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As new map applications have increased in popularity the opportunities for gathering geographic data have increased as well. The difficulty that interactive user-driven map applications have is the motivation for user participation. People have become more comfortable contributing to forums, blogs, and sites driven by user content, but user-driven map sites have been slow to cultivate a large amount of user-contributed data. Focusing on a small geographic area can increase user participation within interactive map applications. The design and implementation of an online map applications focused on a small geographic area is presented. The site uses a map interface to gather new spatial data from users, as well as allowing browsing and search. Users can also annotate existing data on the site through the map interface. The final site presents a mix between theory-based design and the inherent limitations of a practical implementation.

Headings:

Information Systems – Design

Computer Software – Development

Geographic information systems

Web Sites - Design

YOU ARE HERE: BUILDING AN ONLINE INTERACTIVE MAP APPLICATION

by
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Introduction

Clay Shirky writes in his book <u>Here Comes Everybody</u>, "Human beings are social

creatures – not occasionally or by accident but always. Sociability is one of our core

capabilities, and it shows up in almost every aspect of our lives as both cause and effect"

(14). Over the last several years the cause and effect of sociability has become

widespread in web applications. The increased use of interactive technology on the Web

has spurred a collective rethinking of how to enhance the basic bonds of sociability that

exist within our lives. Whether contributing a comment on a blog, creating a Wikipedia

page, updating a Facebook status, or simply watching a video on YouTube, people have

started to weave these new virtual social tools into their own social networks. These new

tools do not act as replacements to traditional social interaction, but rather they open up

new opportunities for interaction and communication.

The power of online social networks is that they link individuals together and

transcend the limitations of geography. This has forced a new way of thinking about the

domain of geography. While the proliferation of the Internet and online social networks

has in one way removed geographic limitations from people's lives, it has also created a

new mechanism for sharing individual knowledge about geographic locations. One of the

ways this has manifested itself is through the growing number of interactive geographic

applications available on the Web. Sites such as Google Maps, Platial.com, and

Mapufacture allow people to view and contribute geographic data and then share this data

with other users. Spatial data that has traditionally been kept within the domain of trained geographic professionals is now being created by ordinary people.

This new geographic movement, which combines principles from Web 2.0, traditional geographic information systems (GIS), and web-based mapping systems, is built on the foundation of creating sociability through interactive web applications that link people together through geography. The difficulty that this movement faces is willingness of ordinary people to participate. While user contributions to websites have grown substantially recently, participation is still relatively new in the domain of web-based geographic applications. New interactive geographic applications are starting to emerge, (Helft, 2007) but user contributions to these applications are limited compared to other Web 2.0 based websites. The increased proliferation of the so-called "Geoweb" is based on the theory that individuals possess a more intimate knowledge of their local area than traditional geographic organizations and that people are willing to share this knowledge with others.

What is needed to motivate individuals to contribute to interactive mapping sites is a compelling reason to spark the cause and effect of sociability. Unlike topical social networks, geographic social networks must organize around the principle of location. What has been missing in other online map applications is the idea of a geographic location being the prime motivation for interaction.

This paper describes the design and implementation of an interactive online mapping site, you-arehere.com, which focuses on one small local area. The central idea of the site is that individuals can view and contribute data through an interactive map

application that is unique to their own local area. People can visit the website and browse what other people know about their local community. People can contribute their own knowledge via a map interface on the site by adding content. This content will include things such as event announcements, restaurant reviews, crimes, and blog entries. All of the data added to the site will be linked to a spatial location, which will allow users to quickly view a myriad of different data from different categories over space and time.

The fundamental concept of this site centers on two main principles:

1. Individual knowledge has great value
2. Sharing individual knowledge increases collective knowledge

People possess a very personal idea of their local environment. They know where their local grocery stores are, their friend's homes, their workplace, their homes. They know how to get there, how all of these personal locations relate geographically, and they have inherent tacit knowledge about each of these places (who lives there, what color the house is, how clean it is). They know which roads have bad traffic at eight in the morning, they know which bus routes are the best on the weekends, they know what restaurants have the best brunch; the challenge is taking that valuable knowledge that individuals have about their local community and making it available to a large audience.

you-arehere.com will take advantage of this specialized geographic knowledge by providing easy to use map tools for the display and gathering of information from ordinary individuals. This site will actively encourage participation from individuals by presenting user-generated spatial content that is specific to a local area. This specific focus will fill the important motivation gap that other interactive maps sites have not been able to overcome.

