IPRO 303 Innovative Mapping

Project Plan Spring 2010

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Table of Contents

Team Information 3
Team Roster 3
Team Identity 7
Team Purpose 8
Team Vision 8
Team Goals 8
Team Objectives 9
Background Information 10
Company History 10
Company Challenges 10
Technology and the Solutions 10
Previous Work 11
Ethical Dilemmas in Research 11
Sociological Effects and Costs 11
Proposed Implementations 12
Previous Research 12
Team Values 13
Team Ethics 13
Conflict Resolution 13
Work Breakdown Structure 14
Problem solving process 14
Team Structure 14
Meeting Times 15
Gantt Chart 16
Expected Results 17
Expected Activities 17
Research and Testing Results 18
Potential Project Tasks' Outputs 18
The Deliverables 19
Project Challenges and Constraints 19
Results as a Solution 20
Project Budgets 20
Designation of Roles 21
Works Cited 22
Appendix 23

Team Information

Team Roster

Aric Austermann
Year: Fourth Year
Major: Architecture
Description: Aric has experience working as a part of a team and doing research projects. His researching insight will ensure that the team covers all aspects while compiling data obtained from their own research. He has experience using various navigation software and hopes he can contribute by making applications more accurate and user friendly. Aric hopes, through this IPRO, to create a more precise and larger catalog of map locations and directions.

Jacob Ernst
Year: Fourth Year
Major: Architecture
Description: Jacob has participated in many research projects and thus has honed his presentation skills. These skills will be invaluable once the time comes to present the finished product to the users and to NAVTEQ. He has worked with GPS software and car navigation systems. He is interests include developing a communication link between software users and the NAVTEQ via this project.

Pallavi Gupta
Year: Third Year
Major: Electrical and Computer Engineering
Description: Pallavi is strong in the area of technical problem solving. She has a background in circuit and software implementation which will be beneficial to the project. She is looking forward to working with this multidisciplinary team of fellow students and together, come up with a satisfying solution for our team sponsor, NAVTEQ.

Team Information

Anam Moin Khan
Year: Third Year
Major: Electrical and Computer Engineering
Minor: Business Management
Description: Anam wishes to use her knowledge of computer engineering and programming to help make software that will change the GPS system of today to be more accurate and user friendly. Her minor in business will also help her create a system that will encourage customers to provide feedback and gather data towards improvements they would like to see. Working within an interdisciplinary team, Anam is certain that they can come up with a viable solution.

Aaron Komoroski
Year: Third Year
Major: Psychology
Description: Aaron worked as a co-team leader on the same IPRO during the fall 2009 semester and understands the workings of both NAVTEQ and the IPRO office. He has a computer science background which helps him bridge the gap between the technical and non-technical aspects of an issue. Aaron wishes to use his analytical skills to understand both how NAVTEQ and the end users view the concept of micro-landmarks. Aaron has experience in public speaking and giving presentations.

Mark Michael
Year: Third Year
Major: Computer Information Systems
Minor: Mark is the co-team leader of this IPRO and has played a key role in this project since its inception. He is currently an IT Consultant for a local helpdesk company which gives him access to many people in the target group of this project. Mark has previous experience with programming languages C++, C#, Java, ASP.NET, and SharePoint development. He also has experience developing several different web applications.

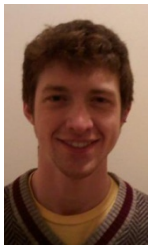
Team Information

Scott Mochinski
Year: Third Year
Major: Psychology
Description: Scott's background experience with respect to this project primarily falls in the category of pedestrian and GPS end-user for 10 of the last 15 years here in Chicago. He was a long-distance truck driver for 5 years during which time he relied heavily (exclusively) on GPS navigation on a daily basis. Scott is comfortable with computers and programming, and his study of psychology gives him insight into conducting interviews and surveys. He has significant leadership experience which includes being a contract negotiator and union organizer for the International Brotherhood of Teamsters. He intends to use these skills to help the team achieve the utmost success.

Ameena Payne
Year: Third Year
Major: Business Administration/ Specialization in Marketing
Minor: Sociology
Description: Ameena's background in marketing includes using ethnographic/demographic research to determine target consumers and their buying behaviors with respect to this product. She is very personable, communicates well with others, and wants to use these strengths to give presentations, conduct focus groups, and contribute to public speaking aspects of IPRO 303. Her job experience has helped her hone her leadership capabilities and she knows how to work as a part of a team.

