

FAVECITY

A Visual Exploration Of City Travel Information

A Thesis submitted in Partial Fulfillment of the Requirements for the Degree of
Master of Fine Arts in Computer Graphics Design

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Abstract

Web 2.0 provides a great environment for interactive information sharing and collaboration. We are no longer to receive information passively. On the contrary, everyone can contribute content and share personal experiences. It is a perfect social media for travelers to be connected.

faveCITY is a visual exploration of what do people think and how do they feel about their favorite cities. It collects users' opinions about the city such as city emotion, favorite city feature, best season to visit and a souvenir recommendation. The goal of this project is to combine Web 2.0 features with information visualization to create an information-sharing platform for city travelers. By visualizing these data, it could provide users unique travel advices, such as which city is the most popular travel destination right now, which city is the most romantic city etc. Furthermore, the platform is interactive and the data is live which means the results could be changed in real time.

Demo Site: <http://cias.rit.edu/~cxc6494/favecity/>

Key Words

Information Visualization
User-Generated Content
Web 2.0
Social Media
City Travel

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01

Introduction

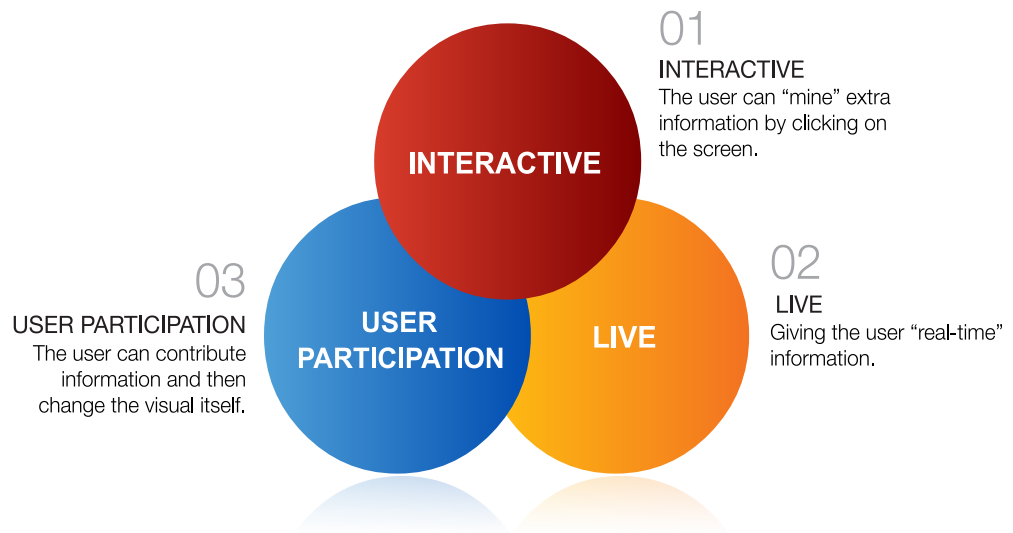
01. Introduction

I didn't realize how much I love to live and travel in a city until I was 8,000 miles away from home. I miss the rush, the convenience, the crowds, the lights, even the noise and the pulse of life. The global city is celebrated for the universality of its diverse people, multi culture, complex transportation, towering buildings and pulsing 24-hour rhythms. I guess that is why cities always hold an endless fascination for travelers. Every time when I have a chance to visit a strange city, I am eager to know what local people or experienced visitors would recommend - Where to go? What to buy? Where is the best local restaurant? Sometimes it would be a surprise because some travel advises you even couldn't find them in a travel guide.

Key Features

This web-based interactive application will combine "Web 2.0" features to provide users a platform to contribute and share their travel experiences. The main goal of this project is to explore possible interactive design solutions to display social networking information dynamically. The key features are: (1) Interactive: The user can "mine" extra information by clicking on the screen. (2) Live: Giving the user "real-time" information. (3) User Participation: The user can contribute information and then change the visual itself.

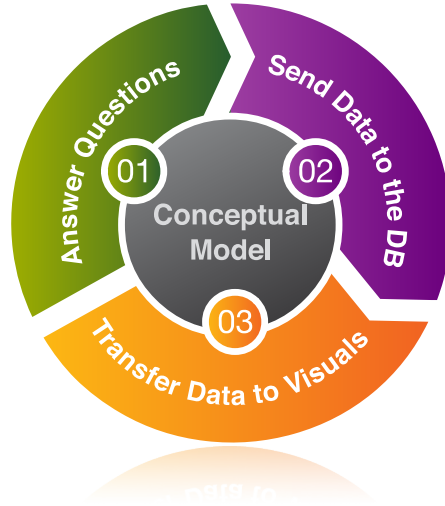
FIGURE 1.1 / Key features



Concept Model

The conceptual model of this application is: by asking the users city related questions, collecting their answers to the database, and then visualize these data to enhance a better understanding of this information.

FIGURE 1.2 / Conceptual model



Target Audience

Age	Above 13
Gender, ethnicity	All
Language	Not required
Moving Experience	At least 1 time
Interests	Love to participate in information sharing, on-line communities, interaction and travel
Educational Level	Not required
Income Level	Not required

02

Case Study

We Feel Fine

World Filter Visualization

Digg Spy Data Visualization

tripsay.com

Trourist

02. Case Study

This section outlines the examples of existing projects that I used for inspiration throughout this thesis project.

2.1 We Feel Fine

URL: <http://www.wefeelfine.org/>

TAG: Information Visualization

Description:

We Feel Fine is an exploration of human emotion on a global scale. It uses large-scale blog analysis to provide a glimpse inside the hearts and minds of people all over the world. It collects around 20,000 human feelings per day and accompanied by demographic information about the author of each feeling (age, gender, geographical location, and local weather conditions). It then presents these findings in a series of playful interfaces, each of which paints a different picture of human emotion.

Relevance:

We Feel Fine is a useful precedent because it fully takes advantages of abstract concept “Human Emotion” and converts it into a beautiful art piece. Using a series of playful interfaces, the feelings can be searched and sorted across a number of demographic slices, offering responses to specific questions. The visualization is a self-organizing particle system, where each particle represents a single feeling posted by a single individual. The particles’ properties – color, size, shape, and opacity – indicate the nature of the feeling inside. The particles careen wildly around the screen until asked to self-organize along any number of axes, expressing various pictures of human emotion. This precedent is a successful example of how to convert abstract data, use design principles to create emotion visualization.

2.2 World Filter Visualization

URL: <http://www.theworldasflatland.net/>

TAG: Information Visualization

Description:

World Filter Visualization is created by Information Design Studio. Visitors are located via their Internet protocol (IP) number on a map of the world. The concept of this project is by visiting this website, they add their country to the overview of the world, thus further completing it. People are surprised that they are located and that they get a personal welcome greeting (e.g., “Ciao Italia”) on a design website.

Relevance:

World Filter Visualization is also a great example in transferring complex data into a flat, 2D visualization. Users may suspect that their behavior is being tracked online, but they almost never get to see the digital traces or footprints they leave as they explore. World Filter Visualization is a way to connect with site visitors and to engage their participation in mapping a unique view of the world.

2.3 Digg Spy Data Visualization

URL: <http://labs.digg.com/>

TAG: Information Visualization

Description:

Digg Swarm is developed by Digg Labs using a real-time way to view data. It lets users explore activity beneath the surface of the Digg community. Visualizations identify patterns on Digg and give users different ways to interact and see what other people find interesting. Digg Spy has four visualization models: Arc, BigSpy, Stack, and Swarm. Stack represents stories on a timeline and is useful for watching the volume of Digg activity in relation to story popularity over time. Swarm lets you can watch the interaction between users and stories. BigSpy provides a visually compelling version of the simple HTML Spy. Arc is a dynamic pie chart of activity across different sections of the site and shows which topics are most active, and show the community is Digging content across topics.

Relevance:

Digg.com is an online destination where users submit and rate content from sources all over the Web. Digg Spy Data Visualization is the tool designed to give people a broader, deeper, and visually interesting view of the content on Digg.com. It is a useful precedent for this thesis because it shows how to interpret complex data in playful and effective way. The project scope, technology and visual design are the role models in visualizing dynamic information.

2.4 tripsay.com

URL: <http://www.tripsay.com/>

TAG: Web 2.0, Social Media, Online Community

Description:

TripSay is a Finland-based social travel service that allows users to create their own personalized destination guide. Taking tips and suggestions from TripSay's recommendation engine, users are matched with places, sights, content and activities from their friends or people with similar interests to create the ideal trip just for them.

Relevance:

I think TripSay is a successful Web 2.0 online community precedent. TripSay is launched on June 2008 for private beta and officially launched on August 2008. I found this web site in the late September 2009 after I almost finished my thesis project (October 2009). But it is still so great to know the concept of this thesis project has some similarities as this finished online social media.

2.5 Trouist

URL: <http://www.trouist.com/>

TAG: Web 2.0, Social Media, Online Community

Description:

Trouist is a social networking web service for people seeking to live their travel destinations, not only visit them. It is a meeting point for those persons who travel to be connected with the world, not disconnected from it. Trouist users will be able to seek, explore and recommend unique travel experiences. Trouist allows users to check out experiences from friends and like-minded travelers or locals from across the globe. It also provides users to design a travel plan or with the help of friends. Enriches the trip by seeking advice from friends and people who have been there before. Pools travel experiences with other tourists so they can also live their travels.

Relevance:

Trouist is a good Web 2.0 application example. It presents Web 2.0 concepts: user participation, information sharing, and user-generated content in its services. It is a useful precedent not only it is a travel website but also a social networking tool. It also could be an inspiration that how to plan and manage a Web 2.0 community.

03

Research

Information Visualization

Web 2.0

Visual Principles

03. Research

To keep this project in the right path, I did the research about Web 2.0, information visualization and visual variables from books and online resources. This section describes the definitions that have important connections to this thesis study.

3.1 Information Visualization

I researched the following books “Digital Information Graphics (2002)” by Matt Woolman, “New Media Design (2007)” by Tricia Austin and Richard Doust and “Information Visualization: Perception for Design” by Colin Ware, tried to clarify “ what is information visualization”. From these resources, I summarized a definition that could help this project to be more focused. Information visualization describes the process whereby vast amounts of data or complex flows of information are mapped and represented visually. It allows the viewer to gain knowledge about the internal structure of the data and relationships in it.