Background & Significance

There are two main challenges in putting this theory into practice: one is empowering

individuals to understand that their highly localized personal knowledge of their

geographic environment is valuable information, and the second is motivating people to

contribute their geographic knowledge in a way that can be easily accessed by other

users. Every online community faces these challenges: "An online community will not

survive without lasting user motivation and user participation in terms of social

interaction and the productions of user-generated content" (Brandtzaeg 1). One of the

ways that successful online communities have created both a sense of empowerment and

motivation is by centering on a narrow topical focus. Krichmar and Preece state, "it has

been recognized by community developers that narrowly focused purpose promotes the

success of an online community" (203). Online geographic applications typically have a

narrow task focus (e.g. user-contributed spatial data), but they are lacking a narrow

spatial focus. Like other online communities, online geographic communities could

increase their overall success by creating a community that is centered on a very specific

area, which in this case would be a highly localized geographic area. Within online

interactive map applications an increased emphasis on localized content will increase the

amount of user-contributed data.

Previous work studying online communities has generally focused on three areas:

what they are, why people participate, and how to measure success. An online

community can be thought of as a group of users united by a particular technology or

topical area. Java, Brandtzaeg, and Hsu focus their work around users of a particular

technology, in this case Twitter, Social Networking, and blogging respectively, while Cheng and Krichmar focus on the topic areas of, e-learning and health. Preece however, takes a broader approach saying: "I use the term 'online community' to mean any virtual social space where people come together to get and give information or support, to learn or to find company" (348). Here the focus is on the social aspect of the virtual user group not the topic or the specific technology used. By taking this broader view the virtual community becomes a mirror of the traditional community, however, the interpersonal relationships are enabled by technology. In this social context the goal of any online community should be to extend the same ideals, motivations, and sense of empowerment that are fostered by traditional physical communities.

One example of how online communities are mirroring physical communities is by providing a virtual space where groups of friends or like-minded people gather. Social networking sites (Facebook, MySpace, etc.) and sites such as Twitter present novel tools to promote virtual interaction between social groups that often have an established relationship. Talking about Twitter, Java states: "People in friendship communities often know each other" (61). Brandtzaeg found that the number one reason for users to abandon an online community was a "lack of interesting people/friends" (7). Just as individuals will typically not go to a bar, community center, or event without knowing someone who will be there,users of online communities will not participate without this same reassurance.

Online communities not only provide a mechanism for organizing established social groups, they allow people with similar interests to interact with one another. This too is analogous to social groups that exist in the physical world. Krichmar and Preece

illustrate this by studying an online health community group called the Kneeboard: "Our work suggest that there are similarities between the online Kneeboard community and typical face-to-face self-help programs" (218). Java also provides evidence of this self-organization in Twitter: "Studying intentions at a community level, we observe users participate in communities which share similar interests" (61). The organization of people around specific interests is one of the strongest arguments for online communities. The ability of online tools to bring together incredibly specialized user communities cannot be denied, but bringing people together by itself does not constitute a successful social community. To fully realize a social community there must be a degree of interaction between the participants. As Preece states, an online community is a place "where people come together to get and give information" (348). New web-based technology is providing mechanisms for user interaction and narrow topical interests can bring people together, but what motivates people to actively share their own knowledge and experience with others is still unclear. This demands that the topic and technology that underlies online communities be built within the context of social interaction.

The interplay between technology and topic creates the mechanism through which users choose to participate in a community. It has been shown that technology by itself cannot sustain a community (Brandtzaeg, 2007), but rudimentary websites can produce successful online communities (Krichmar and Preece, 2005). What this implies is that sites that lack a strong technology component can build a successful online community, but sites that lack a compelling purpose (even with innovative technology and shiny graphics) are less sustainable. This again points to the need for sites to develop less as a technology platform and more as a social tool. Parameswaran and Whinston put this idea

in the context of commercial success: "In social computing, information technology facilitates organized human endeavor, the primary dimension of which is social rather than commercial" (339). Long-term success for an online community depends on user motivation to participate, which in turn is created through a strong social community.

Preece outlines three components for good sociability in software development: purpose, people, and policies (349). The policies refer to the governance of the site and their ability to create a sense of trust. This sense of trust is not to be overlooked, but it is the interaction between the purpose and the people that will ultimately drive the community. Kelly echoes these three themes more specifically: "There are 3 major questions facing designers of on-line communities: how to get users to behave well, how to get users to contribute quality content, and how to get users to return and contribute on an ongoing basis"(391). A site must provide a reason for a person to become initially engaged. This could be the presence of friends, a topic of interest, or an interesting technology. More importantly a site must provide people with a compelling reason to continue to engage and participate over time. The key factor for success within an online community is the level of participation of its members.

Creating sociability in an online map application can be achieved by focusing on the spatial aspect of the user group. This means a return to design that is community based rather than technology based. Yang describes a community as: "geographic communities of people living in close proximity or ''communities of interest'', those with shared interests such as members of an organization" (132). Here the emphasis is on the spatial proximity of people to one another and the subsequent desire to organize around a specific spatial domain. In geographic applications participation can be

motivated by technology (Google Maps), topic, or by spatial location. Organization by location is something that can encourage participation within geographic applications and it may also act as a trigger to more widespread participation. Swaroop and Morenoff found this in traditional community organizations saying: "participation in community organization is related not only to characteristics of the immediate neighborhood, but also to the wider spatial context of surrounding areas. Spatial dependence may reflect that the social processes that generate participation in social organization 'spill over' into adjacent neighborhoods" (1687). What this means for online geographic applications is that by focusing on a small area, such as a city, increased user participation for one city could lead to an increase in participation for adjacent cities.

