

Team Transmission Safety on the Atlanta Beltline

Milestone 1: Preliminary Interviews and User Personas

Overview

This system will act as an information center for users of the BeltLine. The information provided by the system would pertain to the safety of those users, especially crime and path obstructions that may cause BeltLine users to be apprehensive of the trails.

This information center is needed because the trails on the BeltLine are currently unfinished, and have served as getaway routes for criminals in the past. By providing a system that informs both users and the proper authorities of what is occurring on the BeltLine, criminal activity and injuries can be reduced and even prevented.

Methodology

Our initial focus groups were determined through conversation with the representatives from the Atlanta BeltLine and through casual observation while on the BeltLine during tours and during arts performances.

A secondary focus group came from the Atlanta BeltLine Facebook fan page. A survey of 13 questions was posted on the page in order to gather general data about the view of the users. The population of this sample group was limited given that most of the responses were from college students and a select population of BeltLine users. The survey was not available to those outside of the BeltLine Facebook fan page or who did not have direct contact with one of the group members thus providing a restricted population to sample from.

Interview Questions

1. How often do you use the BeltLine trails?
2. What time of day do you use the BeltLine trails?
3. How safe do you feel the BeltLine is currently?
4. Explain why you feel this way about the BeltLine.
5. Think of a time that you used a trail other than the BeltLine. Did you feel safe?
6. On this trail, what made you feel safe/unsafe?
7. Do you believe that the BeltLine would be safer if users received regular updates about the trails (criminal activity, obstacles on the paths, etc.)?
8. Do you have regular access to a computer or a smartphone?
9. Rank these interfaces for real-time updates of BeltLine safety activity. (Kiosk, Web Application, Mobile Application)
10. Rank the information based on what would be most important to know while on the BeltLine? (Criminal Activity, Obstacles on the Paths, Construction, Weather Updates)

Constraints

- Casual observation opportunities of the BeltLine are limited by classes and jobs
- Skewed user perspective of uses of the BeltLine
- Small population to sample data from
- Feasibility and implementation due to scope, timetable, and funding of the project

- Systems and infrastructure that is already in place on the BeltLine and supporting organizations.

User Characteristics

Group	Teenager	Young Parent	Senior Citizen
Age	13-19	25-35	65+
Sex	M/F	M/F	M/F
Physical Limitations		children in strollers	handicaps such as hip replacements, etc.
Education	high school/college	(some) college	(some) college, professional degree
Technology Use	extremely proficient	fairly proficient	moderately proficient
Motivation	motivated to use new technologies	fairly motivated to use technology, provided it is relevant to situation	not very motivated to use new technology
Attitude	excited about the use of technology in connecting with safety organizations	happy about the option to use technology to provide for family	indifferent about technology use

Persona 1: Melody (representing teenage BeltLine athletes)

Melody is 17 and training for her first triathlon. She has a part-time job that takes up her time immediately after school ends and lasts until about 7pm. She uses the BeltLine to train for the running and biking portions of the triathlon. She prefers to stay on the paved sections of the trails, since they are lit more consistently than the unpaved sections, and she can train at night.

Persona 2: Amelia (representing younger parents)

Amelia is 30 and has a one-year-old daughter whom she takes with her on the BeltLine in a stroller around three in the afternoon every day. She struggles with dyslexia, which causes her to take a considerable amount of time reading news updates about trails on the BeltLine. She plans on taking her daughter to the parks on the BeltLine once she is old enough to enjoy them and play with other children, but she worries about the walk, since there is a path that is currently being paved between her entrance point and the park where her friends take their children to play.

Persona 3: William (representing senior citizens)

William is 65 and has just retired from his job. He wants to spend time outside with his wife, getting back in shape, so that they can start traveling together without worrying about how tired

they may get. His daughter-in-law lives in one of the neighborhoods attached to the BeltLine, so he and his wife like to walk the distance between their neighborhood and hers on the trails. He worries about his wife during the walk, because of her hip-replacement surgery that was performed two years ago.

Task Analysis

The overall task that we are trying to analyze is getting safety information about the BeltLine. As a group, we have divided the category of “safety information” into four subcategories: construction, crime, obstructions, and weather.

Task: Find out about construction on the BeltLine

1. Visit the BeltLine website (<http://beltline.org/>)
 - A. Click the “Progress” tab at the top of the page
 - i. Look under “Planning”
 - B. Select from one of the following options: Master Planning, Corridor Design, Parks, Trails, Transit, Foundational Studies depending on your preference
 - i. Read the text from the newly opened page for pertinent details

Task: Find out about crime on/around the BeltLine

- A. Search the web
 - i. Find the desired search engine
- B. Enter the query based on precinct
- C. Examine the search results
- D. Select the appropriate link
 - i. Read the article/report for pertinent details

Task: Find out about obstructions (potholes, ice, dead animals, etc.) on the BeltLine

- A. Go to the BeltLine
- B. Start with the anticipated activity
- C. Encounter the obstruction

Task: Find out about the weather in the BeltLine area

- A. Search the web
 - i. Find the desired search engine
- B. Enter the query
- C. Examine the search results
- D. Select the appropriate link
 - i. Peruse the web page for pertinent details

Usage Scenarios

1. Jacques is a Frenchman that is on a visiting Atlanta for a week. Since Jacques is just a visitor, he cannot read English very well. He decides to exercise during this trip and have heard

great reviews of the Atlanta BeltLine trails. Once at the BeltLine, he consults the information center to see more information about the trails. Ideally, the interface would be visual heavy and rely less on words. As a result, this will allow people like Jacques (who don't understand English) to easily navigate the interface.