3.2 Web 2.0

The definition of Web 2.0 is still under dispute. I’m not trying to define Web 2.0 in this study. But I think the characteristics of Web 2.0 could be the principles for this project. According to Bart Decrem, a founder and former CEO of Flock, Web 2.0 doesn’t actually refer to any one technology. It is the term for an emerging set of Internet-based tools and an emerging philosophy on how to use them. The philosophy focuses on the idea that the people who consume media, access the Internet, and use the Web shouldn’t absorb what’s available passively. On the contrary, they should be active contributors, helping customize contents for their own purposes, as well as those of their communities.

3.3 Visual Principles

3.3.1 Gestalt Principles:

Gestalt theory allows designers to predict how viewers will respond to design elements. German psychologist developed Gestalt principles in 1920s. Knowing and using gestalt theory can help ensure that the visual messages will be understood and that the designs will be more dynamic in this thesis project. “Information Visualization: Perception For Design (2004) “ by Colin Ware and “Data Visualization (2008)” by Ben Fry all talked about Gestalt principles. The contents and examples of Gestalt

principles may slightly vary from book to book. I listed some useful visual principles and created the examples as the references for this project.

Proximity

Proximity is a grouping principle of perceptual organization. It states that, all else being equal, we tend to perceive elements to be associated when they are close together.

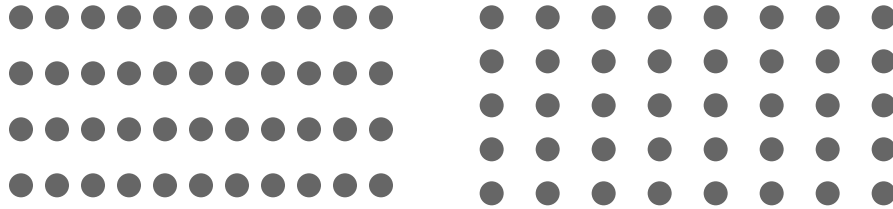


FIGURE 3.3.1 / Proximity

Similarity

Similarity is another grouping principle, which states those elements that share qualities (of color, size, or shape) will be perceived as part of the same form.

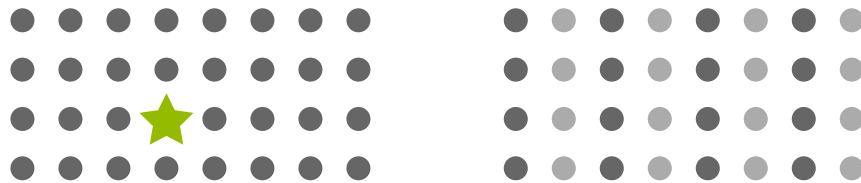


FIGURE 3.3.2 / Similarity

Continuity

The principle of good continuity states that we prefer to perceive smooth, continuous contours rather than abrupt changes in direction. Elements that continue a pattern tend to be grouped together.

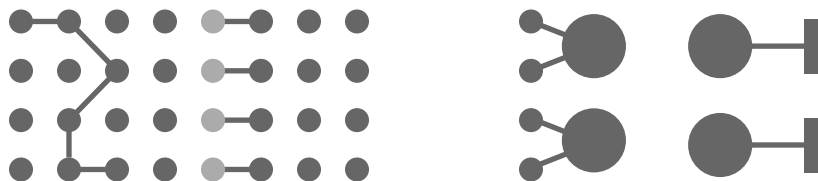


FIGURE 3.3.3 / Continuity

Closure

The principle of closure states that we tend to enclose spaces by completing contours and ignoring gaps in figures. It follows from good continuity and allows us to group elements together or to interpret forms as complete though parts may be missing.



FIGURE 3.3.4 / Closure

Figure/Ground

Figure/ground organization is an important phenomenon of gestalt perception. The figure/ground principle states that we tend to perceive some visual elements as the figure, with a definite shape and border, while other elements appear as the ground, further away and behind the main focus of the figure.



FIGURE 3.3.5 / Figure/Ground

Surroundedness

Surroundedness is another principle that organizes figure and ground. The elements of an image seen as surrounded will be perceived as the figure, and the elements that are doing the surrounding will be perceived as the ground.



FIGURE 3.3.6 / Surroundedness

Symmetry

Symmetry states that we tend to perceive shapes as figures based on their combined symmetrical forms, rather than their individual asymmetric parts.



FIGURE 3.3.7 / Symmetry

3.3.2 Preattentive Variables:

According to this book, “Designing Interfaces (2005)” by Jenifer Tidwell, the author points out the basics of information graphics in Chapter 6. It is called “Pre-Attentive Variables”. The concept is that if you want some data points to stand out from the others, you have to make them look different by varying their color, size, or some other pre-attentive variables. Because these visual attributes are pre-attentive which means they convey information before the viewers pay conscious attention.

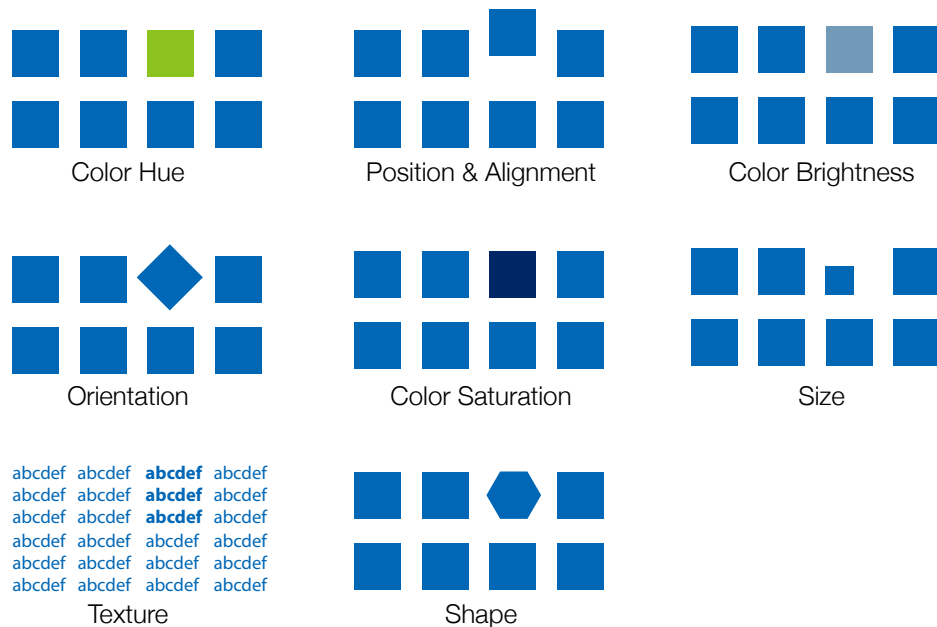


FIGURE 3.3.8 / Pre-attentive variables

04

Process

Development

- Initial Idea
- Turning to Flash

Final Application

- Branding
- Information Architecture
- Back-end Process
- Design Process
- Usability Testing

04. Process

This section states the process of developing faveCITY, including my initial idea, wireframes, Flash ActionScript 3.0 code examples and the final application.

4.1 Development

4.1.1 Initial Idea

My intention was to use Adobe Flex to develop this application in the beginning. I spent a lot of time to learn Flex and MXML (a markup language based on Extensible Markup Language (XML)) by myself. Because I thought Flex would be the best choice to create a rich Internet application (RIAs) in this project. Using Flex could create a lot of functions easily, such as connect to MySQL, create form validation function etc. However, I didn't expect the learning curve was much longer than I thought. There were a lot of gaps need to be overcome while developing this application. After building the first wireframe and discussing with my advisor, I changed the direction and went back to use Adobe Flash and ActionScript 3.0 as the developing tool.

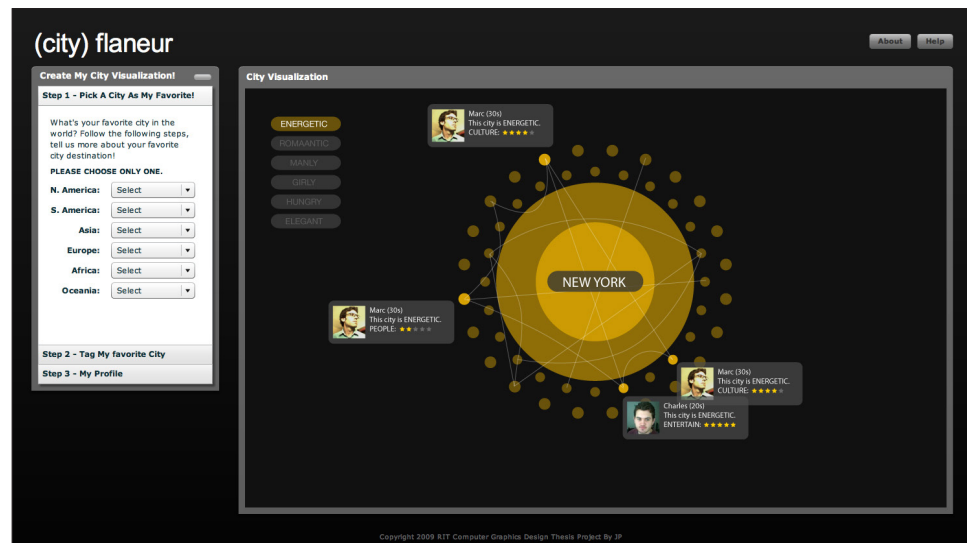


FIGURE 4.1.1 / Flex wireframe: single city results

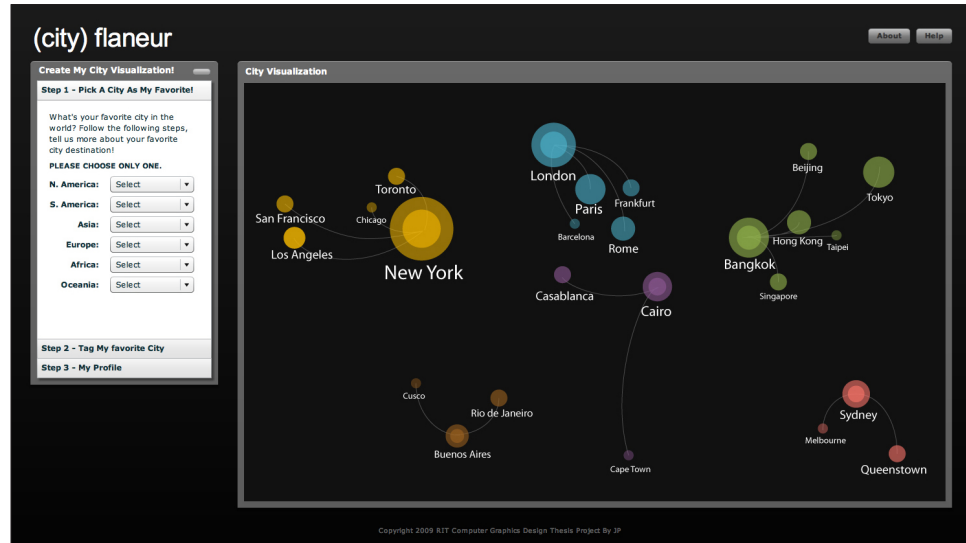


FIGURE 4.1.2 / Flex wireframe: the whole cities results

4.1.2 Turning to Flash

I developed several wireframes and interactions based on the application structure in this project. The overall visual style I set for this interactive application was “clean”, “simple” and “clear”. The reason was that I thought travel information sharing should be fun and easy, I didn’t want information visualization became overloaded for all users. After showing wireframes to my committees, we all agreed the next action was to start the programming. Because this would have a great impact to my interface layouts and application interactions.