Site Review

Before designing a new mapping service it was important to review existing sites. There are many different sites that offer integrated maps and the ability for users to contribute data. Each of these sites has strengths and weaknesses both of which have informed the design of this mapping service.

There are many sites that provide the ability for users to not only interact with spatial data, but generate it as well. Google Maps (http://maps.google.com) is one of the most popular mapping sites (Hopkins, 2008) and although its primary purpose is to provide users with location based search results and driving directions, it does offer users the ability to create custom maps through 'My Maps.'

Google My Maps allows users with a Google account to create their own map by adding points, lines, or polygons to the Google Maps interface. Features can be annotated

and individual maps can be saved as either public or private. Additionally, maps can be imported from other sources and multiple collaborators can create a map. Overall My Maps is a powerful online mapping system. The major drawbacks of My Maps are its reliance on Google and users who have a Google account, its lack of community participation, and its focus on the individual user and his or her maps only.

Another map-based site is Outside.in (http://outside.in). This site is a blog aggregation site that uses place as it commonality. Outside.in presents local blogs based on IP address or user input. Posts from blogs can be viewed by topic or by map. The map portion is a Google Maps interface with posts placed on the map. The idea of organizing blog content by geographic location is a powerful one, but Outside.in relies on the blog producers themselves to provide the spatial data necessary to map individual stories.

Yelp.com (http://yelp.com) is a site that features user reviews of various locations based on cities. Yelp.com features maps, but only once you view an individual place review. The main focus of the site is on developing user reviews for many different places and topics (e.g. shopping, dinning, and nightlife). What is interesting about Yelp.com is the number of reviews that are present even for small cities such as Durham, NC. Although the focus is not on maps, one of the high-level the organizing principles is geography.

Finally, Everyblock.com (http://everyblock.com) is one of the best examples of an online mapping application. Everyblock.com uses maps and geographic organization to present very highly spatial refined data (neighborhood-level). Originally Everyblock.com started as site devoted to mapping crimes in Chicago, Il (chicagocrime.org), so much of the data presented on the site is focused on crime, but there is a large amount of data

related to local news, city government, and real estate. Everyblock.com does a great job

organizing and presenting data geographically. The one big limitation is that

Everyblock.com does not allow public access to update or add new data (although they

do generate data from other sources, such as Yelp.com and flickr.com, that do allow user

participation.)

Design Process

The literature and service reviews serve as the basis for the design of the service you-

arehere.com. The theoretical background was present throughout the design process.

Many of the design decisions were based on a combination of theory, practicality, and

impact on the main user groups. The design process was an attempt to integrate the

theoretical background into a practical application.

Target User Population. The overall design process focused on creating tools that would

facilitate the creation, sharing, and discovery of information through a map interface. The

individual components of the site were initially designed around these three broad areas

of functionality and the needs of three user groups:

> Active community members
> Non-professional local data producers (e.g. bloggers)
> General citizens

Active community members are individuals who regularly participate in local

events and organizations. Active community members would also include people who

moderate or contribute to community listservs or websites. This is a critical user group to

reach for the site because in many cases these individuals have a large set of interests and accompanying tacit knowledge of their community.

Active community members have some overlap with local data producers. However, data producers are people who run their own website or blog. Their interests and motivation may be much the same as the active community member, but they have decided in some way to volunteer their own knowledge to some type of virtual community. The knowledge shared by data producers will become a key component of the initial baseline data collected by the site.

General citizens is the broadest of the three user groups and is the most difficult to engage. While both active community members and data producers have made the difficult transition from passive consumers of information to active producers, most of the general population still has yet to make that transition. One of the overarching goals of the site is to motivate people who may have never actively contributed to a website before to make the leap. Because of the enormous amount of domain specific knowledge that is present in the general citizens of a community this is a critical group to reach.

Each of these user groups represents a different level of participation and potential motivation. The data producers are people who would be most comfortable with contributing data to a site since they are already engaged in the process. Active community members are also highly motivated and likely to contribute data, but they must overcome some technical and conceptual barriers, especially when dealing with a mapping application. General citizens are the user group that will require the greatest amount of motivation to contribute to the site. Not only must they overcome the same technical and contextual barriers as active community members, but also they must be

presented with a compelling reason to actively engage with the site and its members. This range of motivation, technical skill, and engagement demands a system that is simple and novel at the same time.