Ernesto Ramirez
Year: Third Year
Major: Computer Engineering and Computer Science
Description: Ernesto wishes to use his knowledge of programming to help develop software that will be user friendly. He is a part of an Illinois Institute of Technology and Dominican University joint program. This will broaden the demographics of the project research base. Researching different demographics will provide the team with valuable information regarding the demands of software users in different regions and also increase the overall research base of the project.

Team Information



Peter Sanborn
Year: Fourth Year
Major: Psychology
Minor: Architecture
Description: Peter is the co-team leader of this IPRO and hopes to use his leadership qualities to keep the team on track and to obtain the objectives for the semester. His background in psychology will provide a strong foundation for developing user interfaces, while knowledge and interest in architecture, computing, and other various technologies will assist in general functionality.

Piyush Sinha
Year: Third Year
Major: Computer Engineering
Description: Piyush has worked as a part of this IPRO from its inception and thus understands the aims and objectives of this program completely. Piyush has a strong background in technology. He has good analytical and design abilities. Piyush finds GPS mapping technology quite interesting and has experience using products that incorporate NAVTEQ mapping technologies. In addition to contributing to this IPRO, Piyush is interested in developing his team skills.

Team Information

Team Identity

Name: Innovative Mapping
Motto: Solutions through Coal**iit**ion
Logo:

Team Purpose

Team Vision

To come together, synergize, and construct a practical, innovative, and simple solution to the problem at hand.

Team Goals

The sponsor of this project, NAVTEQ, is one of the largest digital mapping companies in the world. Currently, NAVTEQ's focus is on how to make their technology more community and pedestrian and friendly. Our project has two main phases:

1. Target the majority of mobile device users and give them an outlet to report any micro-landmarks and other relevant information for pedestrian users to NAVTEQ.

2. Provide NAVTEQ with a working solution template.

Each member in this team is representative of the target market, and hence will be able to provide valuable insight in terms of the everyday NAVTEQ user. In addition, we plan to obtain feedback from application users regarding changes, desired new features, and methods of pedestrian navigation that would be practical, relevant, and easy to use. With the help of our development team, this feedback will be added to last semester's research in order to design and develop a solution. The proposed solution will pass through a quality control process to test and improve its usability and ensure it is in accordance with the team goals and vision.

Team Objectives

- Deliver feedback from current mobile handset users to NAVTEQ
- Build on the previous semester's developments
- Design a dynamic and easy-to-use solution which enables pedestrians to navigate more effectively.
- Develop a user-friendly system for locating and labeling micro-landmarks
- Work as a team: with honesty, integrity, and passion to develop the best solution to the project problem

Background Information

Company History

NAVTEQ® is the sponsor of our IPRO. NAVTEQ is a "world leader in premium-quality digital map data and content."[1] NAVTEQ supplies information used on in-vehicle navigation systems, mobile navigation systems, navigation programs used in cell phones, and internet based navigation websites. The data that NAVTEQ provides is extensive, covering 77 countries and spanning 6 continents. Formed in 1985 in Silicon Valley California, it is one of the founders of digital mapping data and map routing.[2] 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 1990's. It eventually moved its headquarters to the current location in the heart of Chicago. NAVTEQ currently has approximately 4,000 employees spread over 190 offices in 39 different countries, and was recently acquired by Nokia, the popular phone and electronics maker.[3]

Company Challenges

NAVTEQ has presented this group with the challenge of finding an easy, user-friendly way for pedestrians to incorporate local knowledge into NAVTEQ's map data. This interaction between pedestrians and NAVTEQ will come in the form of user-suggested updates as well as input regarding what NAVTEQ calls "micro-landmarks".[4] Micro-landmarks are defined by NAVTEQ as meeting places, road signs, or any sites known to locals as a place of interest. There is currently no way for NAVTEQ to consistently update their data with relevant information. The most efficient way to resolve this problem is to have select users report the desired changes which NAVTEQ can then investigate and update.

Technology and the Solutions

The technology involves mobile devices and their interaction with NAVTEQ's servers. A well designed user interface for the mentioned mobile devices - Global Positioning Systems (GPS), navigators, and cellular phones - will allow users to send micro-landmark suggestions directly to NAVTEQ's servers.