FIGURE 4.1.3 / Application wireframe

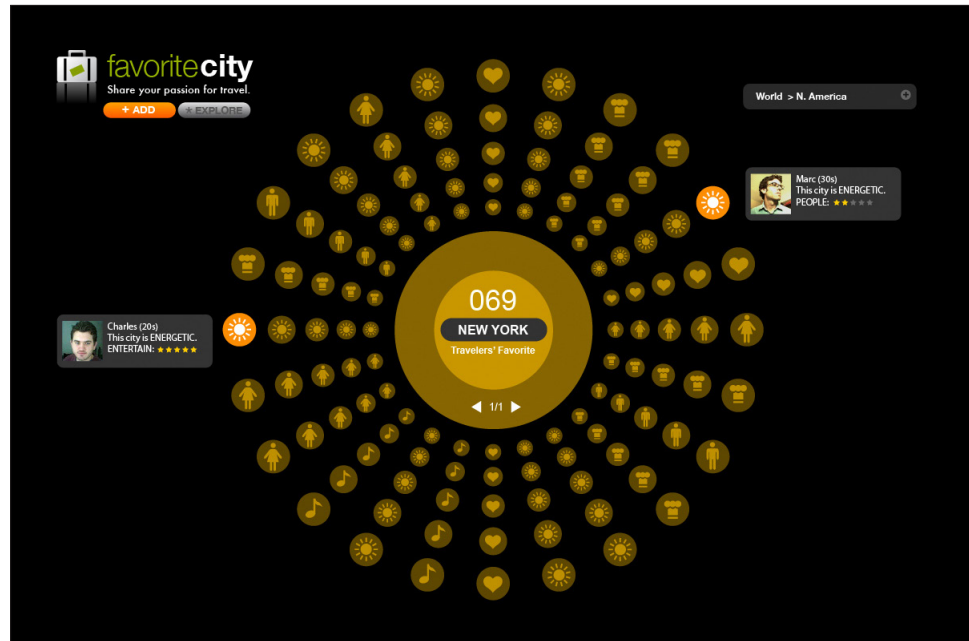


FIGURE 4.1.4 / Application wireframe

Flash, PHP and MySQL

Although I decided to use Adobe Flash to develop it, I realized in order to implement my visual thoughts and convert it to a functional application there was a lot of coding work. The first challenge was using Flash to communicate to the database. I created a PHP file as the middleware to communicate with Flash and MySQL. The following codes in PHP file (getcitydata.php) indicated the workflow between PHP and MySQL.

PHP:

```

43     // table ID
44     $tableID = "mycity2";
45
46
47     if ($userlocation != "") {
48         // INPUT TO MYSQL
49         // create SQL query to insert query into the "mycity2" table
50     $query = "INSERT INTO mycity2 (id, city, emotion, feature, season, souvenir,
username, usergender, userlocation, fileName) VALUES ('', '$city', '$emotion',
'$feature', '$season', '$souvenir', '$username', '$usergender',
'$userlocation', '$image_filename')";
51
52
53     // Send Query to MySQL, Adds new entry to database
54     mysql_query($query);
55     }

```

FIGURE 4.1.5 / "getcitydata.php" codes

Furthermore, function “sendData” in the ActionScript was the key point to call “getcitydata.php” file and insert data to the database.

ActionScript:

```
1 //===== Send Data to DB =====//
2 // send data to db. only execute this function at the last call.
3 function sendData() {
4
5     var myRequest:URLRequest;
6     var myVars:URLVariables;
7     var myLoader:URLLoader;
8
9     myVars = new URLVariables();
10    // myVars.(db)field name = variables defined in Flash
11    myVars.city = myCity;
12    myVars.emotion = myEmotion;
13    myVars.feature = myFeature;
14    myVars.season = mySeason;
15    myVars.souvenir = mySouvenir;
16    myVars.username = myName;
17    myVars.usergender = myGender;
18    myVars.userlocation = myLocation;
19
20    myVars.userpic = myImage;
21
22    // this prepares the request for the loader
23    myRequest = new URLRequest();
24    myRequest.url="getcitydata3.8.php";
25    myRequest.method=URLRequestMethod.POST;
26    myRequest.data=myVars;
27
28    // this is the loader that will send and receive
29    myLoader = new URLLoader();
30
31    // could be TEXT or BINARY
32    myLoader.dataFormat = URLLoaderDataFormat.TEXT;
33
34    // detect if the content loaded successfully
35    myLoader.addEventListener(IOErrorEvent.IO_ERROR, showError);
36
37    myLoader.addEventListener(Event.COMPLETE, onLoadXML);
38    myLoader.load(myRequest);
39
40    function showError(e:IOErrorEvent) {
41        trace("There was an error!");
42    }
43    gotoAndStop("result1");
44
45 }
46 }
```

FIGURE 4.1.6 / Function “sendData” connected to the PHP file

Image Upload/Rename Function Issue

One of the big coding issues I struggled with for a long time was the image upload function. In the front-end user interface part, the image was supposed to be displayed in real-time after the user pressed the “upload” button. In the back-end, the original image file name from the user should be renamed after it was uploaded to the server. These two specs took me a long time to find the solution. I created a new PHP file to deal with image upload and rename function. In ActionScript part, “setTimeout()” function provided enough time to display the image after the user pressed the “upload” button.

PHP:

```
4 // rename image
5 $image_filename_exp = explode(".", $_FILES["Filedata"]["name"]);
6 $image_ext = $image_filename_exp[count($image_filename_exp) - 1];
7 $image_counter = 1;
8 do {
9     $image_filename = "uploads/" . $_POST['regtime'] . "." . $image_ext;
10    $image_counter++;
11
12 } while(file_exists($image_filename));
13
14 move_uploaded_file($_FILES['Filedata']['tmp_name'], $image_filename);
15
```

ActionScript:

```
406 function progressHandler(event:ProgressEvent):void {
407     txtStatus.text = "Uploading: " + event.bytesLoaded + " / " + event.bytesTotal;
408 }
409 function ioErrorHandler(event:IOErrorEvent):void {
410     txtStatus.text = "IO error??";
411 }
412 function securityHandler(event:SecurityErrorEvent):void {
413     txtStatus.text = "Security Error";
414 }
415 function completeHandler(event:Event):void {
416     txtStatus.text = "Upload Complete";
417     btnUpload.visible = false;
418     btnUpload.buttonMode = true;
419     setTimeout(getImage,100); |
420
```

FIGURE 4.1.7 & 8 / Image upload/rename solutions in PHP (above) and ActionScript (below)

Display Results

As for <EXPLORE> section, the basic concept was based on the “strings” and XML. All users’ opinions, profiles and images stored on the database were converted XML strings. In ActionScript, “switch (expression)” statements executed which city data should be loaded or which user’s profile should be shown on the screen.

ActionScript:

```
8      public class CityCircle extends MovieClip{
9
10     var containers:Array;
11     //currentpage shows the last
12     var currentpage:Number=0;
13     public function CityCircle(lastxml:XML, counter:Number, cArray:Array){
14
15         if (lastxml != null){
16             // show the selected cityName
17             txt_cityName.text = lastxml.@city;
18             containers = cArray;
19             txt_counter.text = ""+counter;
20
21             var tempCity:String = lastxml.@city;
22             //switch (lastxml.@city as String)
23             switch (tempCity) {
24                 case "Montreal":
25                 case "New York":
26                 case "Boston":
27                 case "Chicago":
28                 case "San Francisco":
29                 case "Los Angeles":
30                     mc_colors_city.gotoAndStop("N. America");
31                     break;
32                 case "Cuzco":
33                 case "Rio de Janeiro":
34                 case "Buenos Aires":
35                     mc_colors_city.gotoAndStop("S. America");
36                     break;
37                 case "London":
38                 case "Paris":
39                 case "Rome":
40                 case "Barcelona":
41                 case "Prague":
42                 case "Florence":
43                     mc_colors_city.gotoAndStop("Europe");
44                     break;
45                 case "Istanbul":
46                 case "Casablanca":
47                 case "Cairo":
48                 case "Dubai":
49                 case "Cape Town":
50                     mc_colors_city.gotoAndStop("Africa or M. East");
51                     break;
52                 case "Tokyo":
53                 case "Kyoto":
54                 case "Beijing":
55                 case "Hong Kong":
56                 case "Bangkok":
57                 case "Singapore":
58                     mc_colors_city.gotoAndStop("Asia");
59                     break;
60                 case "Sydney":
61                 case "Melbourne":
62                 case "Queenstown":
63                     mc_colors_city.gotoAndStop("Oceania");
64                     break;
65             }
```

FIGURE 4.1.9 / Switch statements in ActionScript

4.2 Final Application

4.2.1 Branding

This online application provides users to express their city preferences, travel experiences. Furthermore, these city lovers can get travel tips from likeminded travelers. The brand personality of faveCITY is “To Share”, “To Recommend”, “To Collaborate”. For example: Simple(city), City(l)Love, Flaneur, travelogue...