Not included in the primary user groups for the development of the site are geographic professionals. This was a conscious decision to leave this group of users out of the development process. Developing a map system that included geographic professionals would create the need to include high-level analysis and overlay tools, which would not be appropriate for novice geographic users. In fact, many online mapping systems contain advanced query, cartographic, and analysis tools, which often create overly complex user interfaces. For this application the focus is on using the map as an alternative interface for presenting user generated data, not to be a high-level geographic analysis tool.

Each of the primary user groups will be both consumers and producers of data within the site. However, the initial design process focused on creating tools that would allow the producers of data to contribute to the site, thus placing more importance on active community members and data producers. In trying to motivate early adopters to participate in the site, a heavy focus was placed on those members of the community who would be most likely to add data. Thus many of the design tasks were constructed around the process of identifying, creating, and annotating data.

Key Tasks to Support. User tasks were divided into two groups: data entry and data display. The majority of user tasks fall into the data entry category. User tasks were used

to develop specific components of the site. Initially a list of general tasks was developed based on the demands of users on the site:

    Login
    View data
            Map data
            Data for a specific point
    Categorize data
            By type/tag
            By source (blog)
            By date
    Add spatial data
    Add comments
    Add events
    Add links
    Add new blogs/sources

Creating general user tasks helped to elucidate the basic functionality of the site. A mix of task analysis and use cases was used to examine how specific functionality would correspond to user tasks.

The data display task of viewing data is the most fundamental user task. But data on the site can exist in two different forms. First there is the general map view. This shows all the points that have been added to the map. These points need to be categorized and users must be able to search and perform basic queries to find points of interest. Once a specific point is located the individual data for that location must be displayed within the interface. How users interact with data at different scales became an important piece of the design. Discovering this user interaction became clear after performing a theoretical walkthrough of how users would view data on the map.

Data entry user tasks were the primary focus of the initial design. The fundamental user task is to add new data to the map. Adding geographic data has two main facets. One is adding the actual geographic location of a place. Often this is

achieved by entering an address, which is then mapped using a standard geographic coordinate system. In this case the system provides a mechanism for mapping addresses and users are responsible for the identification of specific addresses.

Users have to be able to add not only a geographic location to the map, but also the accompanying attribute information. In this case, the attribute data would include basic descriptive information about the location such as name, category, and website URL, along with links about the location, user comments, and events. Adding to the complexity, each location could contain any, all, or only a small portion of this data. For example, a shopping location might not have a website, but might have several upcoming events, while a restaurant might have a website, several user comments, but no events. Users entering data about a location must be able to add as much data as they can while not being asked for unreasonable required information, such as an event that may or may not exist.

The fundamental task of adding a place to the map spawned several new tasks. These included adding comments, events, and links to individual points. This, like the data display, presents an interesting issue of context. If a user adds a new point to the map they should be able to add accompanying data at the same time. This addresses the whole map context, but if an existing point is selected users must be able to annotate the data that has already been added by other users. From a design standpoint this means that an interface for adding new points and an interface for annotating existing points would both have to be created.

Finally, users would need a mechanism for logging into the site. This was necessary to enable user tracking and to provide an additional layer of security for the

database. Design decisions would have to be made to figure out which parts of the site

would be available to anonymous users and which would only be available to

authenticated users.

     Once an initial walkthrough of user tasks had been completed the first iteration of

database design began. This first design encompassed six different tables. As shown

below this design included three different lookup tables that would allow multiple

features to be associated with one location. As the development of the site progressed this

design was altered to include three different lookup flag columns in the 'Places' table.

This became necessary due to the increasingly complex code needed to determine if

features existed for each individual place. This is due to the fact that each location can

have any, all, or a part of all the different data entities.

Initial database design:

     Places table
         ID
         Name
         Description
         Web site
         TypeID -- category for browsing can have multiple link to type look up
table
         BlogID -- id to link to blog lookup table (place id, entry id, blog id)
         the_geom – geographic coordinates

     Comments table
         PlaceID
         UserID
         Comment

     Events table
         PlaceID
         EventID
         Start Date
         End Date
     Events Lookup

Blogs table
            BlogID
            BlogName
            BlogURL
Blog Lookup

Post table
            PostID
            PostURL
Post Lookup

Design Decisions

After completing one full iteration of the design process (defining users, creating user

tasks, and database design) the first prototype site was created. While constructing the

site many design decisions and interface design issues were faced. Some of these issues

created the need for reevaluating previous design decisions and in some cases involved

recoding parts of the site.

The first two major design decisions were the type of map interface to use and

how to design the overall site. The site as a whole was built using the open-source

content management system (CMS) Drupal (http://drupal.org). The Drupal system

provides a robust framework for constructing lightweight and multi-faceted websites. The

decision to use Drupal was based on several different factors. First, the built-in modules

available in Drupal support different user roles and user management. This eliminated the

need to design, build, and implement a user management system from scratch. Second,

Drupal is built on PHP, which allows custom PHP code to be added to the site. Finally,

Drupal is database driven and supports the Postgresql (http://www.postgresql.org/)

database system. The PostgreSQL database supports the PostGIS

(http://postgis.refractions.net) spatial library, which would be used to store and manipulate all of the spatial data within the site.

