representation of the geographical region being studied – the data is converted into simplified icons and a pattern emerges amongst the mapped features. Regardless of whether the data was gathered by multiple parties and could be classified as unbiased, at the end of the day, a one person is responsible for the final visualization. Therefore, with all the technological advances, a GIS does not fall far from the traditional cartography tree. With a single author, the final product remains likely to be a reflection of their own preconceived notions and personal agenda.

Furthermore, Geographical Information Systems that are sold as standalone software packages seem to be catered towards businesses, professionals, and higher education. Not many GISs are designed for the masses, and they are even less likely to accommodate a younger user base. The following section will catalog some of the existing attempts to allow the general public to wield similar tools.

3.1 Scope

Traditionally, maps have had a limited amount of authors, and once printed, they become permanent. Maps suffer from these drawbacks, reinforcing the notion that maps are historical fiction seen from the “eye of the beholder”. CityTagz embraces that inherent bias, and unabashedly allows participants to experience each other's skewed visualization of their locale and surroundings. By gathering everyone's opinion, each place's description becomes more impartial. While this is not a novel concept, it has yet to be applied competently to the field of collaborative mapping. Many online services which allow for restaurant or venue reviews calculate an average score which represents that location's popularity. In a similar manner, this project aims to gather participants opinions of various places and transform them into quantifiable data. It also allows for the posting of images and film clips from popular online photo and video sharing websites, giving each participant access to the latest media-rich social networking technologies.

As part of a collaboration with USC's Family of Five Schools, CityTagz is intended to be used by students in grades 6-12 in their ongoing curriculum. CityTagz is also open to the public. Anyone willing to create a free account and contribute data becomes an active participant in the mapping process.

By transform large geo-historical information into something more palatable, In the real world, CityTagz consciously motivates people to visit landmarks in various areas of the city. In the virtual world, the goal is to motivate participants to become return visitors and continue providing valuable data. If the feeling of ownership provided by the creation of a new landmark is not enough, then surely a tangible reward similar to Amazon's *Mechanical Turk* [20] model will pique the participants' interest. While *Mechanical Turk* provides a small sum for each “Human

Intelligence Task” completed, CityTagz plans to reward the most active participants with gift certificates.

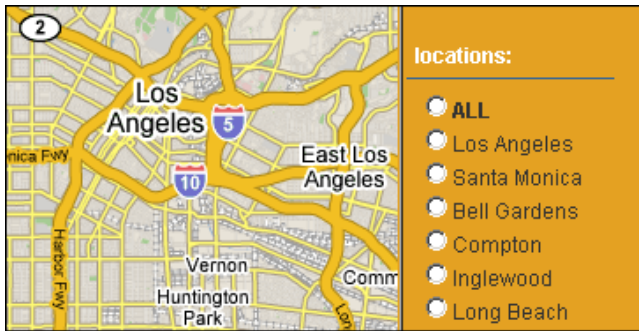


Figure 3 – Los Angeles boroughs

3.2 User Experience

At its inception, CityTagz was advertised to individual middle school classroom, yet it is freely available to any interested city inhabitant.

3.2.1 View Mode

Participants will be able to browse the entire map or select a specific borough (see Figure 3) and use the search capabilities in the query bar. More specifically, they will be able to show or hide all available layers, pan and zoom the map, and view the detailed information on each placemark. Also, users will be able to use the Timeshift slider and watch the landmarks appear, disappear, or change properties over the decades.

3.2.1 Edit Mode

Participants must be logged in order to take advantage of this mode’s add and edit features. This mode features the same actions that are possible in View Mode, plus the ability to add or edit your own posted placemarks.

The minimum required of each post is a landmark or resource name and its geographical location. In addition, participants may contribute a full text description of the place and the services it provides for its surroundings, as well as a media file (audio, video, still image). For classification purposes, multiple tags from a pre-ordered list can be selected, and a related chronological table of events can be submitted.