FIGURE 4.2.1 / Branding Ideas

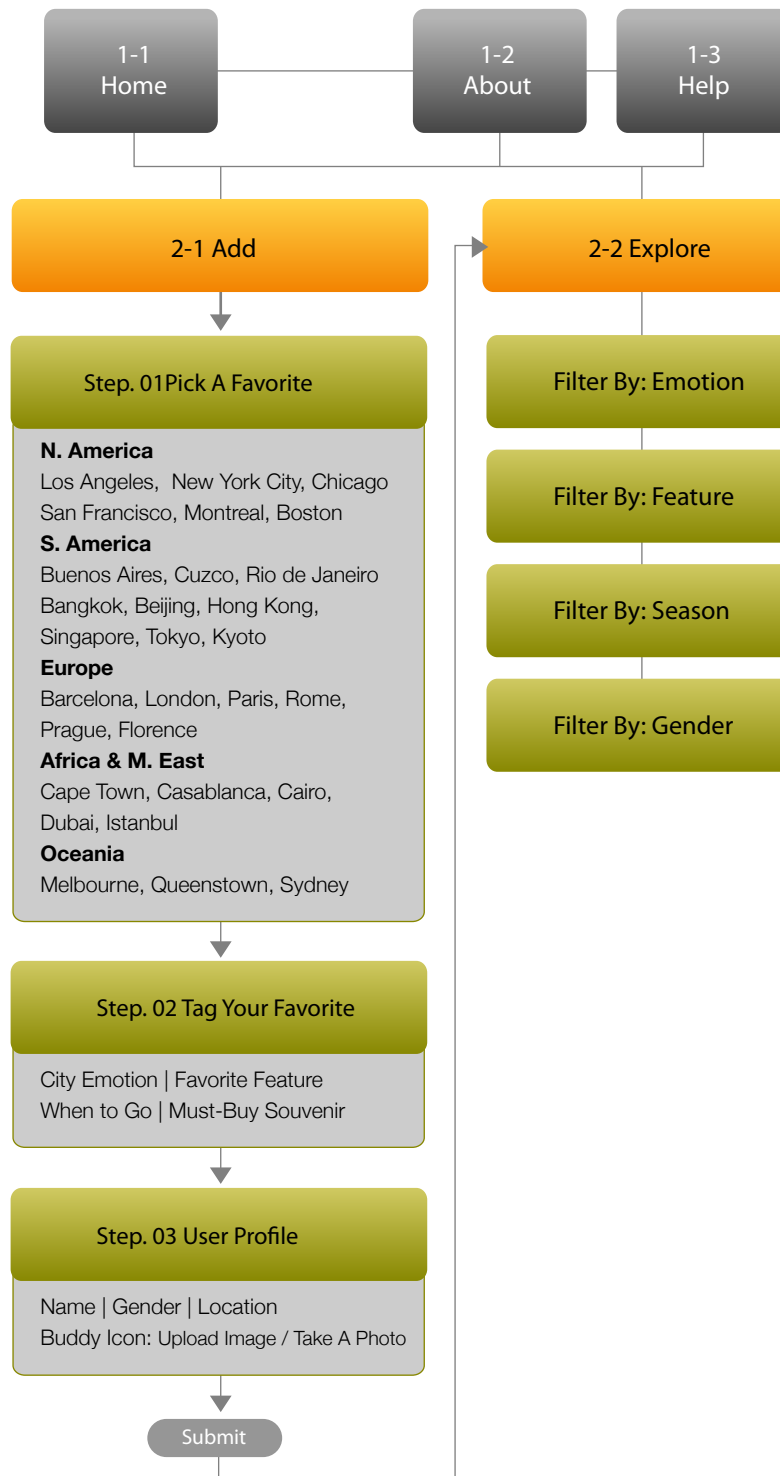
I decided to create a new term called “faveCITY” which comes from “Favorite City”. I think it could express the brand personality more directly.



FIGURE 4.2.2 / faveCITY Logo

4.2.2 Information Architecture (Blueprint)

FIGURE 4.2.3 / Blueprint



4.2.3 Back-end Process

The information visualization of this Flash application is based on user's data. In order to get the data in real time, the application needs to be connected with a database. Adobe Flash cannot communicate directly with a database. However, it can “talk” to server-side applications (also referred to as “middleware”). Middleware can query a database and relay data back and forth. There are many server applications available, the most common are CGI, ASP, PHP, and ColdFusion.

The workflow of this application is when the user adds a new comment in the front-end Flash user interface that is connected with a PHP script, the PHP script takes the data and sends it to the database. To display the visualization results in the front-end user interface in real time, the data will be converted to XML format via the server-side platform, and Flash reads and parses the XML to show the visual results in the end.

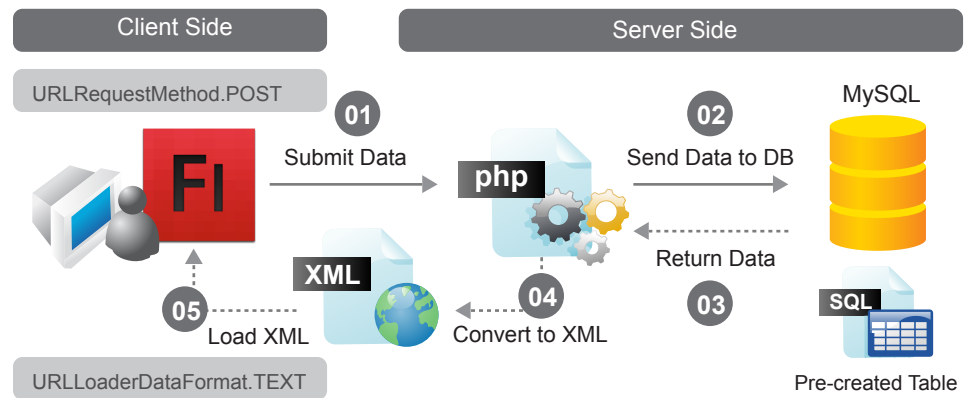


FIGURE 4.2.4 / faveCITY Back-end Process

Storing/Getting Data

I used phpMyAdmin to create a table called “mycity2” in the database. It is the place for storing data and getting data. There are 10 fields in the table “mycity2”: id, city (favorite city), emotion (city emotion), feature (favorite city feature), season (best time to visit), souvenir (souvenir recommendation), username (name), usergender (gender), userlocation (location), fileName (buddy icon).

Field	Type	Collation	Attributes	Null	Default	Extra
<input type="checkbox"/> id	int(11)			No	None	auto_increment
<input type="checkbox"/> city	text	latin1_swedish_ci		No		
<input type="checkbox"/> emotion	text	latin1_swedish_ci		No		
<input type="checkbox"/> feature	text	latin1_swedish_ci		No		
<input type="checkbox"/> season	text	latin1_swedish_ci		No		
<input type="checkbox"/> souvenir	text	latin1_swedish_ci		No		
<input type="checkbox"/> username	text	latin1_swedish_ci		No		
<input type="checkbox"/> usergender	text	latin1_swedish_ci		No		
<input type="checkbox"/> userlocation	text	latin1_swedish_ci		No		
<input type="checkbox"/> fileName	varchar(255)	latin1_swedish_ci		No		

FIGURE 4.2.5 / faveCITY data table in phpMyAdmin

The Middleware - PHP

“getcitydata.php”	When the user adds a new comment in the front-end UI , this PHP file helps to insert query to MySQL, communicates data between the table “mycity2” and faveCITY API.
“upload.php”	This PHP deals with upload, resize and rename image functions in the application.

4.2.4 Design Process

The interface design of this application tends to provide users a clean, simple and playful look. Not only this application handles a huge amount of information, but also it acquires users' opinions as the data to generate the visualization. Simple and clear design could eliminate unnecessary interruptions while manipulating this application. Semiotics plays an important role in information visualization. It could display information in a straightforward but not boring way. So I created a lot of symbols to represent abstract information in this application, such as emotions, features, gender, seasons.

In terms of color, the secondary color of identity – green is usually used in “mouse over” and “selected” modes. There are twenty-nine cities for user to choose in this application, the color coding rules are: each continent is assigned to one specific color and the city color is based on it belongs to which continent.

4.2.4.1 <ADD> Section

This section contains three steps for users to accomplish. The first step is “Pick a favorite city”. 29 city circles are displayed on the world map for users to choose. Each continent is assigned a hexadecimal color in the legend box. The color coding rules are: North America- c28b11, South America- 643a13, Europe- 34768e, Africa & M. East- 58305e, Asia- 607725, Oceania-b14441.



FIGURE 4.2.6 / Step.1 Pick a favorite city

The step two is “Tag your favorite”. There are 4 questions for users: “Tag a city emotion for your favorite city”, “What is your favorite feature about this city?”, “Do you think when is the best time to visit?”, “Recommend a must-buy souvenir”. These questions are designed to clarify the reasons for the user’s favorite city. It will help other people to get a better understanding and travel advice from the user’s comments. I created a lot of symbols to represent each answer. For example, a heart shape means ‘Romantic’ emotion, a sun symbol represents “Energetic” emotion, a maple leave means “Autumn” season, a snowflake indicates “Winter” season. Instead of using a lot of text, I think a simple and meaningful symbol design could express more than words. These symbols will be used widely in the results page as well.



FIGURE 4.2.7 / Step.2 Tag your favorite



FIGURE 4.2.8 / Symbols represent each answer

The step three is “Set up user profile”. The user needs to answer some basic demographic questions, such as “Name”, “Gender”, “Location” and “Buddy Icon”. “Buddy Icon” function provides different options: (1) Upload an image from a computer (2) Take a photo from the Webcam and upload it (3) Use the default icon.

After complete three steps in ADD section, the user can view the result in real time. It shows all likeminded travelers’ opinions and profile information.