2. George is planning on riding his bicycle on the trail today. However, construction is being performed on some parts of the trail. Ideally, a notification will be sent out to everyone who has the mobile application installed. In addition, there should be a prominent, easy-to-spot alert present to all information centers on the BeltLine and inform the users that construction is happening.

3. Kelly was running down a trail on the BeltLine by herself around 8PM. She ran a lot longer than she thought she was going to, and didn't come back to her car till around 9:30PM. It was very dark at this time, and nobody else was present in the parking lot. As she proceeded to unlock her car, a man wearing a ski mask demands for all her belongings. Petrified, she gave them her phone along with her car keys. The robber proceeds to steal her car, and leave Kelly stranded in the parking lot. Ideally, there will be a standalone information center in addition to a mobile one. In case of robberies similar to this case, people like Kelly will still be able to report the crime, even though her phone got stolen.

4. Bobby is an avid runner who has just heard about the Atlanta BeltLine. He is planning on running on the Beltline trail and would like to know the various running routes available. Once Bobby arrives on the BeltLine, there will be an information center nearby the main entrance, letting Bobby know about the various trails available. The closer it is to the entrance, the more likely it is to be used by users such as Bobby. Ideally, once Bobby uses the interface, the trails would be clearly marked, as well as give other information (such as trail difficulty, slope level, etc.)

Current UI Critique

Current information centers for attractions are available on site. Some attractions have mobile apps to accompany their on site ones. Existing information centers allows the user to access all the needed information easily by listing all the services by categories. Most information centers present a welcome screen, and a big button that when pressed, allows the user to access many categories. These categories range from maps, attractions around the area, etc. There is a lot of wasted space in the welcome screen. The space can be replaced with attention-grabbing important information (such as construction, crime alerts) that the user can use, instead of just a slideshow of pictures. In addition, most information centers aren't visually-oriented and instead relies on the user to speak English or change the default language setting, which can be difficult to figure out and wastes unnecessary time.

To cut down on the time it takes to use a system, a simple, visually enticing navigation system can be used so that individual steps can be seen and acted upon by the user. The wasted space on the home screen is much better used for quick and digestible information such that even a user who is just passing by and has no physical interaction with the system can

make use of the system.

Usability Goals

- Information needs to be available at high usage points on the Beltline where greater than or equal to 50% of the users at a specific point have an unobstructed view of the information.
- > 50% of the information displayed has to pertain to the localized area (needs to be defined) around that implementation point.
- Information should be available for consumption at anytime of the day, any day of the week.
- Submission of information to the system by the user needs to be able to be done in less than 10 seconds.
- If reported, users need to be updated of the status of their submission within 24 hours.
- Information about the near area needs to be available in less than 4 actions by the user
- The interface must be able to be used by > 95% of the user base
- Interface uptime must be > 99%

Implications

- A new idea was proposed after a discussion of how impractical it was for users to find out about obstructions on the BeltLine by physically witnessing them. The idea was to create a comment section on the chosen interface that incorporates user input about any hazards that would be of interest to other BeltLine users.
- The interface has to be visual heavy to cater to people who aren't fluent in English or are illiterate (foreign or homeless people)
- The usage scenarios, and the usability goals give clear defined descriptions and goals that that allowed for a greater understanding of the task at hand. These allow us to better understand how the system needs to cater to the many different people who use the Beltline.
- In addition to a stationary on-site information center, such as a kiosk, there also needs to be a mobile application for the Beltline users who have smartphones
 - Such an application would be synced and similar in interface to the kiosk systems.

Reflections

- During the task analysis, it was determined that it was actually quite difficult to find any information about construction that was currently being conducted. It took a few minutes of searching around the BeltLine's website before we could find any sort of construction update.
- After actually going to the Old Fourth Ward Park on the BeltLine, we began thinking that families with young children may become our focus. We were also very impressed by the sheer scope of the BeltLine's effects on the community around it.
- Given the broad range of users on the Beltline, the usability goals will have to be tweaked and updated as more knowledge is gained about the Beltline and credible baselines are established to measure each goal.
- Having a standalone information center can be very protruding on the overall ambiance of the environment. If implementing such information center, we would have to make sure that it blends with the nature of the environment. This is primarily to preserve the aesthetics of the trail.

Milestone 2: Initial Prototypes

Project Description

There will always be construction in order to keep the BeltLine in shape, and malicious people looking to cause crime. Our information center aims to help keep people safe from various crime and construction dangers by raising awareness of these dangers to users who are using the BeltLine and authorities who are well-equipped to handle these situations. By raising awareness through mobile applications and the stand-alone kiosks, users will be more equipped to protect themselves from danger. Our mobile application will be able to alert users immediately through a push notification when a crime has been reported, so that he/she can be more cognizant of the surroundings. The kiosk will also display any alerts and allow the user to seek information on the trails, such as trail difficulty, slope level, etc. Our initial user population is trail runners, but we believe that our information center can be beneficial to all demographics.

