

Project  
Plan  
Spring  
2011

# I PRO 303: Kalleidos

Faculty Advisor: James Burstein



# Project Plan Spring 2011

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## Team Information

### Team Roster



**Name: Ausrine Rakauskaite**

Year: Second

Major: Architectural Engineering

Minor: Entrepreneurship

Description: Through her involvement in a variety of organizations, Ausrine has an extensive background in working with different teams. She intends to use her communication and writing skills to communicate with the IPRO. Ausrine intends to work in the deliverables sub-team while also assisting the rest of the team in development and presentation.



**Name: Ben Siver**

Year: Third

Major: Computer Science

Description: Ben brings strong development skills to IPRO 303. From past experiences working on group software projects, Ben has excelled in design of robust and useful softwares. For this project, Ben is looking to contribute by implementing software useful for the team.



**Name: Hanna Pirkh**

Year: Fourth

Major: Electrical Engineering

Description: Hanna has extensive knowledge in electrical engineering and programming. She has written an ample amount of code in Java and has especially been enjoying developing visual applications. Hanna has good imagination, artistic taste and many original ideas.

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**Name: Hilary Kovacs**

Year: Third

Major: Chemistry

Minor: Air Force Aerospace Studies

Description: Hilary's experience in chemistry and Air Force ROTC has given her valuable experience in research, large-scale planning, written and verbal communication, and teamwork. She hopes to use these skills to contribute thorough documentation throughout this project.



**Name: John Jewell**

Year: Fourth

Major: Architecture

Description: As a returning member to the IPRO 303 winning team, John brings experience in set up and exhibit design. As architecture major, John intends to contribute to the team in visual representation ranging from posters and brochures to exhibits.



**Name: Keojin Jin**

Year: Fifth

Major: Architecture

Description: Keojin's brings his architectural design and visual as well as analytical background to help team with visual representations. As today's industrial world requires more interconnection between different professional backgrounds, he contributes to the team with interest and skills in parametric computational design, visualizing various data into a visual form.

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**Name: Marcos D. Arroyo**

Year: Fourth

Major: Computer Science

Description: Marcos is a 4th year Computer Science major. He has worked on projects that required the use of network programming, database management, and website design. All of these projects required the use of Ruby on Rails/HTML/CSS, Java/JDBC, C, and SQL. He believes that he will be able to use everything he has learned to help meet the development needs of IPRO 303.



**Name: Mark Michael**

Year: Fourth

Major: Computer Information Systems

Minor: Business Management and Information Security

Description: Mark has a strong background with technology, and social media development. Also this is his fourth semester working with Navteq. After the success of the previous semesters he is using the skills and knowledge he gained from those projects to help push forward this project into the next stages.



**Name: Melanie Koto**

Year: Third

Major: Biology

Minor: Math and Science Education

Description: Melanie continues with IPRO 303 after primarily working with the design team to create presentation documents. Now she takes over as a co-team leader with hopes to lead the team to further success by organizing the team according to everyone's individual strengths and leading each group throughout the semester to develop the best product.



**Name: Morgan Curran**

Year: Third

Major: Biology

Description: Morgan's strong science and lab background allows her to bring strong researching, writing, and team work skills to the group. She hopes to contribute to the deliverables team by helping to complete the final deliverables products that are required by the IPRO office.

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**Name: Rishi Kushaare**

Year: Fourth

Major: Business Admin and Applied Science in Engineering

Description: As a continuing student from last semester, Rishi brings his learning experience working with NAVTEQ for the second time in strategic planning, research, and leadership to help the team set up milestones and execute them. He brings his passion for technology to lead this project's development and design teams.



**Name: Sujin Ri**

Year: Fourth

Major: Computer Science

Description: Sujin's academic background and work experience have given her knowledge in a variety of programming languages; logical thoughts and creative ideas regarding software implementation. Although she is interested in developing & designing computer games and websites, she has a strong will to learn and a desire to be challenged in other fields to expand her knowledge. She hopes to contribute her programming skills throughout the whole process of development.