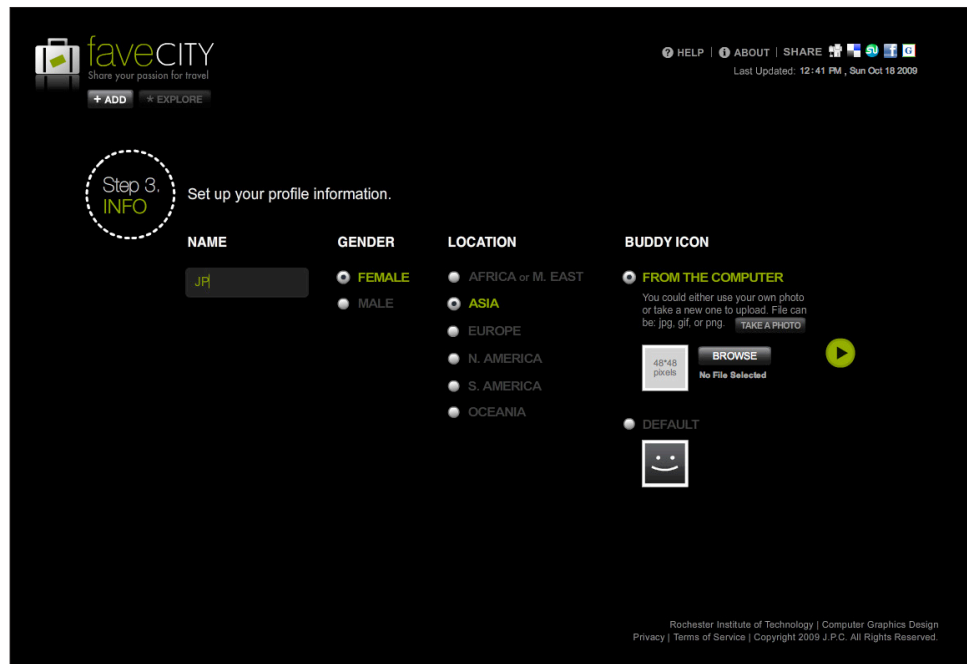


FIGURE 4.2.9 / Step.3 Set up user profile

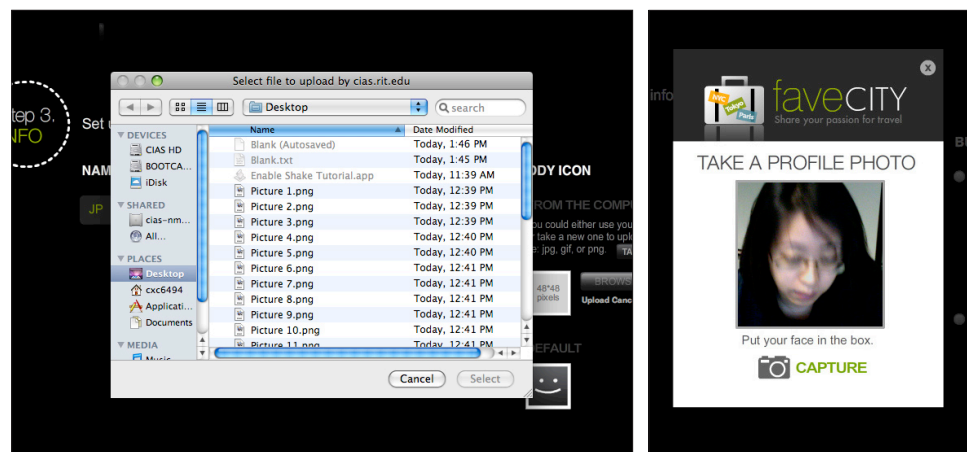


FIGURE 4.2.10 / Step.3 Upload a buddy icon image or take a profile photo



FIGURE 4.2.11 / One favorite city results

4.2.4.2 <EXPLORE> Section

The main visual design concept is inspired by “Ferris Wheel”. It definitely is a city product. A lot of big cities in the world has its own “Ferris Wheel” as a city landmark, for example, “London Eye” is located in London, “Chicago Wheel” located in Chicago, “Cosmo Clock 21” located in Tokyo. The shape of Ferris Wheel could be a good metaphor for faveCITY. Each person “lives” or “rides” in one circle after he or she votes a favorite city.



FIGURE 4.2.12 / Ferris Wheel is a metaphor

The default page of EXPLORE section is a world map showing the popularity for twenty-nine cities. The size of each city circle varies with the popularity. The most popular city shows the biggest circle. This allows users to tell which one is the most popular city currently. Users also can read the accurate popularity number when mouse over each city circle.



FIGURE 4.2.13 / This world map shows the popularity for all cities

When the user clicks on one city circle, the page will be directed to the single city result. This page shows all likeminded travelers' information and opinions. The emotions buttons allow users to click and view those people have the same comments. The movable drop down panel - city navigation box provides users to explore other city results. The filtering bar includes "Filter By Feature", "Filter By Season", "Filter By Gender" functions. Users can organize information by changing sort condition. In order to provide users a complete city emotion results, the drop down panel on the left side of the screen – the city emotions ranking displays the following information: which city is the most energetic city and which one is the most romantic city, etc.



FIGURE 4.2.14 / Single city results

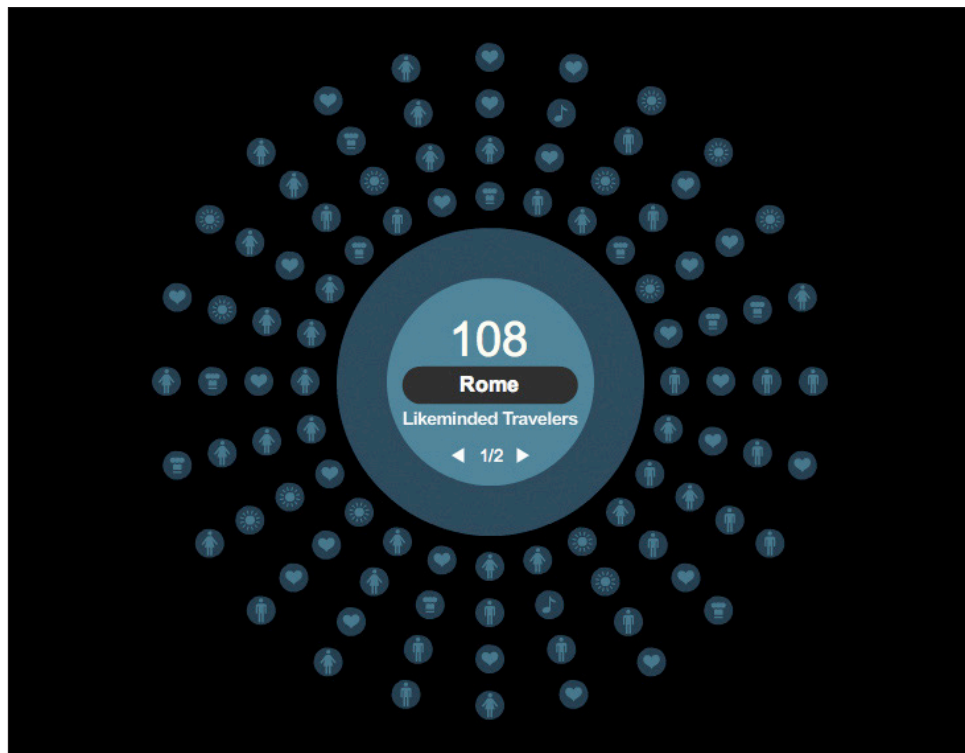


FIGURE 4.2.15 / Each user “lives” in one small circle. Each wheel carries 24 users. Per page contains 4 wheels. The number represents how many likeminded users have the same choice.

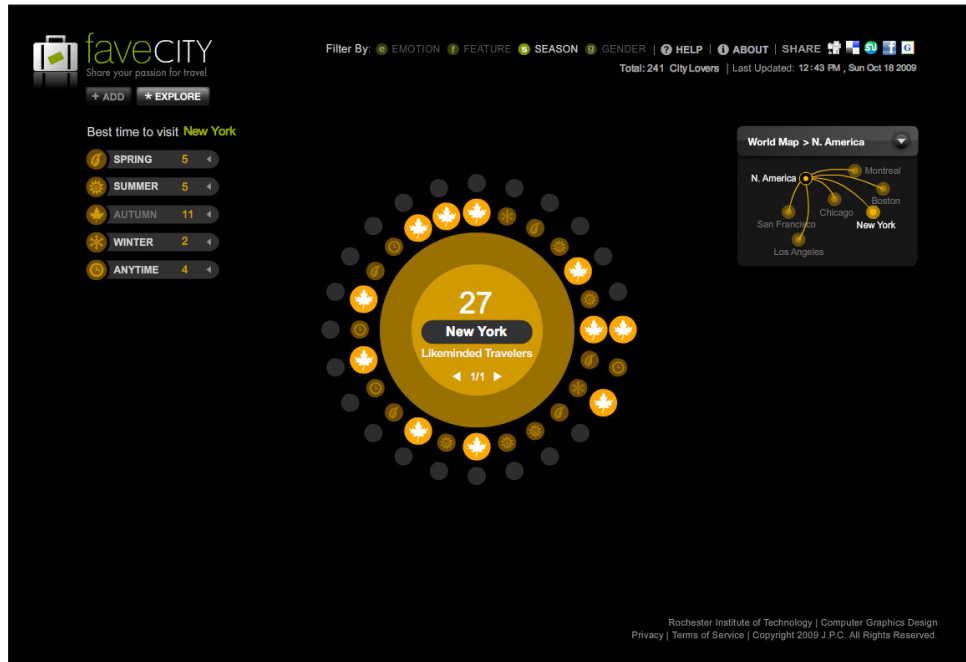


FIGURE 4.2.16 / The data could be filtered by “Season”, “Emotion”, “Feature” and “Gender”. The buttons on the left hand side allow users to click and view those people have the same comments.

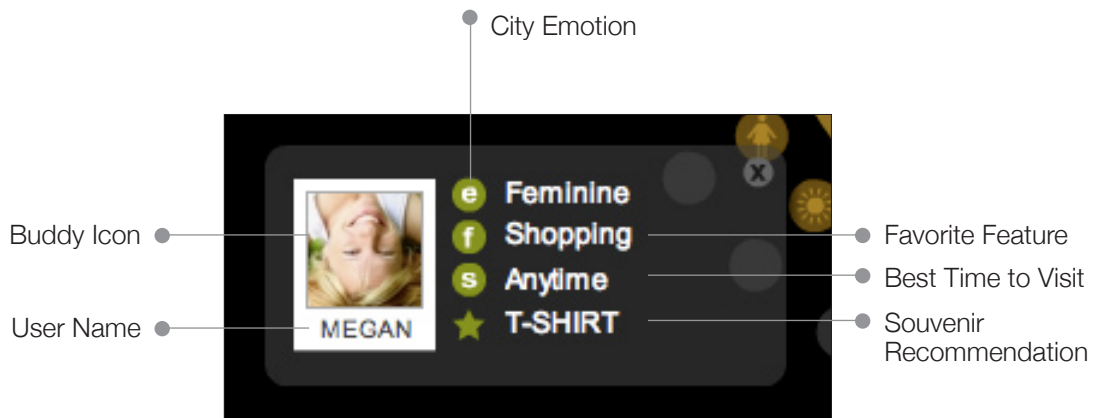


FIGURE 4.2.17 / User profile

FIGURE 4.2.18 / Filter | About & Help | Social Bookmarking | Total Participants Data Update Time