For the map interface the Google Maps API (http://code.google.com/apis/maps/) was chosen. The Google Maps API is a well-known interface that has been used to create many different map "mash-ups." Because of this it offers several advantages over other mapping systems. One is that many users will already be familiar with the interface. Another is that the API is well documented and there is a large amount of sample code available. Finally, the API contains all of the basic map functionality, including panning, zooming, and different map types. This would eliminate the need to create many new mapping tools from scratch.

There are several drawbacks to using the Google Maps API, the biggest of which is that as a designer you are stuck with the functions that are available through the API. For this particular project the lack of user interaction with the map data was a large challenge that had to be overcome. To do this, the API functions were augmented with a spatially enabled database, PostGIS. PostGIS is a library that is used by the Postgresql database system to handle spatial data. By combining PostGIS functions, PHP scripts, and the Google Maps API, a fully functional user-driven map application was created.

Once the technical structure of the site was established the next major design tasks focused on creating two main user interfaces. These two interfaces fall into the same two major categories as the design tasks: data entry and data display. Within each of these categories several smaller design tasks had to be established in order to provide different elements of functionality, but establishing the type of content that would be encompassed by the site had to be completed before either interface could be developed.

Developing the content areas of the site was split into two facets. One facet began as a general list of what content would be useful to present in the site based on the three user groups:

Restaurants
Historic places
Neighborhoods
Music events
Stores
Parks
Trails
Events
Images
Stories
Crimes

The second facet focused on what content could be reasonably added to the database. This eliminated items such as images and neighborhoods because the initial development of the site would not be able to support non-text or non-point features. This also helped to redefine the initial database design established in the first design phase. Individual tables within the database and the connections between them were reevaluated and in some cases redesigned. For example, the addition of comment, event, and post flags were added after determining what specific types of content would be available on the site.

From these two facets of content areas the decision was made to center the design of the site on the concept of a place. Technically a place within the site is simply a point on the map that is denoted by a specific latitude and longitude. Conceptually the place is the base unit for the entire site. Places are the central piece of content that hold other content items within the site. Places can have other content items such as blogs, links,

events, and comments associated with them. Places can also be categorized and

participate in multiple categories.

The categories that were chosen for the site were based on the needs of the three

user groups and the initial list of content that would be available on the site. From this

five categories were created:

Music
Food
Shopping
Historical
Crime

All of the data in the site must be placed into one of these categories. The

difficulty with using categories such as these is to be both inclusive and general at the

same time. While these categories are established throughout the site, as more user

testing is performed they will naturally change. One alternative is to supplement the

categories with user-generated tags for places. This would allow for broad categorization

of data, but also allow users to create very specific tags that could be used for browsing.

Much of the interface design focused on how to display individual places and

their associated data on the map. By focusing on the "place" as the base unit for the site

the individual data entry and data browsing tasks could be tied to the "place" as well. For

each of these tasks the interfaces were designed to engage with one place at a time, but at

the same time to keep users focused on the main map.

Data Entry

Entering new data on the site can be done for either existing data or as part of adding new

data. Each of these data entry tasks takes place within the main map interface. These

tasks are also tied to individual places within (or created) on the map. This limits users to entering or editing only one point at a time, but it also allows for a complete set of events, comments, and posts to be added all at once.

Authorized users can add new places to the map by clicking a link above the main map or by choosing the 'Add Place' tab. Once there users see the main map and an option to 'Add a Place to the map.' Here users can provide the spatial location either by entering an address or by directly adding a point to the map (figure 1). Once a place is found users can verify its location or move the point and then add the associated information about the place (figure 2).

Add a Place to the map

Search for an address

durham nc

Go!

Place an icon on the map
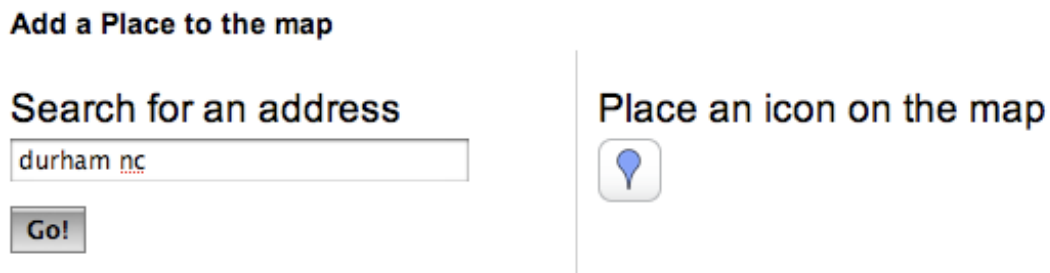
Figure 1. The main search interface.