Prototype Rationales

BeltLine TrailWatcher Web Application

The web application design arose from the need for many BeltLine users to plan their trips along the trails before physically accessing them. This web application would allow users to see the status of the trails at a glance, including construction and recent crime reports. From this knowledge, users can accurately plan their desired route ahead of time.

BeltLine Watchdog Information Kiosk

The kiosk design arose from an understanding that not all people on the BeltLine have access to a smartphone or tablet while on the trails, and some may not have access to a computer before using the trails.

A set of kiosks along the trails would provide up to date information for BeltLine users regarding the status of the trails, criminal activity, etc. It would also provide a method for calling local authorities should the user find themselves in any form of danger; it would also provide authorities with the exact location of the user.

The kiosks would ideally be touchscreen interfaces in order to allow the user to simply press the desired button without having to navigate through a scroll-menu first. On the sides of the kiosks would be light strips that allow the user to see the kiosk from the side if it is dark outside; the strips would glow a light blue when the area has been safe and report-free for 24 hours, but would glow red if there has been an incident report at that kiosk in the past 24 hours.

BeltLine TrailWatcher Mobile App

The design of a mobile application arose from the fact that many people have smartphones that run on either the iOS or Android platform. A mobile application would allow BeltLine users to pull out their phone while on the trails and check the status of construction projects and safety concerns, without having to stumble across them first.

Usage Scenarios

1. Kiosk

Kelly is walking on one of the trails at 10pm after an art showcase in the Old Fourth Ward. She feels comforted seeing the Watchdog Kiosks along her path; she still doesn't expect it when a man appears from behind one of the buildings, demanding that she turn over her purse. Kelly does give the man her purse, including her car keys and cell phone. When he leaves, Kelly goes to the nearest kiosk and hits the emergency call button, logging that she has a police emergency. The dispatcher's voice comes on over the speaker and Kelly tells them that she has been robbed. Shortly after, BeltLine Task Force police officers arrive.

2. Mobile App

Derek is a first time visitor to Atlanta and he finds that the urban hiking trails are very interesting. However, he does not know his way around them, or the city yet. He pulls out his smartphone and downloads the BeltLine app, from which he is able to plan a route around five miles of trail and back, giving him a good view of the surrounding city area.

3. Web App

Teyana is accustomed to having to use the library computers to do her schoolwork and online bill payments, since she doesn't have a home computer. Finding herself with extra time after school one day, she chooses to log on to the BeltLine website. She goes to the web application to look up the segment of trail closest to the library and see if there are any art exhibitions going on that day. There are; however, she notices that, on the path she would normally take, someone has reported that walkers should be very cautious. She clicks on the "caution" icon to see what the problem is. A nest of rattlesnakes was found there this morning, and Animal Control is still gathering them up. Teyana then uses the web application to plan a new route from the library to the art exhibit.

Key Requirements

1. Application Structure and Navigation

Our application aims to provide easy navigation to all content on our system, so our goal is to not place any service more than three clicks away, especially the service to call the authorities. We have designed a structure that allows for easy navigation as well as optimal and easy on the eyes display of our content.

The main page will display the following options/information:

- Feed comprised of trail news, alerts, social network statuses on the BeltLine, and other pertinent information to the user of the BeltLine
- Running Trails: Displays running trails and information regarding them, such as slope level, difficulty
- Call authorities: Allows the user to call an ambulance or police officer when in the middle of an emergency
- Help: Gives an interactive tutorial on the features of the app

The following pages would then have another set of links:

- Location: The running trails page would then display the whole BeltLine, where the user can then choose which location they would like. Then this would display the running trails for that one location where the user can see the trail's information.
- Search: In the help page, there will be a search function that would search the entire database
- Contact: User can submit feedback/comments to the makers of the kiosk/app

2. Technical Requirements

- The mobile application should be developed on the Android and iOS platforms
- Mobile application must support standard 240x320 resolution
- Mobile application should be available on Google Play's and Apple App Store's search engines
- Uploading of pictures (of construction, etc.) should be supported by mobile application
- Push notifications need to be supported by application
- Kiosk should have an internet connection of at least 64Kbps
- Kiosk should have a landline to contact police/other authorities
- Web interface should be based on HTML5 and Javascript

3. Security

- Users won't need a user account to access all the features of the kiosk.
- There will be an option for users to link their Twitter and/or Facebook accounts, so that they can post on social networks about the trails

Design Space

1. What requirements may be difficult to realize?

- Kiosk hardware specifications: How much should we spend on the hardware of each kiosk to ensure that the kiosk will be able to support all required functions
- UI Conventions: How much should our mobile/kiosk/web application follow user interface conventions?
- UI consistency among devices: How much change in UI is required when different devices of different screen sizes are used.
- User help: How much help should be provided to users?

2. What are some trade-offs that you should explore?

- Performance of a website is probably going to be faster than a native mobile application
- Mobile application firmwares are more congruent than the multiple web browsers the world uses. With developing a website, we need to take into account the type of web browsers, the version, and internet connection speed.
- The kiosk won't have a camera, so when users are planning on reporting any dangers/crime, they won't be able to share picture evidence, unlike the smartphone application.