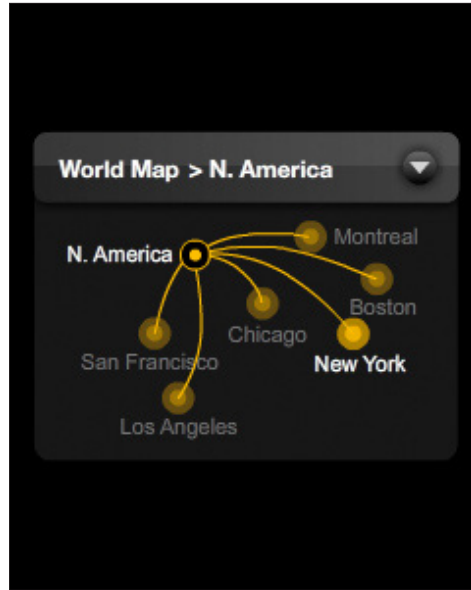


FIGURE 4.2.19 / Movable panel: City Navigation Box

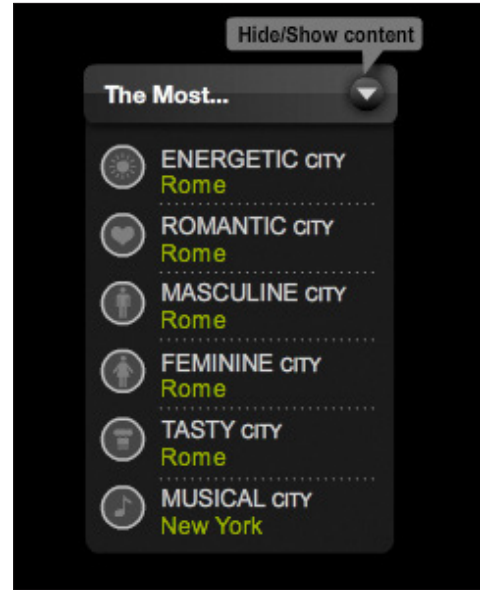


FIGURE 4.2.20 / Movable panel: City Emotions Ranking

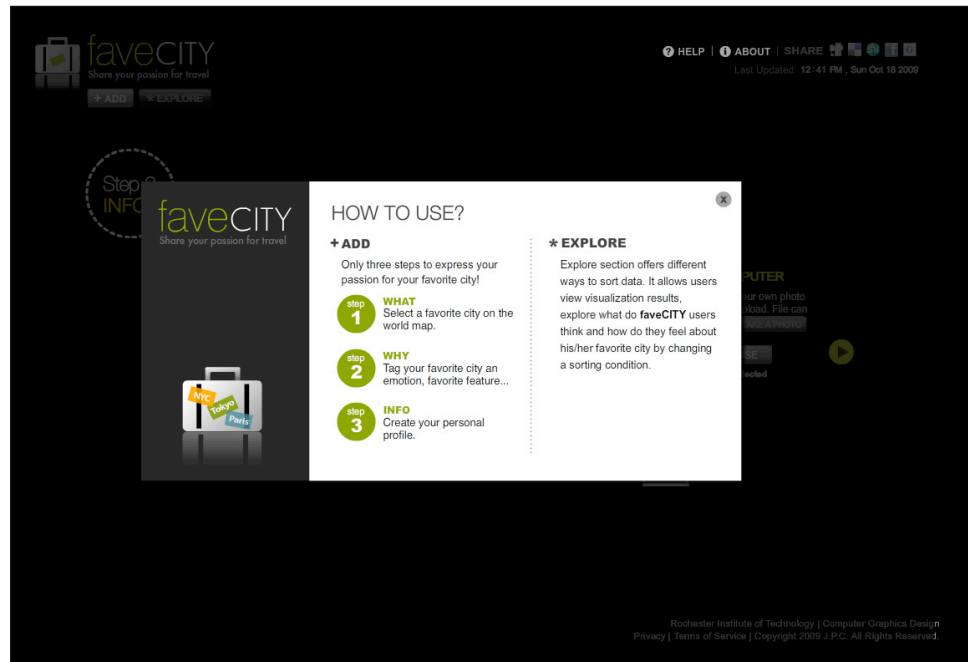


FIGURE 4.2.21 / faveCITY Help Screenshot

4.2.5 Usability Testing

I did the usability testing before faveCITY was launched. There were two tasks: <ADD> and <EXPLORE> on the testing sheet (See Chapter 5. Appendix: Usability Testing Sample). Each task I provided a few steps for participants and asked them to complete these steps. After finished these steps, they could evaluate faveCITY and write down the comments. I got positive feedbacks from the users. Here is th results:

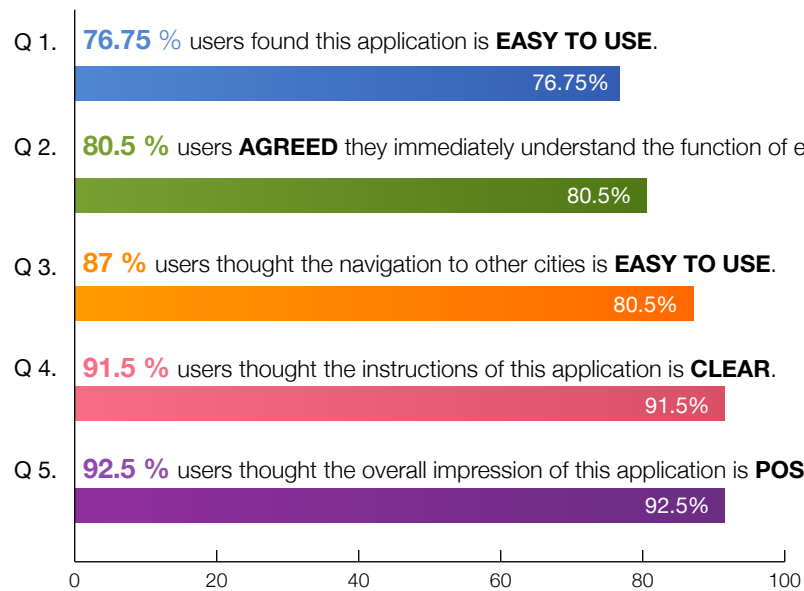


FIGURE 4.2.22 / faveCITY usability testing results

I made some changes after the usability testing observation. First of all, I added “Take A Photo” function in faveCITY application because I found most participants didn’t use their personal buddy icon while doing the test. I would like to provide different options, including “upload your own photo” and “take a snapshot” to encourage users use their unique pictures to represent themselves. I also added an animation for filtering bar in “EXPLORE” section to remind the user filtering bar is just added on the screen and encourage the user to explore other contents.

Conclusion

I have been interested in Web 2.0 trends for a long time. I think the features of Web 2.0: rich user experience, user participation and dynamic content...etc really accelerate the blossom of online social networking. It is also a great platform for information sharing. I select "city" as the topic because I believe there must be some travel tips and personal opinions you could not find in a travel guidebook. The goal of this thesis project is to take advantage Web 2.0 features to create a platform and visualize all information from users. By forcing myself to rethink the relationship between each data and how to visualize the information in an effective way, I realized organizing complex information dynamically is not only needs to use traditional graphic design principles (signs, symbols, metaphor, labels, typography, information hierarchies and color scales) but also could take full advantage of interactive features.



The Biggest Challenge

The biggest challenge while developing this project is definitely the programming. I overcame some difficulties and also got the experiences that I never have before, such as using Flash to connect to MySQL and creating upload image function (resize and rename the image) in Flash and PHP. Not to mention, in order to make the great interactions, I practiced a lot about ActionScript 3.0 coding in this project. Although from a developer's point of view, there must be some functions that could be done better, I am pleased I use my way to accomplish the goal. Maybe it took a long way to get the destination, I feel that I have met the criteria I set up for this project.

05

Appendix

Bibliography

Usability Testing Sample

Proposal

05. Appendix: Bibliography

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05. Appendix: Usability Testing Task Sheet

Usability Testing: Task Sheet

ABOUT FAVECITY:

faveCITY is a visual exploration of what do people think and how do they feel about their favorite cities. It collects users' opinions about the city such as city emotion, favorite city feature, best season to visit and a must-have souvenir from their experiences. The goal of this project is to combine with Web 2.0 features and create an information-sharing platform for city travelers. It then visualizes these data in a series of playful interfaces.

★ These usability testing results will not be used for any commercial purposes. It only will be used to improve the design of this thesis project. It will take approximately 20 minutes to finish the following steps. All data and information you share today will be handled confidentially. Thank you for your participation.

PARTICIPANT INFO:

Name: Andrew Kane Date: 10/14/2009
(PLEASE PRINT)

Age: 16-20 21-30 31-40 41-50 Above 50

Gender: Male Female

START

TASK 1: ADD

Express and share your opinion.

This section needs you to select your favorite city, tag this city an emotion, feature, best time to visit and a must-have souvenir.

Step 01. Click on "ADD" button on the main page

Step 02. Click on your favorite city

Step 03. Tag your favorite city

Step 04. Set up your profile information

Step 05. Review your result

Do you feel that you successfully completed these steps?

Yes No. If no, which part strikes you most?

Throbbing buttons were next!

(to be continued)

Usability Testing: Task Sheet

TASK 2: EXPLORE

Explore like-minded travelers' travel tips

This section provides you all of the information about the most popular city, what do other users think and feel about these cities, what would they recommend if you have interest to visit that city.

Step 01. Click on "EXPLORE" button
 (either on the main page or any page you are now)

Step 02. Click on any city circle you want on the world map

Step 03. Review the results

Step 04. Select another city to review the results

Do you feel that you successfully performed Step 04?

Yes No. If no, what makes you feel confused?

Step 05. In the result page, select any emotion button you would like to know

Do you feel that you successfully performed Step 05?

Yes No. If no, what makes you feel confused?

Maybe show a message when there's 0?

Please circle the number nearest the term that most closely matches your feelings: e.g. **Disagree** 3 2 1 0 1 2 **3** **Agree**

Q 1. As a user, I found this application:	Difficult to use	3	2	1	0	1	2	3	Easy to use
Q 2. I immediately understood the function of each button:	Disagree	3	2	1	0	1	2	3	Agree
Q 3. I found the navigation to other cities to be:	Difficult to use	3	2	1	0	1	2	3	Easy to use
Q 4. I found the instructions of this application to be:	Confusing	3	2	1	0	1	2	3	Clear
Q 5. My overall impression of this application is:	Negative	3	2	1	0	1	2	3	Positive

Comments: Awesome! Very pretty flash, too.

05. Appendix: Proposal

Thesis Proposal for the Master of Fine Arts Degree

Rochester Institute of Technology
College of Imaging Arts and Sciences
School of Design - Computer Graphics Design

Version.6.0 11/04/2008

Interactive Information Visualization in Online Social Networking

Keywords: Information Visualization, Online Social Networking, User-Centered

Background

Do you use Wikipedia to find information? Do you use Flickr to share photos with friends or strangers? Do you watch video on Youtube? Do you have a Facebook or LinkedIn account to maintain your contact list? All these online applications are so-called Web 2.0 social media [*]. Some people may think “Web 2.0” is only a marketing hype, but the chances are most people are already using some application that is a form of Web 2.0. This platform is changing the way we communicate and our social networking. People all over the world are “linked” by these invisible lines. I was inspired by this phenomenon, human relationships in today’s world become multi area, complex and intersecting. I think visualize this complex information could help people understand it.