Background Information

Previous Work

This project is a continuation of the Fall 2009 semester of IPRO 303 Innovative Mapping. Previously, the team worked to create a way for end users to send feedback to NAVTEQ in a fashion that was simple, accurate, and timely. The research conducted during the fall 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. A key finding within last semester's research led to the task of the current project: to identify the parties with a vested interest to provide micro-landmark data.

Ethical Dilemmas in Research

The ethical issues that may result from investigating the problem include aspects of conducting surveys with human subjects, which requires release forms, and the issue of nondisclosure with NAVTEQ which may require not reporting all findings.

Sociological Effects and Costs

If product users do not have a viable way to send information regarding corrections to mapping data, incorrect data will go unfixed; this costs people time if their route is incorrect and damages the credibility of the application. Routine checks to disputed locations require NAVTEQ to send their employees to verify the location before making any additional modifications to their data. NAVTEQ communicates with the community to better track area changes; these communications require the expenditure of resources for both the company and the community. In addition to the human factors involved, equipment used during the verification process may also be necessary and costly.

Background Information

Proposed Implementations

1. Provide a Short Message Service (SMS) solution that allows the application user to send a text regarding the information to be updated

2. Develop a web-based solution which mobile devices could access

3. Design an application to work with specific mobile devices

Previous Research

The Fall 2009 Innovative Mapping IPRO team conducted two focus groups and a survey consisting of over 190 participants. An analysis of the results from the survey and focus groups allowed the team to propose a solution for NAVTEQ. The research and data provided the team with information on user preferences, leading to a built-in solution consisting of a "One-Click" feature. The solution would record the application user's entire trip and their exact location. With "One-Click," the user would be able to select from a variety of options allowing them multiple ways to send feedback. Modes of feedback included sending a text message, taking a picture, drawing an alternate path, or even calling a service help desk. If the user did not want to send feedback from these possible features, they could simply submit the data collected from their trip online.

The focus group participants were asked questions regarding micro-landmarks and whether they would use or submit them. In both sessions, it was concluded that users would not be interested in submitting this information themselves. However, research participants did indicate that this would be a feature that they would use if it became available. The survey did not introduce this concept at that time as it was less intuitive than the concepts of GPS errors and reporting.

Team Values

Team Ethics

Innovative Mapping must follow all laws and regulations addressed by the Illinois Institute of Technology and national procedure. Each team member is held responsible for attending scheduled meetings and fulfilling scheduled requirements for all work that is assigned. 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

1. Conduct surveys to determine:
    a. Best ways for users to report micro-landmarks
    b. Efficient and simple designs for the interface
    c. Preferred methods of reporting micro-landmarks
2. Market Research
3. Develop an initial application design using survey results
4. Create a prototype of the application
5. Test application for connectivity and compatibility with NAVTEQ's map database system
6. Test usability in real-world scenarios
7. Use feedback from real-world testing to improve the application
8. Perform quality control and testing
9. Create application that is ready for production use