**Name: Xiaochen Liu**

Year: Third

Major: Civil Engineering

Minor: Computer Science

Xiaochen strengthens the team with good skills on software and creative thoughts. She is good at Google Earth, Garmin, Arcview, Photoshop and AutoCAD. She is enjoying learning Java as well. Xiaochen has experience working with a team and intends to make valuable contributions to the project.

## Team Identity

**Name:** Kalleidos

**Name History:** IPRO 303, previously known as Innovative Mapping and Chujio, has been assigned different goals for the semester and through those goals a new team name was selected to fit this current IPRO. The name Kalleidos is derived from the combination of two Greek words. The first word, *Kallos*, means beautiful<sup>6</sup>. The second word, *Eidos*<sup>7</sup>, means shape or image. Putting them together gives a "beautiful image", which is the goal for the team- create a beautiful image with the data pulled from the web.

**Logo:**



## Team Purpose

### Team Vision

The team vision is to construct a practical and creative solution to the problem of aggregating real-time data from the web, and creating a visualization of it in an innovative way.

### Team Goals

“Over the last few years there has been an explosion of different websites that allow average person to contribute different content such as pictures, comments, stories and reviews about places around them. While there are many companies that focus on aggregating such data into common stream - complexity of interpreting such data in a meaningful actionable way remains a challenge for many companies including NAVTEQ.” [Appendix B]

- Identify new content from real time feeds which include
  1. Points of Interest and their attribution (e.g. Hours of Operation, Languages Spoken at locale, etc...)
  2. Any associated content (e.g. events, relationships to other Points of Interest (e.g. same owner, etc...))
- Create visualizations based on this content - some basic examples could include
  1. Hot/Not So Hot real estate areas (new construction, sales) based on agent and broker social media updates
  2. High/Low crime areas based on social media stream
  3. Hot/Not city zones based on number of people tweeting/updating Facebook/checking in/etc... in certain areas, parties, POIs.

### Team objectives

- Build on previous semester's developments
- Aggregate and integrate meaningful data from real-time streaming content providers and social networks (e.g. Twitter, Flickr, etc.)
- Develop a unique and visually compelling way to display the data in the most user friendly manner
- Work as a team with honesty, integrity, and passion to develop the best solution to the project problem.



## Background Information

### Company History

NAVTEQ is a “world leader in premium-quality digital map data and content,”<sup>1</sup> so we are very fortunate that NAVTEQ has decided to sponsor IPRO 303 for a fourth term. NAVTEQ supplies information used on in-vehicle navigation systems, mobile navigation systems, navigation programs used in cell phones, and internet based navigation websites. NAVTEQ now offers digital map coverage in 83 countries on 6 continents – and counting<sup>5</sup>. Formed in 1985 in Silicon Valley California, it is one of the founders of digital mapping data and map routing.<sup>2</sup> With the help of a number of investors and owners, NAVTEQ was able to grow and establish offices in countries outside the United States by the early 1990s. It eventually moved its headquarters to the current location in the heart of Chicago. NAVTEQ now has approximately 5,100 employees spread over 212 offices in 48 different countries, and was acquired by Nokia, the popular phone and electronics maker, in 2007.<sup>3</sup>

### Company Challenges

NAVTEQ has presented this group with the challenge of finding, updating, and relating point of interest locations in relevant and contextual ways using automatic, live data streams from social networks. The group is also challenged to create a visually compelling user interface for customer interaction. These points of interest locations are to be found through real time streaming content providers such as Facebook and Twitter. NAVTEQ plans to find new places and update existing places based on what people have to say about them. The company’s motive for this challenge is to continue to provide the purest data to its clients.

### Technology and the Solutions

The technology will involve manipulating current open methods for gathering public data from a multitude of sources. This will include work with social networks’ current APIs as well as the development of an algorithm to filter and organize the data. The algorithm to be developed needs to be able to sift through large amounts of data quickly and efficiently. It must be able to identify new and already recorded points of interests. This data will then be used to create a visually appealing application that allows users to interact with information easily and efficiently.