What is Web 2.0?

Web 2.0 is not referred to an update to any technical specifications. Originally in 2004, it was refer to as this idea of the “Web as a platform”. The concept was that instead of thinking of the Web as a place where browsers viewed data, the Web was actually the platform that allowed people to get things done. But it’s fairly hard to grasp what that really means. Later people started thinking of Web 2.0 as the programming tools. This included AJAX and SOAP and other XML and JavaScript applications that allowed the readers to actually interact with the Web pages just like you use an application on your desktop. Now Web 2.0 is really starting to mean a combination of the technology (like AJAX) allowing the users to actually interact with the information. According to David Best (2006- “Web 2.0 Next Big Thing or Next Big Internet Bubble?”), the characteristics of Web 2.0 are: rich user experience, user participation, dynamic content, metadata, web standards and scalability. Further characteristics, such as openness, freedom and collective intelligence by way of user participation, can also be viewed as essential attributes of Web 2.0. All these Web 2.0 features accelerate the blossom of online social networking. Within the network, each individual actor is the node and the relationships between the individual actors

become the ties. In this network, people share interests and activities across the culture, region, age or gender.

Information Visualization

Information visualization is the use of interactive visual representations of abstract data to elaborate cognition. Visual representations and interaction technology allow users to see, explore, and understand large amounts of information at once. It is also an effective way to explain the complex information, such as social networking relationship.

Problem Statement

This thesis will explore the possible interactive design solutions to display dynamic social networking information. Could abstract information, such as “city”, “emotion” and “social networking”, be visualized in an effective way? Could they reveal the hidden patterns and flow?

Goal

The overall goals of my thesis are:

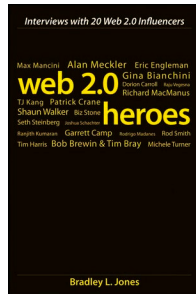
- Engage the viewer in a rich visual experience
- Make the information accessible to the user
- Offer a navigational system that is easy to use

Scope

This project will explore the potential data visualization solutions to interpret social networking relationship. In computer graphics design areas, it includes Interactive Information Design, Data Visualization, Dynamic Database, Graphical User Interface, and semiotics in design.

Literature Review

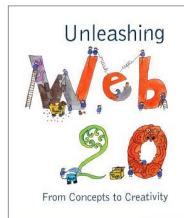
This study will explore Web 2.0 social impact- online social networking blossom and how this phenomenon shortens the distance in the real world and rewrites the relationships between people. Moreover, using dynamic data visualization to describe the relationship. In the literature review, I selected books about Web 2.0, dynamic database and information visualization fields to explore different perspectives and skills. Due to it is a current and developing issue, I also reviewed a lot of online articles and websites to shape and support my point.



[Book] Web2.0

Bradley L. Jones. Web 2.0 Heroes: Interviews with 20 Web 2.0 Influencers. NJ: Wiley, April 14 2008.

This book collects 20 interviews of Web 2.0 impact makers, such as Patrick Crane (LinkedIn), Biz Stone (Twitter) and TJ Kang (ThinkFree). The author also asked them what do they think about Web 2.0. One interesting thing is few of them don't agree "Web 2.0" exists but they couldn't deny the way people communicate and social is changing now. This book will help me to review different perspectives about Web 2.0 and clarify some concepts.



[Book] Web2.0

Gottfried Vossen, Stephan Hagemann. Unleashing Web 2.0: From Concepts to Creativity. CA: Morgan Kaufmann, July 27 2007.

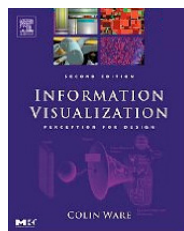
This book explains Web 2.0 technologies and how they can be used to provide value to users in a Web 2.0 world. It focuses on technical (programming) aspects, in addition to points out basic concepts and the business side of Web 2.0. What makes this book useful is the fact that it reintroduces common concepts, such as blogs, in a way that an executive can understand and take advantage of. This book will help me build my arguments on the basic concepts and technologies about Web 2.0.



[Book] Web2.0

O'Reilly. Web 2.0 Report. CA: O'Reilly Media, November 1 2006

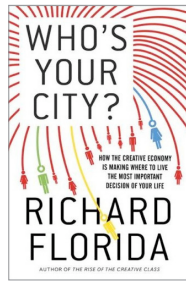
In this publication, the author presents a strong business case study that user-centric Internet applications drive revenue and brand equity. It is a useful reference for anyone wanting to look deeper into those Web 2.0 websites, such as why Flickr is so addictive, or why Google would pay so much for YouTube. This report will be a great reference in developing my study content for Web 2.0 observation.



[Book] Information Visualization

Colin Ware. Information Visualization 2 Edition. CA: Morgan Kaufmann, April 7 2004

This is a basic introduction to Information Visualization, covering topics from human perception to improving the decision-making processes with visualizations. This book will be the important knowledge base about data visualization in my project.



[Book] City

Richard Florida. Who's Your City?. NY: Basic Books, March 10 2008

The main concept of this book is about “How the Creative Economy Is Making Where to Live the Most Important Decision of Your Life”. The author did this research in the United States. The book is organized into four parts. (1) Why Place Matters - explains why place is best described in terms of mega-regions, of which there are 40 in the world. (2) The Wealth of Places describes why the creative class is a primary reason these 40 mega-regions are the economic and cultural engines of the world. (3) The Geography of Happiness - looks beyond jobs and identifies the primary factors (aesthetics, openness) and personalities cities possess that are much better predictors of attracting the creative class. (4) Where We Live Now - identifies the three big moves we make in our lifetime - post graduation/career development; when we have kids; and when they leave/we retire. In the final chapter, the author provides tools to help you find your ideal city. I was inspired by this book, people choose a city to live, to work or to travel could depend on many motivations. Although, the research sample focused on the United States, I thought it still could be a good inspiration for my project.

Online
Article

[Online Article] Web2.0

Nimish Vohra. “Web2.0: The Basics”. September 26 2007
<<http://www.scribd.com/doc/22766/Web20-The-Basics>>

This documentation describes several overview concepts of Web 2.0: such as “web as a platform”, “harnessing collective intelligence Web 2.0”, “rich user experience”, “visual design”, “Web 2.0 design patterns” etc. It will help my research to explain these proper nouns and fundamental concepts.

Online
Article

[Online Article] Web2.0

N/A. “Web 2.0 how-to design style guide”. September 26 2007
< <http://www.webdesignfromscratch.com/web-2.0-design-style-guide.cfm>>

This article demonstrates Web2.0 design style guides. The author explains why they work (i.e. why they have become common), as well as how, when and where reader might use each element in web designs. In this documentation, he also analyzes in greater depth the design features of the current “Web 2.0” design style. It will be useful in designing a Web 2.0 website for my project.

Online Article

[Online Article] Information Visualization Social Media

Samantha Warren. “Data Visualization: Is it the Future of the Internet?”. October 3 2008 <<http://www.viget.com/inspire/data-visualization-is-it-the-future-of-the-internet/>>

This article introduces some good information visualization examples and especially these examples all come from social media, such as twitter, blogs. I play around these applications and found they all did a good job not only from visual perspective but also from information presentation perspective.

Online Article

[Online Article] Information Visualization

N/A. “Information Visualization”. October 18 2008 < http://en.wikipedia.org/wiki/Information_visualization>

This article explains the basic concept of “Information Visualization”, including the history, application, techniques, toolkits and experts in this area. After reading this article, I realized that the discipline of “Information Visualization” is more about computer science, but it could be my knowledge base when developing thesis project.

Online Article

[Online Article] Information Visualization

N/A. “Data Visualization: Modern Approaches”. SMASHING MAGAZINE, August 2 2008. October 18 2008 < <http://www.smashingmagazine.com/2007/08/02/data-visualization-modern-approaches/>>

This article explains the basic concept of “Information Visualization”, including the history, application, techniques, toolkits and experts in this area. After reading this article, I realized that the discipline of “Information Visualization” is more about computer science, but it could be my knowledge base when developing thesis project.



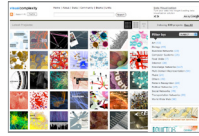
[Website] Information Visualization

Yugo Nakamura. “NEC ecotonoha”. N/A < <https://www.ecotonoha.com/ecotonoha.html>> October 3 2008

This website is definitely an excellent information visualization example. I was impressed with its idea when I first saw it about four years ago. Though it’s a corporate event, you still can see the creativity in every detail. The main concept of this event is a tree-planting activity; the purpose is to encourage people pay attention to the environment protection. When users participate in this event to make the tree in the virtual world (website), the corporation will plant a real tree in the real world. When the user leaves a message, a “text” leaf will grow from the end of branches,



and then the virtual tree will grow up. It's a pretty interesting and engaging project.



[Website] Information Visualization

Manuel Lima. "Visual Complexity.com". N/A < <http://www.visualcomplexity.com/vc/>> October 21 2008

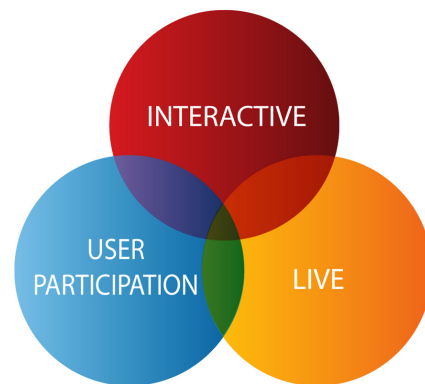
This website collects tons of visualization art works. Manuel Lima, the founder of this website, is an interaction designer and completed his MFA degree from the Design+Technology program at Parsons School of Design. This website leverages a critical understanding of different visualization methods, across a series of disciplines, as diverse as Biology, Social Networks or the World Wide Web. It is a really good inspiration for my thesis.