Team Structure

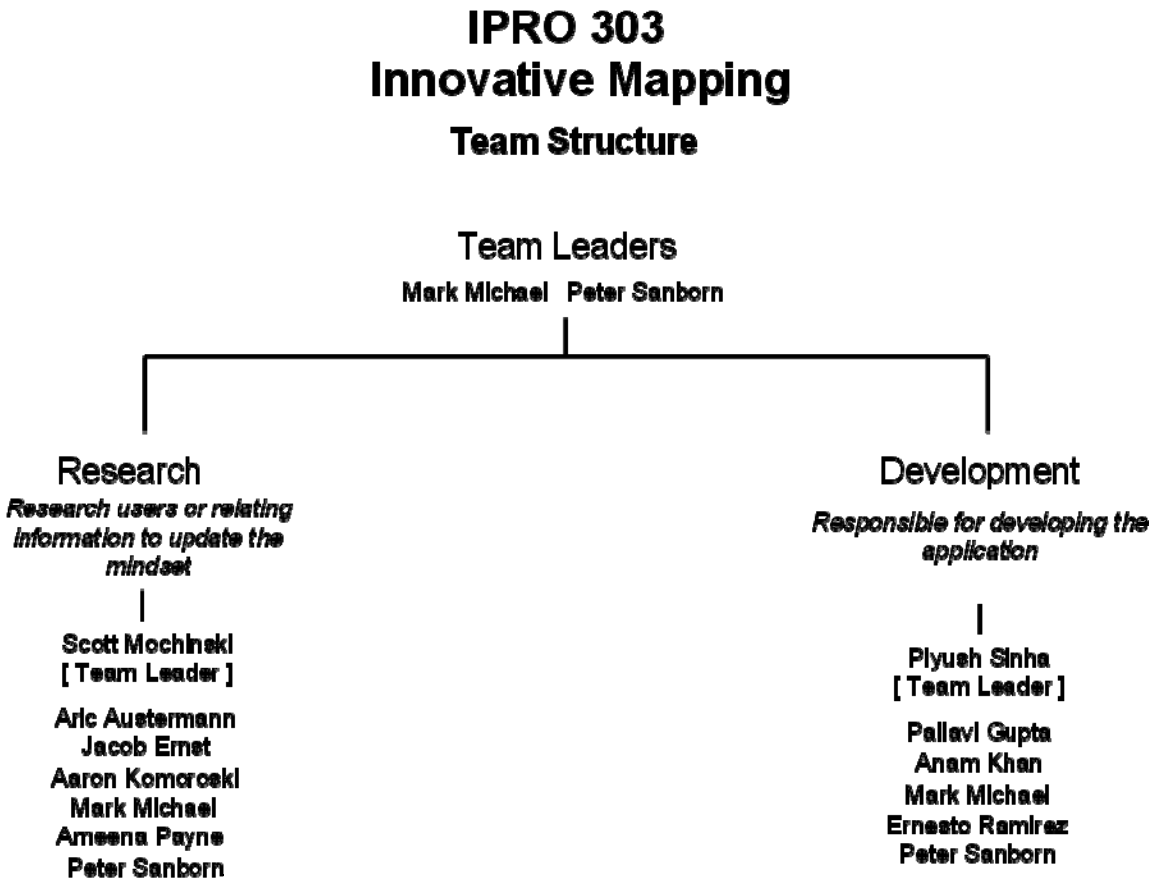
The tasks consist of those aimed at creating and forwarding the NAVTEQ user feedback system and those aimed at formulating NAVTEQ's business strategy. Consequently, Innovative Mapping is divided into two broad sub-teams generally defined as the Research sub-team and the Development sub-team.

The sub-teams work closely with each other to ensure that proper communication is facilitated and that there is minimal wasted effort towards ideas that one group might find unreasonable to pursue. Additionally, this facilitates higher quality ideas that ultimately work toward creating a successful system for reporting micro-landmarks.

Each sub-team is responsible for its own documentation. Leaders are responsible for managing the progress of their sub-teams. Additionally, the sub-team leaders are responsible for making sure that close, constant communication is ongoing between sub-teams, the team leaders, and the project advisors. If inadequate progress is noted, the entire team works together to create a resolution to this issue.

Work Breakdown Structure

The established teams are organized as follows:

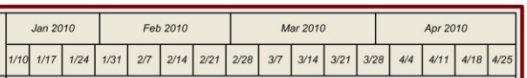


Meeting Times

Then entire Spring 2010 Innovative Mapping team is scheduled to meet every Tuesday and Thursday afternoon. Meetings are utilized as a forum for members of the Innovative Mapping project to present reports on recent developments, to address obstacles faced within the sub-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. The next page contains a basic breakdown of the work process structure and the dates that Innovative Mapping plans to complete each step.