3. How could your interface support some tasks easier than others?

- When users are planning on reporting a danger (crime or construction), it would be harder to do so on a web application that's not optimized for their mobile device. This would be much easier on a mobile application's mobile-optimized navigation.
- A smartphone application would allow for tighter social network integration, since most users already link up their social network accounts to their phone

4. Describe the design alternatives that you considered exploring and then give a brief description and justification of the three (or more) alternatives that you did explore

First we considered a mobile application because not only do the vast majority of people aged 16 and up use them regularly, but they also have important features that we plan to use with our application. These features included a GPS system, camera, and web access. With web access, users can post an alert to the whole BeltLine community straight from their smartphone. A GPS system is useful, so that users can view content on the specific part of the BeltLine they are in. A camera would be extremely useful when users are reporting on construction or crime, and they would like to take a snapshot of the crime suspect or what the construction looks like. Smartphones also possess interactive animations and natural gestures that make the app feel intuitive and seamless. The only limitation is that performance is going to vary depending on the hardware that's running the application. For instance, this app is going to run smoother on the iPhone 5 than on the iPhone 3GS because of the hardware difference. In addition, iOS and Android apps are scalable, in that iPhone apps can still be run on an iPad and Android phone apps can be run on Android-OS tablets. We plan on optimizing the display for mobile applications only, but these apps can still be used on these tablets.

We considered the website idea because a website is easily accessible and can reach the greatest demographic of people. Not everyone is guaranteed to have a smartphone, but a lot of people in the Atlanta area, barring homeless people, are able to get access to a computer with an internet connection. With the advancements in HTML5 and jQuery, websites now are much more interactive than in the past. The only concern we had with the website is that a lot of the user cases that we came up dealt with people using our information center (by reporting construction/crime, see trail information, etc.) on the go.

The onsite kiosk was our last consideration; the first consideration was that the kiosk would run its own OS and have the features coded on this OS. However, we decided that this won't be necessary because first, creating a custom OS just for this kiosk would be a ridiculous amount of work, second we can develop either an app on the Android, Windows, or web platform. This would be a lot easier and would allow us to implement easy updates to our system. If we essentially have the kiosk act as a standalone computer, we can have it run the website. This means that we can kill 2 birds with one stone, and design with the desktop interface in mind.

Prototype 1- Web Application

Our first design is a web application that integrates with the current Beltline website.

Design Rationale

Claim: We made the claim that the web application is the best platform to implement the features that we want.

Evidence (Data): A web interface can be accessed through several mediums, whether it be a stationary computer/laptop or smartphone. The majority of our sample indicated that they have a smartphone, so we believe that developing a web application would allow us to target this audience as well as target those who want to access the application on a laptop/stationary computer.

Warrant: We assume that our users will either encounter the URL of our website or our users will be able to use a search engine and would look up the beltline, which would cause our web application to appear as one of the results from the search engine. We are assuming that users will be able to navigate the world wide web easy, so a web application is great to develop.

Backing: Nowadays, people will want to research a venue before going there. Because the world wide web is so easy to access, whether it be through smartphone or a computer, it's really convenient for someone to look up the venue (in this case the beltline) and plan their day. Our website is planning on having features, such as trail planning, so a web application would make perfect sense to fulfill this role.

Pros and Cons

The main benefits of developing a web application for the Beltline is that a web application is easily accessible in this day and age. Almost everyone has a phone with a web browser or a computer with one, so they will be able to access the application. In addition, the benefits of having a web application is that it's platform dependent, in contrast to mobile applications. Furthermore, a web application can simply be integrated into the existing Beltline site, so users won't have to adjust to a new layout/UI.

The cons of having a web application is that it's not as visually stunning on mobile devices as the native mobile applications themselves. In addition, a web application on mobile devices can't be as advanced as native mobile applications.

Scenario

Bob is a 60 year old male who has been running marathons all his life. He has just moved into the Atlanta area and would like to go to the Beltline because he has heard great things about it. Here is a walkthrough from his perspective when using the website:

Bob is looking for a route to run. He is old-school and doesn't own a smartphone. Fortunately, one of his friends has mentioned that Bob can still plan his route through the web application. Even though Bob doesn't own a smartphone, he still owns a desktop computer in his home. When he finally finishes booting up his computer and launching the web browser, he encounters a problem. He doesn't know the website name. Thankfully, the web browser has a clear search bar available that allows Bob to simply look up "Beltline," and displays the a set of links for the Beltline. Wanting to refine his search to trail routes, he searches "Beltline routes"

instead. The first option says “Beltline- Plan Your Routes,” so he clicks on it. It takes him to a page where he can choose which Beltline location he wants to go to. He chooses on the Piedmont route, since that’s the closest one to his location. He then customizes the trail that he wants to go on, and he is able to see the route information (such as trail difficulty, estimated time, distance, etc.)

Prototype 2- Kiosk

Our second design is a kiosk. We think that a kiosk will allow the small percentage of users who don’t have a smartphone or computer to use our features. In addition, it allows people to have access to our application on-site.

Design Rationale

Claim: We claim that the application should be in a kiosk form, whether it is served through a mobile application/web application disguised as a kiosk or just a standalone kiosk program.

Evidence (data): It is much easier to develop for a well known mobile or web platform rather than an obscure kiosk platform. Our data also indicates that people think that having an on-site application is very convenient.

Warrant: We are assuming that the people who will operate this kiosk will know how to navigate through a mobile application/web application or something similar to it. In addition, we assume that some of the users of this kiosk will not speak English, so we plan on including an option for the user to change the language.