Project Description / Methodology

Concepts:

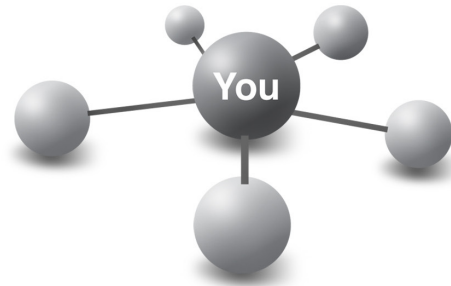
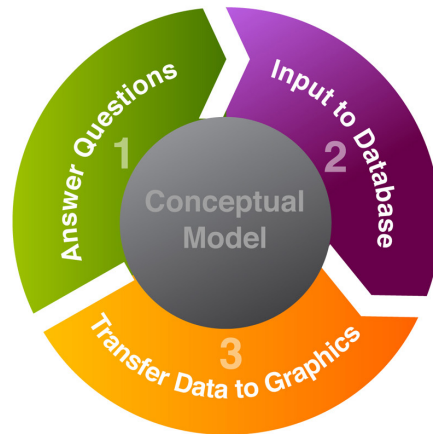
My solution will be an interactive application and apply "Web 2.0" features into the project. There will be three key features for this application:

1. It is "interactive." the user can "drill down" and "mine" extra layers of information by clicking on the screen.
2. It is "live," giving the user "real-time" information on a "dynamic" interface.
3. It is "user participation". The user can input information and thereby change the map itself. In this way, data visualization is like a growing organism that responds according to input that can, come from anywhere in the world.



Subject:

The book "The World Is Flat" by Thomas L. Friedman uses the "flat" metaphor to view the world as flat in terms of globalization. I think in the online social networking world, "networking" also breaks the wall of region, culture, age, etc. More than just retrieve information in one way, people use Web as the platform to share and communicate, no matter which area or city they live, what kind of language they use. However I thought cities around the world still have their own characteristics, culture and emotion, people are linked by some similarities but also have differences.



Exploration:

3 possible directions for this topic: (See attachment - Subject Exploration)

(A) UNESCO World Heritage List (From UNESCO.ORG) Data Quantity : 50~878;

(B) Most Popular City List (From Time Travel.com and my selection) Data Quantity : 15~30;

(C) Countries of the World List (From WorldAtlas.com) Data Quantity : 192;

Most Popular Travel City List:

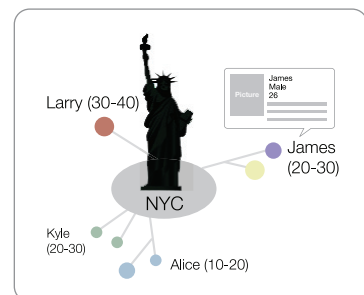
Purpose: Visualize the information about the most popular travel cities and how the users view them.

Strength: Learn city travel information. Cities are limited and would be easy to

Downside: convey information.

Description: The city choices are limited for users.

The user chooses his/her favorite travel city, leave the comments or travel notes about this place. And “TAG” the city a type of emotion and color. These popular travel cities will be displayed in the list menu. Use a landmark symbol to represent each city. The more users choose, the symbol (city) is bigger. **(America:** New York City, San Francisco, Rio de Janeiro. **Asia:** Hong Kong, Tokyo, Singapore, Dubai, Beijing, Bangkok. **Europe:** Rome, London, Prague, Paris, Barcelona. **Africa:** Cairo. **Australia:** Sydney)



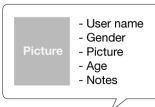
By asking users questions and collecting their answers, I would like to visualize these data and build a unique social networking graphics. The content for this project will mainly consist of a series of questions to let user participate in. Questions will be related to the individual, city and emotion expression, such as:

(1) Basic personal questions: Gender, Age, Name...etc.

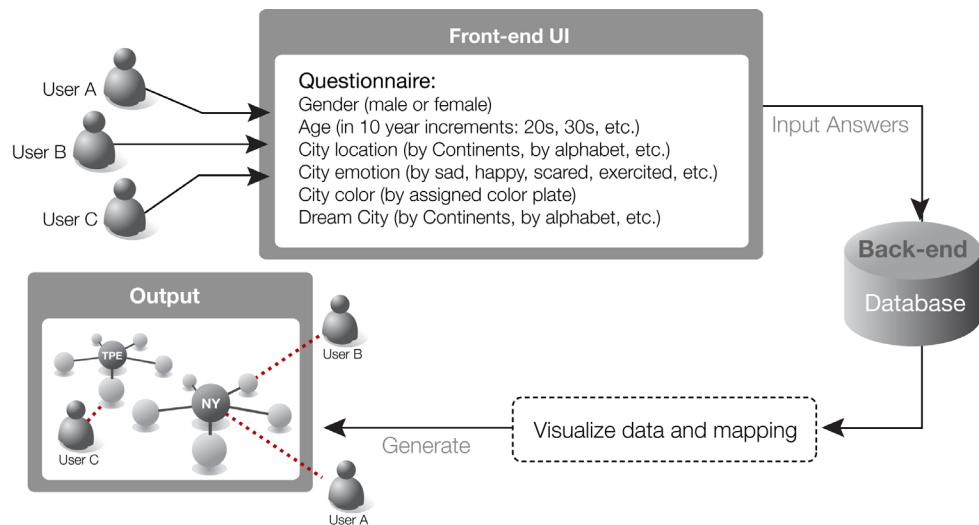
(2) City related questions: Who's your city? If your city has a color, what color would it be? What is your favorite city? Which city is your dream city?... etc.

The answers will be stored to the database and be analyzed. Then this dynamic content will be interpreted in visual graphics. As long as one user inputs his/her data, the graphics will be changed. For graphics, I'll use shape, color, size...these visual variables to depict the different relationship of each user. In the survey & research stage (see Procedure flow chart), I also need to define what kind of visual variable could represent a city, does different city need different visual variable?

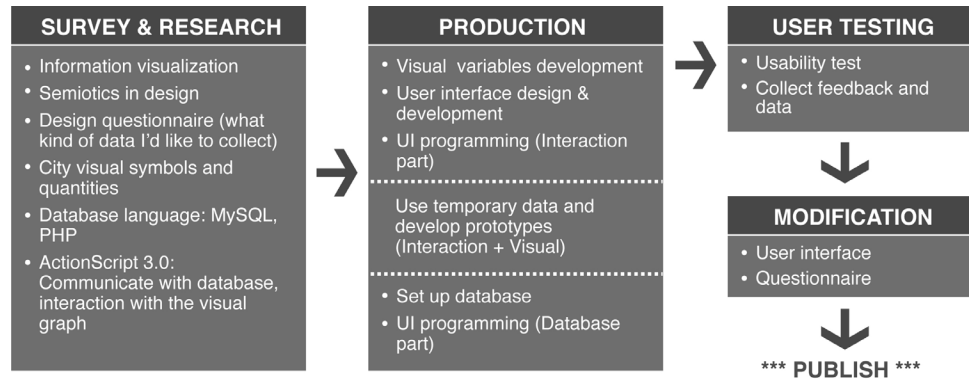
Application Functions:

Join	* Input		
	<ul style="list-style-type: none"> - Basic Info : User name, Gender, Picture, Age, Contact information (Email, Blog, Flickr) - Subject Questionnaire : Favorite City, Emotion Representation, Color Representation, Travel Comments or Notes to the City (Food, Souvenir...) 		
View	* Show user information	<ul style="list-style-type: none"> - User name - Gender - Picture - Age - Contact information (Email, Blog, Flickr) - Comments / Notes (ex. travel notes) 	
	* Switch to different view mode	<ul style="list-style-type: none"> - By User Gender - By User Age - By City - By Country - By Continent - By Emotion - By Color 	
	* Zoom in/out		
		* Print	
	* Help		

Flowchart:



Procedure



Limitations

The challenge and limitation are to scale down the initial ideas and concepts into a manageable project within the time constraint meanwhile also consider my own technical abilities with ActionScript 3.0 and unfamiliar database programming like MySQL, PHP. "Information Visualization" is the interdisciplinary study, however in technical part, it is more about computer science field in terms of the method and program language. That means I need to use an appropriate way from computer graphics design perspective to interpret my information. And this would be my limitation. As to the content, one limitation is how do I design a series of interesting questions to make users are willing to participate in and interact with my application. Once I collect the data, how do I analyze and then visualize these data in an effective way? Because user participation is a very important factor in this project, an effective user sample would also be the challenge as well.

Implications of the Research

The impact I want to capture with the completion of my thesis project will be a greater understanding of how to visualize abstract information and express the relationship of each data by using a dynamic and interactive way. Information visualization uses the traditional language of graphic design: such as signs, symbols, metaphors, labels, typography, color scales, information hierarchies. Unlike the print-based graphic design, in computer graphics design area, "interactive", "real-time information" and "user participation" will be the key additional points to develop this project. The process of exploring how to visualize information in a dynamic way could provide benefits and experiences to the field of computer graphics design.

Peer Review

This thesis project will be a web-based application and the visual really need users' participation so I will publish this application on the web in order to get user's participation and feedback. As to possible competition, there are many competitions I could enter such as HOW Magazine's Annual Interactive Design Award and SXSW Web Awards Competition.

Target Audience

Age	Above 13
Gender, ethnicity	All
Language	Not required
Moving Experience	At least 1 time
Interests	Love to participate in information sharing, web-based communities, interaction and travel
Educational Level	Not required
Income Level	Not required

Software and Hardware Requirements

- Processor: 1.9 GHz Pentium 4 or higher
- Operation System: Macintosh OS X / Microsoft Windows VISTA or XP Professional
- Memory: 1024 MB or higher
- Flash Player 9
- Browser: Internet Explorer 7 / Safari 3 / Firefox 3

Timeline

See attachment

Glossary

Drill Down In information technology, to move from summary information to detailed data by focusing in on something. To drill down through a series of folders, for example, on a desktop means to go through the hierarchy of folders to find a specific file or to click through drop-down menus in a GUI. To drill down through a database is to access information by starting with a general category and moving through the hierarchy of field to file to record.

Information Visualization are primarily Internet-based tools for sharing and discussing information among people. The term often refers to activities that integrate technology, social interaction, and the construction of words, pictures, videos and audio. This interaction, and the manner in which information is presented, depends on the varied perspectives and “building” of shared meaning among communities, as people share their stories and experiences. (From Wikipedia)

Node is a connection point in a network, either a redistribution point or an end point for data transmissions. In general, a node is programmed or engineered to recognize, process or forward transmissions to other nodes. Also, a data point or vertex in a graph. (From Digital Information Graphics)

Social Media are primarily Internet-based tools for sharing and discussing information among people. The term often refers to activities that integrate technology, social interaction, and the construction of words, pictures, videos and audio. This interaction, and the manner in which information is presented, depends on the varied perspectives and “building” of shared meaning among communities, as people share their stories and experiences. (From Wikipedia)