35.98248608479991 -78.9613151550293

Click to Add

Colony Park

Duke University GC Ponds
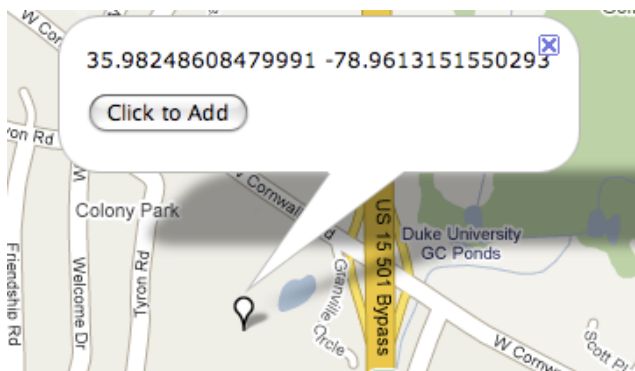
Figure 2. A new point on the map with its latitude and longitude.

Based on the design decisions made during the design process three types of content are available for all places within the site: comments, events, and stories. Users adding new places to the map use a tabbed balloon pop-up to enter basic information about the place along with events, comments, or stories (figure 3). The tabbed interface allows users to essentially page through a data entry form. Users start by entering the name, description, category, and URL for the place. The following optional tabs contain fields for linking to specific blog posts (and the corresponding blogs) as well as events for the location and user comments. Once a user completes the new place form they are taken back to the main map viewer where the new place is shown on the map.

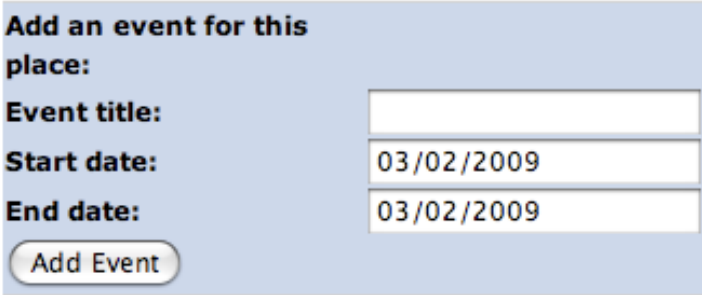**Figure 3. 'Add Place' form.**

Authorized users can also edit existing places through the main map interface. Users can click any point on the map, which will display the name and description of the place. In the detailed overview users can click any of the three links at the top of the page (figure 4) to add additional data for the specific place.

Figure 4. Options available in the overview window.

Clicking a link will bring up a form within the detailed overview in which data can be added (figure 5). These individual forms mimic the larger forms present in the 'Add Place' dialog. Once users add new data to the place it is automatically updated and the detail overview is refreshed.

Add an event for this place:

Event title:	
Start date:	03/02/2009
End date:	03/02/2009

Add Event

Figure 5. Adding a new event to a place.

Data Display

Individual points are displayed on the main map view (figure 6). This is the main page of the site and it serves as the main gateway to the information presented on the site. The default view of the map is a display of all the places contained within the database. Users can use different strategies for browsing and searching the site, but each strategy involves some type of map display.
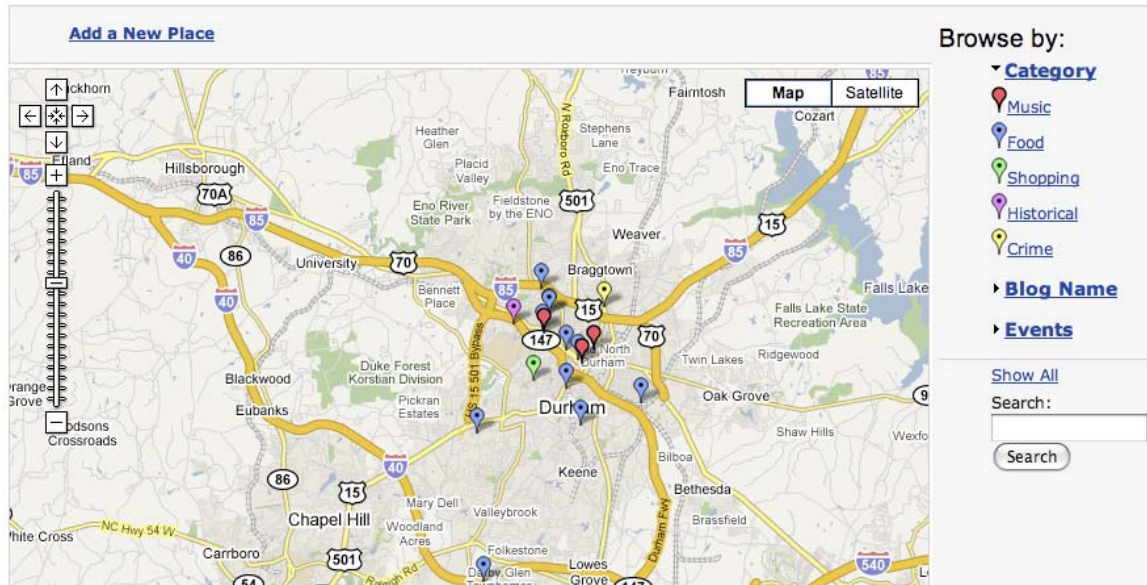
Figure 6. Main map display.