3.3 Data Gathering

An outreach program catered to existing geography or social studies classes in local middle and high schools provides scores of enthusiastic participants who help populate CityTagz with rich personal accounts of routinely-utilized urban resources. Each series of individual accounts serves as an emergent narrative of their daily or weekly routine.

Digital still cameras and memory cards will be distributed on a classroom basis, and an instruction pamphlet on how to use CityTagz will be given to the students and instructor. Each participating classroom receives a hands-on CityTagz tutorial before the data gathering process begins. Student participants gather pictures of local resources and upload them from any computer with an internet connection, while providing precious metadata such as resource type, physical location, frequency and time of day this resource is most heavily exploited.

Each resource type is associated with a map icon, and its relative color and size are affected by ownership and the total amount of tags it has received. The largest icons will be clustered toward the center, with lesser-utilized resources radiating outward. Over time, the amount of tags on a place will represent its popularity as well as its notoriety. Regardless, the most virtually frequented places should mirror the epicenter of human activity in each real world borough.

3.4 Visualization

In its first embodiment, CityTagz will have a user interface consists of the actual map, pan and zoom controls, layer checkboxes and the query bar. In the near future, the data will be migrated to a Flash application. Flash is a vector-based authoring environment which will provide a simplified and more fluid cartographic experience. The map itself will then be broken down into multiple GIS layers: major street basemap, ecology type, transportation network, and historical landmarks. The ground level and ecology types will be preset, while the transportation and landmark layer will remain editable. The map layers are each broken down into quantized hexagons, akin to the layout of a turn-based strategy board game. This pixel art-inspired surface will represent the break with traditional geovisualizations that increase in resolution with each zoom level.

3.5 Technical Overview

A PHP-based login system will allow users to browse as well as contribute to a condensed, semi-cartographic map of Los Angeles boroughs. A MySQL database stores all data submitted by participants. New places consist of the following:

- (1) resource name
- (2) geographical location,
- (3) one of multiple preexisting resource categories
- (4) user-contributed media – a still image, an audio or video clip
- (5) related historical timeline, where each tag is associated with a specific year

This will be made possible through a web-based user interface which allows posting and viewing of various media. The system will first check against duplicate entries, and if a certain resource has already been added, then the user will be allowed to contribute their tag in addition to the existing entries.

Complex MySQL queries make the user ranking system possible and allow for wide-ranging comparisons, resulting in a robust, fully searchable dataset.

3.6 Potential Appendages

Still Imagery

Participants could peruse the comprehensive Los Angeles Public Library Photo Collection and attempt to match the exact angles of shots which reveal the transformation of assorted vistas between time periods.

Interest Groups

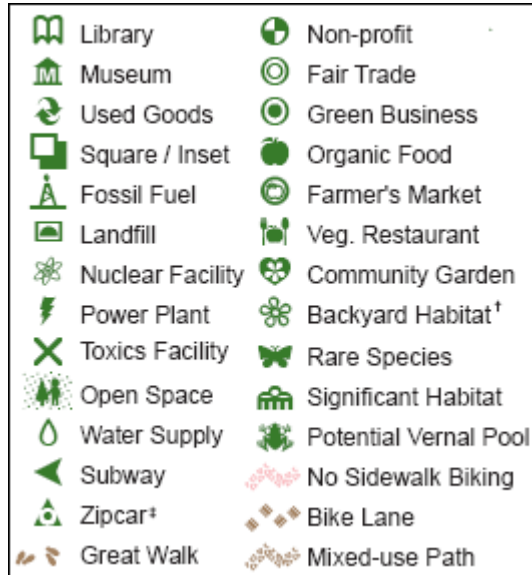


Figure 4 – MIT Green Map Legend

With the installment of a forum-style posting board, participants residing in different parts of the city could share information about where a certain resource is made accessible in their

Tag filtering

A collaborative filtering and tag ranking system would evolve CityTagz into an even more user-friendly and efficient place to quickly research available resources in Los Angeles. Also, user-defined associations between incongruent resource types could affect the clustering of placemarks in a new and unexpected fashions.

4. ACKNOWLEDGMENTS

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