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## **Previous Work**

This project is a continuation of the Fall 2009, Spring 2010, and Fall 2010 semesters of IPRO 303 Innovative Mapping and Chujio. Previously, the team worked to create a way for end users to send feedback to NAVTEQ in a manner that was simple, accurate, and timely. The research conducted during the fall 2009 semester suggested that incorporating micro-landmarks with NAVTEQ databases would be better accomplished if the data came from parties with a vested interest, rather than coming from typical end users. Building off of that project, NAVTEQ wanted to automate the process of updating their current databases of Points of Interest (POI) using a live data stream from popular social networking sites. Now the focus has expanded to visually displaying the data in the most user friendly manner. Due to this evolution, IPRO 303 has decided to change the name to better reflect the changes that have taken place.

## **Ethical Dilemmas in Research**

The ethical issues that may result from investigating the problem include a potential invasion of privacy involving the observation of other people's conversations or posts. NAVTEQ may face confidential dilemmas on where they are data mining and how they go about obtaining it.

## **Sociological Effects and Costs**

The results of this project will provide users with another way to find reviews and information about places they wish to go but have yet to see. From colloquial conversation, people find the best information on a subject rather than a biased source. From the visualization, the public will be able to discern information they would not otherwise be able to. Furthermore this project has the potential to change the public view of NAVTEQ, depending on how the solution is drawn out. It will be the responsibility of KALLEIDOS to make sure that the data and methods that are used and recommended to NAVTEQ will be ethical and will not harm the company's image in any way.

## **Proposed Solution**

This semester NAVTEQ would like to see a working application that extracts and filters data meaningful information from the web that can not only be useful in updating POIs real-time, but also in creating a compelling visual representation of this data that users can interact with easily. Kalleidos will work to provide NAVTEQ with such a product by the end of this semester. To do this, the team plans on taking the following steps:

1. Split the development team into two sub-teams: one team for extracting data and a second team for visually displaying it. Both teams will co-ordinate throughout the semester
2. Define milestones for each sub-team
3. Develop a code to extract data from the web
4. Create a visual demo (user interface) of the finished product
5. Connect the data and the user interface to create an application

## **Previous Research**

The previous research that was done with this IPRO is very helpful in identifying the main groups that use the websites we are focusing on. However, the research does not provide the required knowledge for where this project is headed. According to our sponsor's goals and objectives, we are now focusing on creating an application that can extract information from the web and displaying it in a visually appealing way.

## Team Values

### Team Ethics

Kalleidos must follow all laws and regulations under Illinois Institute of Technology and national procedure. Each team member is responsible for attending scheduled meetings and completing scheduled requirements for all assigned work. A professional attitude is to be demonstrated at all times.

### Conflict Resolution

The following are procedures provided to help address any problems:

- Each team member is required to participate in all team activities
- All members are required to communicate via iGroups and e-mail on a daily basis
- All work will be evenly distributed among the individual team members
- Each team member is responsible for submitting documented progress and any assigned work in a timely matter
- All team members will be respected and treated equally

## Work Breakdown Structure

### Problem Solving Process

The main purpose of our project is to create an application that pulls information from the web and displays it in an easy, useful, and a visually appealing way. Through existing ways of communication on different social media websites, we will focus on the source and the mining of useful information first, and then focus on displaying it. The problem solving process will be as follows:

1. Determine the features and information to be included in the user interface that users need and will find useful
2. Identify different patterns socialites use in their posts to describe information that will be useful to us
3. Write an algorithm to filter any input data and extract the information we are looking for in an efficient way
4. Explore new ways to display the data
5. Test our algorithm first on the quality of its results, then on the quantity it will be able to accept
6. Combine the data with user interface to develop the final product

### Team Structure

Despite the diversity of majors in our team, the fact that all members use social media and will be able to contribute greatly to our research led us to work as one team initially. In order to be most productive, the team split up into sub-teams. Each team members chose their area of perceived strengths according to four sub-teams: Deliverables, Design, Development, and Developmental Design. Throughout the lifecycle of our project however, we will use every single team member based on his/her individual strengths to accomplish subtasks. This will evidently make documentation of all work the responsibility for every member.