Backing: Users would like to be able to access our application, in case their mobile phone/computer is not functioning properly. In the case of crime, a standalone kiosk application would be useful for those seeking authorities.

Pros and Cons

The pros of having a kiosk application has been mentioned in the previous sections. As a summary, the pros of having this kiosk application are that it allows users to seek a standalone application, allows the user to still access the application even if they don’t have a smartphone/computer.

A con of having a kiosk is that there’s the possibility of vandalism to the kiosk. This would result in high fees. In addition, another con of having a kiosk is that, depending on the development platform that we choose, the kiosk might be very difficult to develop for.

Scenario

Sarah is a 22 year old female. She was running down a trail on the BeltLine by herself around 8PM. She ran a lot longer than she thought she was going to, and didn’t come back to her car till around 9:30PM. It was very dark at this time, and nobody else was present in the parking lot. As she proceeded to unlock her car, a man wearing a ski mask demands for all her belongings. Petrified, she gave them her phone along with her car keys. The robber proceeds

to steal her car, and leave Kelly stranded in the parking lot. Ideally, there will be a standalone kiosk center in addition to a mobile one. In case of robberies similar to this case, people like Sarah will still be able to report the crime, even though her phone got stolen.

Design Assessment

1. Information needs to be available at high usage points on the BeltLine. At these high usage points, would the user know where/how to access the system?

Kiosk	Mobile (iOS/Android)	Web
Yes, depending on its placement along BeltLine trails	Yes, as long as the user's phone can access the internet	No, unless the user has access to a web browser while on trails

2. Information noticed at first glance needs to be defined around a given point. Does the information given by the system pertain to the user's localized area?

Kiosk	Mobile (iOS/Android)	Web
Yes, hard programmed into the kiosk	Yes, using a GPS to pull relevant information from the server	Yes, user is given an option to select a specific trail

3. Information should be available for consumption at all times. Can the user access the information 24/7?

Kiosk	Mobile (iOS/Android)	Web
Yes, but the user must be physically on the BeltLine	Yes, in addition to being available off of the BeltLine	Yes, also allows the user to know about trails without being there

4. Submission of information to the system by the user needs to be able to be done in a timely manner. If the user tries to submit a comment/concern, can it be done within 30 seconds of accessing the system?

Kiosk	Mobile (iOS/Android)	Web
Yes, there is a shortcut on the home screen	Yes, once the app is open, there are comments and emergency call buttons	Yes, there is a comments section on the webpage

5. Users need to be updated on the status of their submission in a timely manner. Will users receive a response from their submissions within 24 hours?

Kiosk	Mobile (iOS/Android)	Web
Yes, emergency call submissions have immediate feedback	Yes, emergency call submissions have immediate feedback	No, but the comments section does not necessarily warrant it

6. Information about the localized area needs to be readily available. Can relevant information be accessed in less than 4 actions by the user?

Kiosk	Mobile (iOS/Android)	Web
Yes, the initial display of the kiosk	Yes, in the open app, the news feed is one touch away	No, the user performs several actions before reaching news

7. The system must be accessible to the majority of the user base. Is at least 95% of the user base able to access the system?

Kiosk	Mobile (iOS/Android)	Web
Yes, everyone on the BeltLine trails has access	No, limited to users who have a phone that runs iOS, Android, or Windows Mobile	No, limited to users who have internet access

8. The system is almost never down. Is the system up and running at least 99% of the time?

Kiosk	Mobile (iOS/Android)	Web
Yes, maintenance will be alerted otherwise in order to fix kiosks	Yes	Yes, as long as the server is not down

Summary/Reflection

Most of the requirements specifications were slightly altered to be tailored to the three proposed designs. The system needs to be available in portions of the BeltLine that have high foot traffic because that is where any information pertaining to safety would have the most impact. Since the BeltLine is fairly large, the users of the system should first find out about relevant information about the particular area that they are in. A perfect system would be accessible whenever it is needed so that is what we strived for when designing three alternatives. Because of the various types of users, the system should be easy to use and submissions should be easily submitted. The responses for these submissions should be timely depending on the severity/impact. One of the most important requirements is the majority of the users should be able to use the system because when designing a system all users must be kept in mind in order to create the best system possible.

Milestone 3: Prototype Evaluation Plan

Project Description:

The Atlanta BeltLine is set to be a network of communities in the Atlanta area, focused around the old railroad tracks. With large communities comes a large potential for trouble. The information center kiosk is intended to act as a communication system between the Atlanta Police Department, BeltLine administrators, and BeltLine users and residents of the surrounding communities. The kiosk will allow users and residents to complete four main tasks: calling for emergency assistance, planning their route on the trails, viewing real-time updates on crime activity and construction, and reporting their own observations of dangers and hazards on the trails. The administrator website will allow both BeltLine officials and the Atlanta Police Department to report the status of construction and responses to crime reports, update the general BeltLine news feed, and submit safety tips. The design of these interfaces allows for on-site use by the user and remote use by administrators. The kiosk would stand six feet tall, with a set of light panels on the sides to provide for instant knowledge of trail status, with a large touchscreen to allow users to interact with the system. The administrator website would be an add-on to the existing BeltLine website, with the administrators and APD task force provided their own IDs and passwords, that would allow them to simply and quickly provide users with the needed information.