Users can use a legend on the right side of the map to view places by different category, blog name, or event. Here different color place marks denote different content categories (figure 7). Users can click any of the category headings to display only those points that are labeled with that particular category. Each of the category links is a separate database query, which selects the appropriate place data directly from the database using Javascript and PHP. This same functionality exists for browsing by blog name and event (figure 8). Browsing the map by categories will become critical as the number of points on the map increases. Users must have a mechanism for filtering the total data shown on the map or they would easily become overwhelmed.
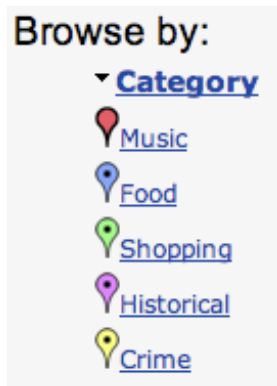
Figure 7. Main category browsing.

Figure 8. Browsing by blog names.

It is important to note that this legend functions differently than legends found in traditional online map applications. These applications usually feature the ability to overlay different layers of the map. This means that individual layers can be turned on and off one at a time or multiple layers can be shown on the map at one time. In you-arehere.com ,users cannot display multiple layers at once like they can in other online map applications. This decision was based on the purpose of the site and the needs of the users. While multi-layer overlay analysis is a simple and powerful geographic function, it is not within the overall purpose of this site. The geographic points presented in the site are meant to be gateways to information. As such the legend acts as a kind of faceted browsing mechanism and not as a controller for multi-layer overlays. Users can access individual place information by clicking on a point in the map. The act of clicking a point

may not be immediately intuitive to novice users, but because the site uses the familiar

Google Maps interface, users of all skill levels are more likely to have encountered

similar functionality before. Clicking a point brings up a small balloon window (figure

9). Other alternatives for displaying data were explored such as sidebar that would show

the point data. Ultimately the decision was made to use the balloon pop-ups because of

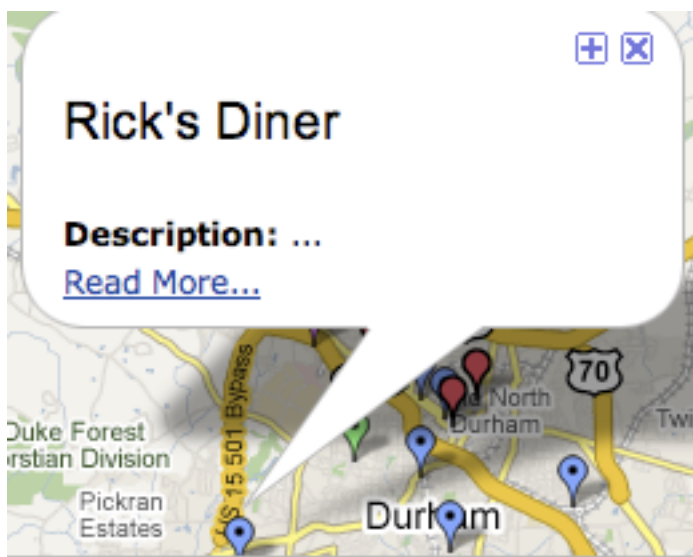their familiarity and their ability to keep users engaged with the map interface.

Figure 9. Small pop-up window.

The initial small window only provides the name of the place and a brief

description. This is designed to allow users to quickly view multiple points without

having to switch from a large detailed window back to the overview map. Once a place of