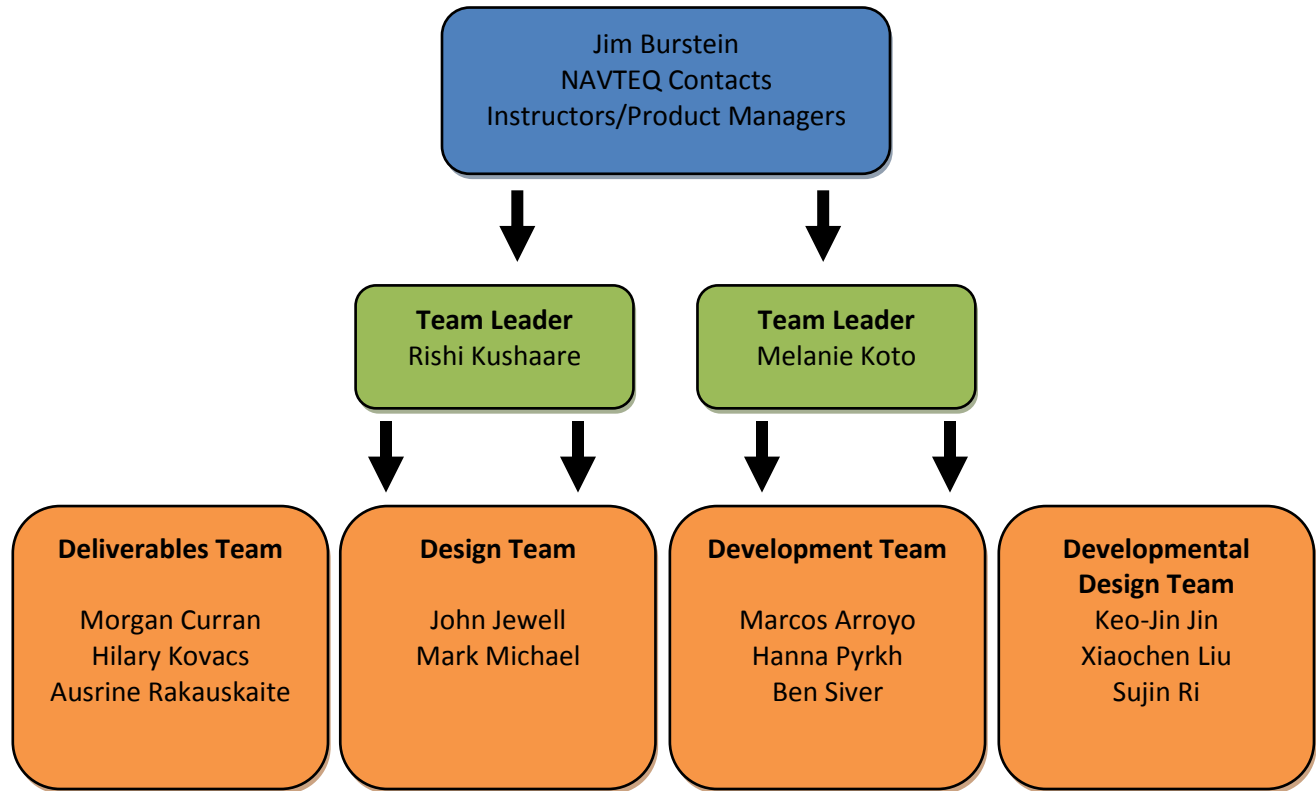
The IPRO team will be divided into sub-teams to distribute members according to their strengths. Thus each team has different responsibilities as follows:

- Deliverables Team – Writes and modifies pertinent documents; tasks include the project plan and final report
- Design Team – Creates innovative visuals for the final presentation; tasks include the program, brochure, and large touch screen display
- Development Team – Produces coding to actively pull information from social networking sites
- Developmental Design Team – Generates visually appealing representation of data and work with the development team

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The established teams are organized as follows:

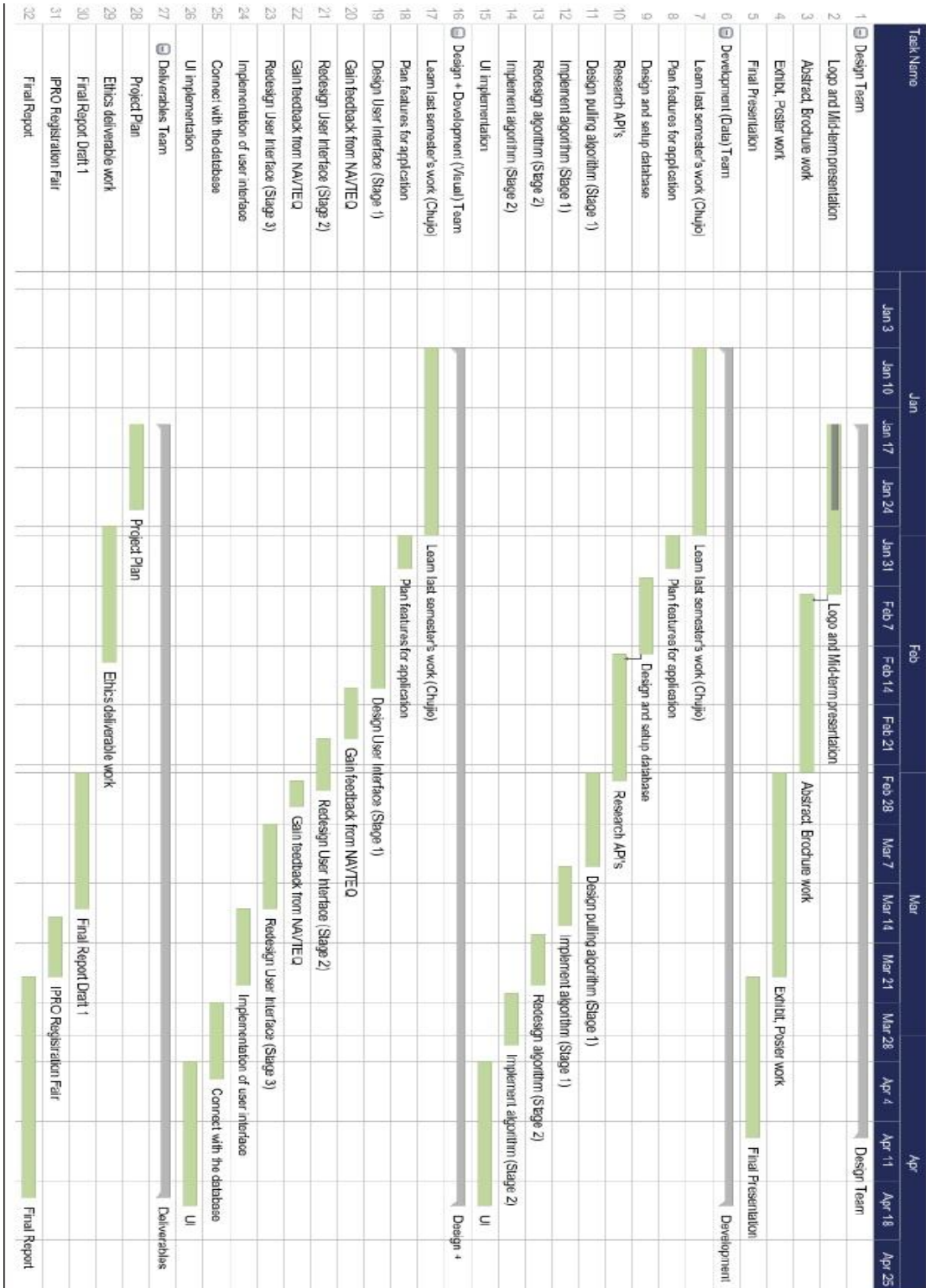


## Meeting Times

The Kalleidos team is scheduled to meet every Tuesday and Thursday afternoon. Meetings are utilized as a forum for members of the Kalleidos project to present reports on recent developments, to address obstacles faced within the team, and to discuss what these mean for the entire group. Solutions are then brainstormed and the process is repeated. Additionally, time in class is spent reviewing and revising the set schedule of events to make sure the issues outlined are relevant and realistic based on current progress. Work Days are scheduled beforehand as sessions during which the sub-teams can work on respective assignments. The next page contains a basic breakdown of the work process structure and the dates that Kalleidos plans to complete each step.