Requirements Summary:

1. Kiosk Application Structure and Navigation

Our application aims to provide easy navigation to all content on our system, so our goal is to not place any service more than three clicks away, especially the service to call the authorities. We have designed a structure that allows for easy navigation as well as optimal and easy on the eyes display of our content.

The main page will display the following options/information:

- *Feed* comprised of trail news, alerts, social network statuses on the BeltLine, and other pertinent information to the user of the BeltLine
- *Running Trails*: Displays running trails and information regarding them, such as slope level, difficulty, etc.
- *Call authorities*: Allows the user to call an ambulance or police officer when in the middle of an emergency

The following pages would then have another set of links:

- *Location*: The running trails page would then display the whole BeltLine, where the user can then choose which location they would like. Then this would display the running trails for that one location where the user can see the trail's information.
- *Search*: In the help page, there will be a search function that would search the entire database
- *Contact*: User can submit feedback/comments to the makers of the kiosk/app

2. Technical Requirements

- Kiosk should have an internet connection of at least 64Kbps
- Kiosk should have a landline to contact police/other authorities
- Interface should be created either in Android or iOS development environment. This provides a platform that's well-known and not obscure to develop for

3. Security

- Users won't need a user account to access all the features of the kiosk.
- There will be an option for users to link their Twitter and/or Facebook accounts, so that they can post on social networks about the trails

4. Non-functional Requirements

- Response time of search queries or running trail queries
- The kiosk should be usable by users who don't necessarily speak English by allowing the user to change the language setting
- To better cope with natural disasters, the kiosk casing should be bolted down to the ground by numerous bolts.
- The kiosk application should also be distributed to iOS/Android app store
- Price of iPad/Android tablet and kiosk stand should not exceed \$600

Design Summary:

The kiosk system will provide instant access to news updates and emergency contacts to all users of the BeltLine trails while they are physically on the trails. The requirements that most call for this design are the need for an emergency call system that will allow users to contact authorities quickly, and for those authorities to know the exact location of the emergency, and for users to be able to access an up-to-date news feed of hazards and crimes on the trails.

The digital interface of the kiosk will be very simplistic; four icons on the screen allow users to interact with it and view the news feed. The physical kiosk will display three colors of lights; an ambient blue when there are no nearby hazards, yellow if the user should be cautious, and red if there is an emergency situation on that path.

Prototype(s, P):

1. 3D Models of the Kiosk

- 1 for ambient blue lighting (no emergency)
- 1 for red lighting (emergency)
- 1 for yellow lighting (use caution)

Description:

The physical design of the kiosk would serve not only to be an aesthetic design, but also one that provides instant information regarding the safety of the trails. The kiosk will be a slim, black, six foot tall "tablet", with a touchscreen interface that begins about three feet from the ground. The lights on the side panels of the kiosk serve to provide instant updates for passersby by glowing one of three colors. A light blue color represents that the trail is currently safe. A yellow light represents the need to use caution on the trails, either due to construction or a recent

crime that has called for heightened trail security. A red light on the trail represents that a crime has been committed and reported in that area of the trails in the last 24 hours, and that the area is still deemed a safety hazard. The kiosks would also act as mile markers.

Scenario:

Andrey is a runner, using the WestEnd trail at 7:15 in the evening. He's used to running past the BeltLine kiosks; passing the blue lights help him know how far he has been running. This evening, however, he begins to notice a few yellow lights along his path. He knows they mean to use caution, so he starts paying close attention to the condition of the pavement. As he approaches the mid-point of his run, he sees a kiosk lit with a red light ahead of him. He stops at the kiosk briefly, noticing that there is a "hazard" icon on the trail just ahead of him. He walks around a bend in the trail to see what the problem is and notices a downed power line just on the edge of the trail that would have taken him by surprise had he not known it was there.

Rationale:

The physical design of the information kiosks is meant to provide information as well as be visually pleasing, so as not to be an intrusion on the trails. The lights are an effective way to provide quick, easily understandable information during both the day and the night.

2. Digital Model for the Kiosk

- emergency call
- trail planning
- news feed
- submission page

Description:

The digital interface of the kiosk is meant to be a simple way of gathering and reporting information quickly. Users on the BeltLine should be able to use the device intuitively; whether or not it is their first time or their fiftieth time, they should be able to navigate through menus quickly. The main menu of the touchscreen will have four icons, one for an emergency call, one for navigating through a trail-planning route, one to view BeltLine news, and one to submit observations of the trails. Each sub-menu will only take up to five icon-presses to complete each task.

Scenario:

Olivia is new to the Atlanta area and has chosen to spend her Saturday exploring the BeltLine trails, to see if she would like to take her dog on walks there. She enters the EastSide trail; immediately she finds a kiosk that tells her what mile of the trail she is currently on. She notices the trail icon on the touchscreen and chooses to navigate into its submenu; from that menu she views a map of the EastSide trail and plans a daily route for her and her dog to use that takes them through the Old Fourth Ward Park, which is a great benefit because her dog loves being around other people and dogs. In less than ten minutes, Olivia knows that she can use the

trails whenever she wants and that she and her dog can quickly become part of a new community.

Rationale:

The digital interface is meant to be a simple way for users to get information about activity on the BeltLine, such as detailed information on construction projects on the trails. The simple design allows users to quickly adapt to the system and complete any of the tasks effectively, even if it is their first time interacting with the kiosks.