Gantt Chart

ID	Innovative Mapping	Start	Finish
1	Project Plan	1/12/2010	2/5/2010
2	Midterm Review Presentation	2/4/2010	2/23/2010
3	Ethics Reflective Report	2/23/2010	3/26/2010
4	Final Project Report (Draft)	3/16/2010	4/9/2010
5	IPRO Abstract/Brochure Poster	4/8/2010	4/19/2010
6	Final Presentation	4/13/2010	4/22/2010
7	Final Project Report (Final)	4/22/2010	4/30/2010
8			
9	Phase 1	1/12/2010	4/2/2010
10	Study the requirements given by NAVTEQ	1/12/2010	1/26/2010
11	Assignment of Roles(Development and Research)	1/17/2010	1/19/2010
12	Conduct market research	2/2/2010	2/11/2010
13	Discuss research/surveys	2/11/2010	2/14/2010
14	Define the ideal end user	2/16/2010	2/21/2010
15	Define the ideal local expert	2/16/2010	2/21/2010
16	Reach consensus	2/23/2010	3/2/2010
17	Define requirements	3/4/2010	3/14/2010
18	Propose achievable and realistic solutions	3/18/2010	3/23/2010
19	Presentation to NAVTEQ	3/25/2010	4/2/2010
20			
21	Phase 2	4/2/2010	4/30/2010
22	Develop a template for micro-landmark	4/2/2010	4/20/2010
23	Test user friendliness of template	4/20/2010	4/23/2010
24	Run focus groups on template	4/20/2010	4/23/2010
25	Apply improvements to the prototype	4/23/2010	4/25/2010
26	Deliver a working solutions to NAVTEQ	4/27/2010	4/30/2010



Expected Results

Expected Activities

The team aims to deliver at least one working solution template to NAVTEQ. A group of activities are involved in this process. These activities fit into two chronological phases:

- Phase I (January until Mid-April) - Research phase. During this phase the students will:
    - Study the requirements that were given by NAVTEQ
    - Conduct market research
    - Discuss research/surveys results
    - Define the ideal end user
    - Define the ideal local expert (also referred to as the data provider)
    - Reach a consensus
    - Define the requirements
    - Propose achievable and realistic solutions
    - In April, during a formal meeting with NAVTEQ, student representatives will meet report team findings
- Phase II (April) - Development and Testing phase. During this part of the project the students will:
    - Develop a template for “micro-landmark” submission
    - Test user friendliness of template
    - Run focus groups on template
    - Apply improvements to the prototype(s) according to test results
    - Deliver a working solution during a formal meeting with NAVTEQ

Expected Results

Research and Testing Results

Due to the nature of this project, there is going to be a higher focus on research than on development. The emphasis on research this term is based on the fact that this is the first time the topic of micro-landmarks will be thoroughly examined. Re-analyzing last semester's research will help redefine the issues that will be addressed this semester. This will also help minimize the time it will take to collect and sort information. Research that will be conducted will further help define the term micro-landmark in a way that both the suppliers and end-users will understand and appreciate. The study of NAVTEQ's current system will help Innovative Mapping better define the data and the format of the data that will need to be provided to NAVTEQ.

The second phase of this project will include feedback on the proposed solution and whether or not it is a plausible solution. The feedback to the proposed solution will also allow Innovative Mapping to optimize the solution and produce an acceptable template for a market-ready product.

Potential Project Tasks' Outputs

Since this is a continuation of NAVTEQ' s sponsorship, they are hoping that this semester's Innovative Mapping team builds on last semester's success. This semester's focus will be primarily on "micro-landmarks". The main goals for Spring 2010 are to define a finite meaning to the term micro-landmark and to establish a user-friendly way to facilitate contribution of data that is beneficial to both the contributing party and the end-user.

Expected Results

The Deliverables

The team anticipates three deliverables to NAVTEQ:

- The first deliverable is a document defining micro-landmarks. This should result from the first phase of the project and have the approval of NAVTEQ and the team.
  Deliverable 1 Target : First half of February

- At least one prototype of how people will submit micro-landmark data constitutes the second deliverable. This will be achieved by the end of the second phase of the project.
  Deliverable 2 Target : First half of April

- The last deliverable of this project is a presentation of the team's research and proposed solution to NAVTEQ. The sponsor's decision to approve the solution after this presentation is the team's ultimate goal.
  Deliverable 3 Target : Towards end of April

Project Challenges and Constraints

A few challenges have been identified so far by the team members. A significant challenge is that NAVTEQ is a leader in providing data and maps to many different companies that deliver and update the information differently. For instance, NAVTEQ supplies MapQuest.com, GARMIN, BMW, and others with the data. This increases the level of difficulty in coordinating regular updates within the constraints of each of these different platforms. It follows from this that the team's main challenge will be finding a way to get updated information maintained and updated by the various mapping software.