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## Gantt Chart



## Expected Results

### Expected Activities

The team aims to deliver an innovative method for collecting and visually displaying readily available real-time POIs that consumers will be able to use in an easy and meaningful way. These activities fit into two chronological phases:

- Phase One (January) – Research phase. During this phase students will:
  - Study the requirements that were given by NAVTEQ
  - Learn from last semester’s work
  - Form sub-teams based on individual strengths
  - Plan specific milestones for this term for each sub-team
  - Define the requirements
  - Propose achievable and realistic solutions
  
- Phase Two (February-April) – Development and Testing phase. During this part of the project the students will:
  - Develop an algorithm that extracts data from the web
  - Test the algorithm with test set of random raw data
  - Create a new user interface to display the data
  - Connect the data to the user interface
  - Apply improvements to the prototype(s) according to test results
  - Deliver a working solution during a formal meeting with NAVTEQ

### Research and Testing Results

The main focus of this term will be identifying new content from real time feeds and creating visualizations for this content such as “hot or not” city zones. Research will be conducted to help define what meaningful data is, how it can be extracted from a larger pool of information, and also to find new ways to display the content on a map.

The second phase of this project will include tests on the proposed algorithm and to seamlessly integrate it with the developed user interface. Tests that will be conducted will allow Kalleidos to optimize the algorithm and to produce creative visualizations based on the collected data.



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## Potential Project Tasks' Outputs

This semester's focus will primarily be on content and visuals. The content needs to be identified from real time feeds to show points of interest with their information of interest. The visualization should include (but are not be limited to): Hot/Not real estate areas, High/Low crime areas, Hot/Not city zones, and all should be generated from information submitted by the general public on social networks. Our goal is to produce working product that NAVTEQ can use and present it in a visually stimulating way.

## The Deliverables

The team anticipates two deliverables to NAVTEQ:

- The first deliverable is an HTML file portraying the user interface for desired application. This should result from the first phase of the project and have the approval of NAVTEQ and the team.

Deliverable 1 Target: Beginning of March

- The last deliverable of this project is a presentation of the team's research and proposed algorithm to NAVTEQ in addition to the visual interface.

Deliverable 2 Target: End of April

## Project Challenges and Constraints

A few challenges have been identified so far by the team members. A significant challenge that we will face is the time limitations of one semester's worth of work. This issue has been a reoccurring theme when a project of this magnitude is presented and KALLEIDOS is excited to meet the challenge. The issue of getting meaningful data from the social networks that we will connect to our mapping system might also prove challenging. The key is to find a way to use the data that we gather from these social networks and location based services.

Technical standards and norms create additional challenges to this project. Due to the multitude of sources the data may come from, each source will have the data formatted in a certain way. It will be part of our project to generalize and transform that data into one main format that then can be parsed and analyzed.

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## Project Budget

The following is a list of materials and expenses that will be required to properly complete this project. Supplies will be required in the research and development phases of this project. A software development kit may be required in the design and creation of a prototype. A mobile device will be essential during the testing phase.

Budget IPRO 303 Spring 2011	
Equipment	\$325
Materials and Supplies	\$325
Publications and Communications	\$200
Faculty Stipend	
Travel Expenses	\$50
Prototyping	\$200
Other (Team Building*)	\$100
<b>Total:</b>	<b>\$1,200</b>

\*"Team Building" is any light competition to promote fellowship. Event includes food.

## Designation of Roles

**Minute Taker:** Marcos Arroyo

Responsible for preparing and recording the decisions made in every meeting. Shortly after the meetings are held, in charge of uploading meeting minutes to iGroups for the team to use as a reference.

**Team Leaders:** Melanie Koto and Rishi Kushaare

Responsible for providing guidance, instruction, and direction to the team. Monitor the progress of the team to ensure results that need to be obtained are successful. Also, ensure that the project proposed by NAVTEQ is accomplished.

**Planning:** Rishi Kushaare

Responsible for making plans for every team meeting and set up strategic milestones for the development and design team. Ensuring that meetings go as planned and run smoothly. Responsible for planning and executing development and design team tasks.