3. Administrator Site

Description:

The administrator portion of the BeltLine website is meant to provide the BeltLine officials and Atlanta Police Department a way to interact with BeltLine users by providing updates on police responses to crimes, BeltLine updates on construction and other events, and to provide users with safety tips. The website will act to update the information on the kiosks that are in place on the trails. Using a unique ID and password, BeltLine officials and APD officers can log in on beltline.org and choose from one of three categories to update: crime & construction, events, and safety tips. Within just a few clicks and some text input, BeltLine users on the trail will be able to access this information on the kiosks.

Scenario:

Officer Smith of the Atlanta Police Department BeltLine Task Force has just returned from responding to a report of a robbery on the NorthSide trail. The dispatcher who took the call already updated the status of the kiosk it was reported from to “emergency - red”, so he knows the kiosk will glow red until tomorrow night. When he returns the next evening, he goes to check out the area around the kiosk. The stand still glows red. When he goes back to the precinct, he updates the status of the kiosk to “caution - yellow” so that people are still aware that there has been an incident, and that the Task Force will be paying extra attention to that section of the trail.

Rationale:

The site is meant to make it easy for BeltLine officials and the Atlanta Police Department to update the kiosk system and allow them to provide information to a wide selection of users at once.

Evaluation Plan:

- Kiosk Prototype Tasks
- Emergency Call
- Check News Feed
- Plan Route
- Submit Trail Observations
- Admin Website Tasks
- report responses to emergencies etc

- Update News Feed
- Provide Safety Tips (Admin Submissions)

Both sets of tasks will be evaluated through questionnaires provided to the user before and after they test the prototype tasks. The questionnaires will be provided through GoogleDrive in order to allow us to evaluate the data easily.

Data will also be collected through experimenters counting the number of errors that users make while testing the prototypes, including how many clicks it takes them to complete the tasks. The tasks will all be timed.

Summary/Reflection:

The final design decision was made due to the knowledge that users are more capable of accessing information while physically on the BeltLine. Because of this, a kiosk was decided to be the most effective physical design. For administrators to access and edit the news feed and status of the trails, however, a website was also needed. This website is attached to the official BeltLine website (beltline.org) to prevent officials from having to know a separate location. Using a unique user ID and password, both BeltLine officials and Atlanta Police officers will be able to update the site and kiosk systems, allowing an interaction between community members and officials that otherwise isn't available.

We had requirement specifications for a mobile prototype before we made the final decision to focus solely on a kiosk design. Now that we have narrowed our focus on the kiosk design, we were able to remove the specifications for the mobile application. Instead, we added requirement specifications such as the non-functional requirements such as the estimated price of the kiosk and also updating the technical requirements. We added more requirements to make sure that the hardware (internet connection, processing power) of the kiosk will be able to run our application smoothly.

When creating the digital prototype, the kiosk's interface was influenced by the design of the iPad. Although the kiosk is envisioned to be a touch screen, the prototype is click-based and the advancement between screens relies on clicking icons rather than touching general areas. The interface was implemented this way because of the hardware limitations of the systems with which we planned on testing the prototype. One thing that we did not have to worry about was the scale of the prototype's screen. Since the prototype was roughly a third of the size of the envisioned model and successfully navigating through the various screens was not a problem, the digital prototype was a valid depiction of our model.

Milestone 4: User Testing Results and Evaluation

Users

The participants of this study were members of the Georgia Tech community, Atlanta natives, and members of communities from different states. The participants ranged in age from 18 to slightly over 50, with an average age of 35.3. Ten of the twenty participants were male. When rating their comfort with computer use, which was translated into a “computer literacy score”, the group reported that they were, on average, very comfortable and competent with computers.

Evaluation Technique

The eight tasks that were developed to test two prototypes were evaluated to determine the ease of use for a user who is unfamiliar with the systems. For the kiosk interface, participants were asked to plan a route along the BeltLine trails, view a news feed to become familiar with BeltLine events and safety notifications, submit their own observation to be approved for and posted on the news feed, and place an emergency call. For the administrator website, participants were asked to log in using a unique user ID and password, submit a safety tip to be displayed on the kiosks, respond to an emergency call by updating the safety status lights on the kiosks, and update the news feed.

The evaluation for these eight tasks centered on the number of clicks it took for each participant to complete the designated task, with a secondary measure of the time it took for each task to be completed. Once the tasks were completed, users were asked to complete a questionnaire, rating the ease of use for both prototypes and provide their own comments and feedback on what the system did well or what it lacked.

Rationale

Counting number of steps and time for user to complete tasks

It’s important for the user to be able to quickly access the features on the kiosk without an excessive number of clicks, so that the kiosk experience will be as smooth and enjoyable as possible. In addition, for features such as the emergency call, it’s very important for the user to be able to access the phone function as quickly as possible and contact the proper authorities, given the urgent nature of the situation.

The interfaces for both the kiosk and the website were designed in order to complete each task under a certain amount of time and with a minimal amount of steps. However, the designer, being very close to the interface design process, may not know what sort of errors could be made in navigating their own system. Thus, the participants in this study provided the data needed to know how efficient the system is to a casual user.

Questionnaires

Questionnaires are important in assessing our users because they provide questions that directly ask how “easy” or “useful” a user thinks of specific features like planning trail routes and submitting observations. This allows us to get a good gauge of what features seem to be important to the user.