Technical standards and norms create additional challenges to this project. Many mobile device producers use different technical solutions. As such, a possible solution that is programmed to work on one mobile phone, for example Nokia, is not necessarily going to work on another, such as an iPhone. Additionally, a website viewed on a higher resolution screen is not going to look as clear on a lower resolution screen. Therefore, the proposed solution might need to have multiple designs so that it is accessible to greatest number of end-users.

The above mentioned challenges and constraints are in addition to a fifteen week time constraint which increases the challenges faced by this team. The team is expected to finish working on the project within one semester period.

Expected Results

Results as a Solution

Innovative Mapping will deliver to NAVTEQ at least one working solution template. The template will provide an easy, user-friendly way for pedestrians to use micro-landmark data while, at the same time, aiding NAVTEQ in their goal to keep their data current.

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 of this project.

BUDGET IPRO303	
SPRING 2010	
Research	
Printing	$100
Development	
Mobile Device	$200
Software	$150
Team Building*****	$150
Total	**$600**

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

Designation of Roles

Minute Taker: Ameena Payne
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: Mark Michael & Peter Sanborn
Responsible for providing guidance, instruction, and direction to the team. Monitor the progress of the team. Ensure results that need to be obtained for a successful project are accomplished.

Research Sub-team Leader: Scott Mochinski
Responsible for leading end-user research regarding the relating of update information to NAVTEQ. Lead research to determine end-user mindset regarding micro-landmarks.

Development Sub-team Leader: Piyush Sinha
Responsible for leading the development team in the development of the application solution template for NAVTEQ.

Agenda Maker: Peter Sanborn
Responsible for making an agenda for every team meeting. Makes sure that meetings go as planned and run smoothly. The agenda must be as such that deadlines are met on a timely basis and that the meetings are as productive as possible.

iGroups Moderator: Pallavi Gupta
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 site and that necessary information is delivered to the team. Responsible for creating necessary folders for the appropriate files for better accessibility. Maintains that the allotted amount of space on iGroups does not get exceeded.

Works Cited

1. *NAVTEQ Corporate - About Us*. Web. 10 Sept. 2009. <http://corporate.navteq.com/index.html>.

2. "NAVTEQ Corporate - Global Leadership." *NAVTEQ Corporate - About Us*. Web. 10 Sept. 2009. <http://corporate.navteq.com/global.html>.

3. "NAVTEQ Corporate - History." *NAVTEQ Corporate - About Us*. Web. 10 Sept. 2009. <http://corporate.navteq.com/history.html>.

4. Tajpuria, Ashish, NAVTEQ, and Holsinger David. "IPRO 303: WHO IS NAVTEQ?" NAVTEQ Presentation. Illinois Institute of Technology, Chicago. 1 Sept. 2009. Lecture(presentation available upon request).

Appendix

Appendix 1: Contact List

Name	Major	Email address	Telephone number
Austermann, Aric	Architecture	aausterm@iit.edu	[redacted]
Ernst, Jacob	Architecture	jernst3@iit.edu	
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Khan, Anam Moin	Electrical and Computer Engineering	akhan50@iit.edu	[redacted]
Komoroski, Aaron	Psychology	akomoros@iit.edu	
Michael, Mark	Computer Information Systems	mmichae3@iit.edu	
Mochinski, Scott	Psychology	smochins@iit.edu	
Payne, Ameena	Business Administration	apayne1@iit.edu	[redacted]
Ramirez, Ernesto	Computer Engineering and Computer Science	eramire1@iit.edu	[redacted]
Sanborn, Peter	Psychology	psanborn@iit.edu	
Sinha, Piyush	Computer Engineering	psinha2@iit.edu	

Advisors			
Name	**Email Address**	**Telephone Number**	
Burstein, Jim	burstein@iit.edu	[redacted]	
Shunia, Limia	mail@limiashunia.com		

Appendix 2: NAVTEQ Requirements

Project goals

- Enable Map Reporter input
  - Focus strongly on the pedestrian and mobile handset user. This could be a website, a mobile application, or any other appropriate means of collecting this information.
  - In addition to updates or fixes – for example, correcting the address of a building – allow users to contribute to the map.
- Collect Map Reports from pedestrian users
  - Try to direct users to specific arrival points; instead of "Wrigley Field", direct users to the Harry Caray statue.
  - Focus on visual cues that stand out to a pedestrian and could be used as a reference point to guidance.

NAVTEQ

11