**iGroups Moderator:** Melanie Koto

Responsible for ensuring that the IPRO deliverables are completed on time and properly uploaded in an organized manner to the iGroups website. Ensures that major milestones are added to the iGroups website and that necessary information is delivered to the team. Responsible for creating necessary folders for the appropriate files for better accessibility. Maintains the allotted amount of space on iGroups does not get exceeded.

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## Appendix

### Appendix A: Team Roster

#### Students

<u>Name</u>	<u>Major</u>	<u>Email Address</u>	<u>Phone Number</u>
Arryo, Marcos	Computer Science	<a href="mailto:Marroyo1@iit.edu">Marroyo1@iit.edu</a>	██████████
Curran, Morgan	Biology	<a href="mailto:Mcurran1@iit.edu">Mcurran1@iit.edu</a>	██████████
Curtis, Christopher	NA	<a href="mailto:Ccurtis7@iit.edu">Ccurtis7@iit.edu</a>	██████████
Jewell, John	Architecture	<a href="mailto:Jjewell1@iit.edu">Jjewell1@iit.edu</a>	██████████
Jin, Keo-Jin	Architecture	<a href="mailto:kjin@iit.edu">kjin@iit.edu</a>	██████████
Koto, Melanie	Biology	<a href="mailto:mkoto@iit.edu">mkoto@iit.edu</a>	██████████
Kovacs, Hilary	Chemistry	<a href="mailto:hkovacs@iit.edu">hkovacs@iit.edu</a>	██████████
Kushaare, Rishi	Business Admin & Applied Science in Engineering	<a href="mailto:Rkushare@iit.edu">Rkushare@iit.edu</a>	██████████
Liu, Xiaochen	Civil Engineering	<a href="mailto:Xliu66@iit.edu">Xliu66@iit.edu</a>	██████████
Michael, Mark	Computer Information Systems	<a href="mailto:Mmichae3@iit.edu">Mmichae3@iit.edu</a>	██████████
Pyrkh, Hanna	Electrical Engineering	<a href="mailto:hpyrkh@iit.edu">hpyrkh@iit.edu</a>	██████████
Rakauskaite, Ausrine	Architectural Engineering	<a href="mailto:arakausk@iit.edu">arakausk@iit.edu</a>	██████████
Ri, Sujin	Computer Science	<a href="mailto:sri@iit.edu">sri@iit.edu</a>	██████████
Siver, Ben	Computer Science	<a href="mailto:bsiver@iit.edu">bsiver@iit.edu</a>	██████████

#### Advisors

<u>Name</u>	<u>Email Address</u>	<u>Phone Number</u>
Burstein, Jim	<a href="mailto:burstein@iit.edu">burstein@iit.edu</a>	██████████
Ko, David	<a href="mailto:David.ko@navteq.com">David.ko@navteq.com</a>	██████████
Ramic, Haris	<a href="mailto:Haris.ramic@navteq.com">Haris.ramic@navteq.com</a>	NA
Redzic, Gordon	<a href="mailto:Gordon.redzic@navteq.com">Gordon.redzic@navteq.com</a>	NA

## Appendix B: NAVTEQ Requirements

### I PRO 303

Determine innovative methods for collecting and visually displaying readily available real-time POI data so that consumers can easily utilize the data in meaningful ways

1. CONTENT: Identify new content from real time feeds which includes
  - a. Points of Interest and their attribution (e.g. Hours of Operation, Languages Spoken at locale, etc...)
  - b. Any associated content (e.g. events, relationships to other Points of Interest (e.g. same owner, etc...))
  
2. VISUALS: Create visualizations based on this content - some basic examples could include but should definitely NOT be limited to the following:
  - a. Hot/Not So Hot real estate areas (new construction, sales) based on agent and broker social media updates
  - b. High/Low crime areas based on social media stream
  - c. Hot/Not city zones based on number of people tweeting/updating Facebook/checking in/etc... in certain areas, parties, POIs.
  - d. Team is encouraged to explore new, out-of-box visualization techniques