interest is found a user can click the 'Read More' link to display the full record for the
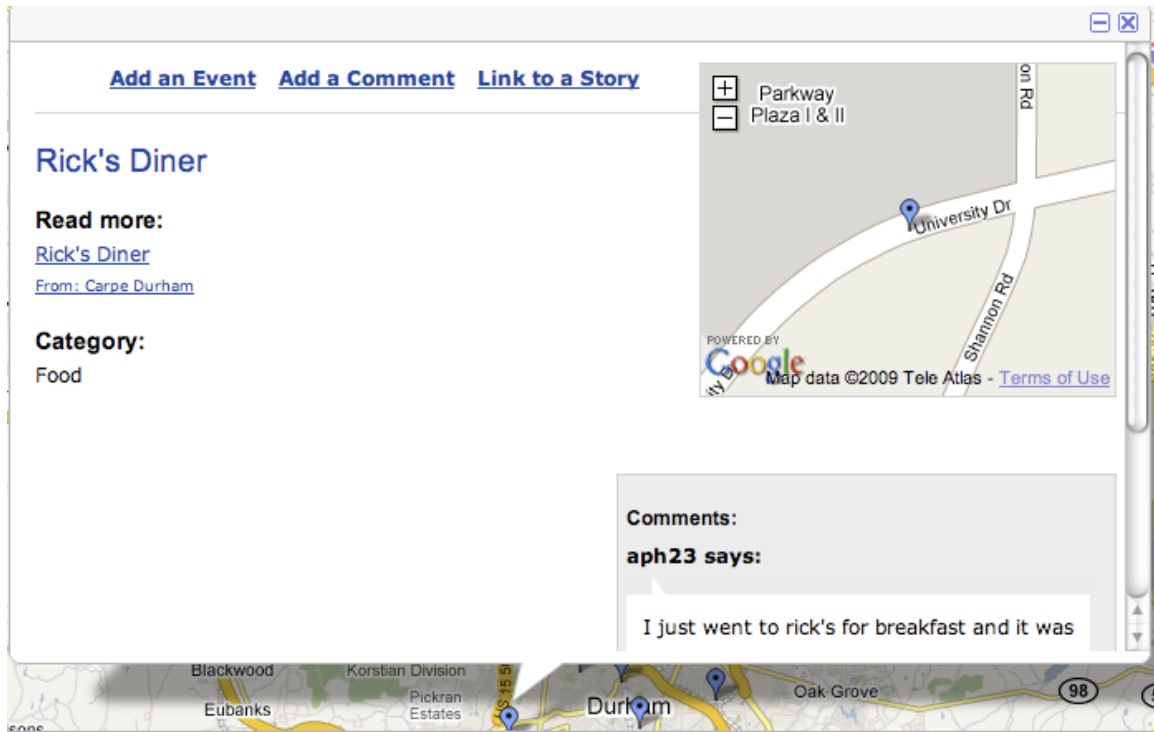
point (figure 10).

Figure 10. Large overview window.

This larger window contains all the basic information gathered about an individual place including the name, website URL, and category. Any user comments, events, or blog posts about the place are presented in this window, but any or all of these elements may be present for any given point. For the design this presented a unique challenge because multiple scenarios had to be taken into account. The interface had to be created in such a way that missing individual pieces of data would not impact the overall design of the window. For example, figure 10 shows a place that contains both a blog post and user comments, but no events. By placing the user comments on the right side of the window a natural space was created on the left side below the category to place any events. This also allows for timely and more general information about the

place (e.g. events, posts, name, description) to occupy a more important space in the

window than user comments.

Another challenge when designing the overview window was where to place the

dynamic forms that allow new data to be added to the point (figure 11). Like the events,

these individual forms are placed beneath the category label. Here the motivation was to

place the box in a space that users would be able to notice and would not affect the entire

layout of the page (i.e. placing them at the top of the page).

Category:
Food

Link to a story about this place

Link to Story: [   ]

Story Title: [   ]

Source: [Carpe Durham   ▲▼]

(Add New Source)

(Add Story)

Figure 11. Adding new link to a place.

Users are also presented with a small detailed map for the place location. The focus of

these detailed windows is to present data about the place and its context all within the

map interface.

Discussion

you-arehere.com was intended to incorporate the theory that focusing on a small spatial location would provide more motivation for users to contribute data. Throughout the development process this motivating factor and the theory behind it were ever present. The final site has been built as close as possible to this original intention.

Due to the limited time and scope of this project several new pieces of functionality will be added to the site in the future. One is the ability for users to add images and videos to places. Images provide another form of context that is different from written descriptions.

This visual context can be very important for users driving to a specific place, but it is also the most effective way to bridge the gap between the modeled reality of the map interface and actual reality. Additionally, allowing users to add images allows for a more personalized view of an individual place.

Another piece of new functionality would be the ability to add line features (e.g. trails, roads, etc.) to the map instead of just points. This would not be a difficult task in terms of coding, but the organization and categorization of line features would be quite different than points. Line features occupy a much larger spatial domain, which can contain other smaller spatial features, such as points. Lines are also made up of several segments that can each individually be categorized. These two components create an exponential jump in the complexity of designing and implementing an organizational schema. Finally, based on preliminary user feedback the browsing and searching interface must be improved. This includes the addition of user-generated tags for individual places. Because the initial design focus had been mostly on the data entry side, the data display tools and functionality have not been fully developed. The current data

display tools are adequate for the small amount of data present on the site, but the addition of large amounts of data will make it difficult to find very specific information quickly. Searching and browsing that is multi-faceted and more specific will have to be developed in the future.

Despite the need for new additions, you-arehere.com is a fair representation of both the theoretical and practical application of what was originally intended. As with any design project compromises and changes have been made, but the overall goal of creating an interactive online mapping site that focuses on a small local area that users can contribute data to has been achieved. The application also serves the needs of the three targeted user groups very well. Keeping the user groups and the overall intention of the site present throughout the design process was critical to implementing a successful application.

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