We also decided to allow the user to provide any additional feedback that they have on our system. The intention of the comments on the questionnaires is to determine what additional features the users would like to see, including more social interaction and different aspects of the BeltLine, such as art installments.

Task Name	Mean Number of Clicks	Expected Number of Clicks	Mean Time (seconds)	Expected Time (seconds)
Trail Planning	17.8	15	118.35	120
News View	4.35	5	30	35
Observation Submission	5.65	5	33.7	45
Emergency Call	3.05	3	9.6	10
Admin Log In	2.8	3	26.55	25
Admin Safety Tip	3.15	3	15.30	15
Admin Emergency Response	2.95	5	16.15	20
Admin News Update	2.55	3	19.3	35

Once the tasks had been completed by participants and their click counts and times recorded on a spreadsheet, three tests of statistical significance were performed on each: a T-Test, General Linear Model, and Pearson's Correlation. The T-Tests provided information on how significant the results were in respect to our expected click count and time. The General Linear Model allowed experimenters to measure performance of users across tasks. The Pearson's Correlation test demonstrated which tasks were correlated in their number of clicks and time to complete. The results are as follows:

T-Tests Performed on Click Counts

Task Name	Significance (2-tailed)	Interpretation
Trail Planning	0.001	significantly higher than expected
News View	0.120	not significantly different than expected
Observation Submission	0.174	not significantly different than expected
Emergency Call	0.847	on par with expectations
Admin Log In	0.019	slightly higher than expected
Admin Safety Tip	0.481	not significantly different than expected
Admin Emergency Response	0.000	significantly lower than expected
Admin News Update	0.001	significantly lower than expected

T-Tests Performed on Times

Task Name	Significance (2-tailed)	Interpretation
Trail Planning	0.714	not significantly different than expected
News View	0.203	significantly lower than expected
Observation Submission	0.031	significantly lower than expected
Emergency Call	0.596	on par with expectations
Admin Log In	0.816	on par with expectations
Admin Safety Tip	0.921	on par with expectations
Admin Emergency Response	0.021	significantly lower than expected
Admin News Update	0.000	significantly lower than expected

The results of the General Linear Model revealed that users performed consistently across tasks. This was interpreted as “heavy-clickers remain heavy-clickers across all tasks” and “users

who take time to complete a task take time to complete all tasks”. The Pearson’s Correlation tests showed correlation between the first and second tasks and the third and fourth tasks, which is to be expected, as user performance improves as they become accustomed to the system.

Analysis

In order to gain a better understanding of the subjects we used for the evaluation, we provided them with a pre-demo questionnaire. The results from the questionnaire determined that there was an equal number of males and females being tested. Based on our evaluation criteria, this was good because we wanted our evaluation to be a reflection of the interactions of the average first-time BeltLine kiosk user with no specific emphasis on gender. There was a decent spread amongst our defined age groups: 40% between 18 and 21, 7% between 22 and 29, 33% between 40 and 49, and 20% over 50. Our main concern with age was that people over the age of 50 would be able to use the system without experiencing any difficulties. People under the age of 18 were not considered because in our evaluation criteria, we classified them as minors and assumed that they would be accompanied by an adult who would be using the system instead.

From this questionnaire, we also gathered that only about 65% had ever used a recreational path in an urban area and that not a single subject had ever visited the BeltLine. Our evaluation criteria took this into account because we treated each user as if they were using our system for the first time and whether they had ever visited the BeltLine or not didn’t affect their use of the system. They only needed to know what the BeltLine was which was provided to them before they interacted with the system. Almost 90% of the participants expected the kiosk to cater to any safety needs they had while on the trail. Since our system was created to provide safety information to BeltLine users, this heavily corresponds to our evaluation criteria. Given a 5-point scale, the average computer literacy of the subjects was about 4.8 (extremely comfortable). This was the only thing from this questionnaire that was alarming because if we wanted the most accurate results we would have wanted the average computer literacy to be in the middle of the scale (comfortable). Based on our evaluation criteria, we wanted people who were extremely uncomfortable with computers to also be able to use our system. Judging by the fact that all of the subjects were at least very comfortable, this criteria was not fully met.

For the evaluation, our subjects acted as both a Beltline kiosk user and a Beltline administrator. For each type of user, the subject performed four keystone tasks. The kiosk user planned a route on the trail, checked the news feed, submitted an observation and made an emergency call while the administrator logged into the website, posted a safety tip, handled an emergency response and updated the news feed. For each task, the number of clicks and completion time were recorded for each subject and then the overall mean was compared to the expected number of clicks and the completion times determined by the evaluation criteria.

Most of our findings were on par with our predictions but there were a few interesting results. The trail planning task required an average of 2.8 more clicks than expected but the mean and expected time were relatively the same. Since this was the first interaction the user had with our system, most of these clicks were required to become acquainted with the system rather than actually performing the task and the expected completion time was drastically greater than any other task’s expected completion time. The emergency call task only took the user an average of 9.60 seconds to complete which was less than our expected completion time for that task. This is

important because in the evaluation criteria we attributed the smallest completion time to this task due to the urgency of its nature. For administrator tasks, the results from the emergency response and news update tasks were significant because both were done with significantly fewer clicks and less time than expected. The evaluation criteria for these tasks was set to reflect the timeliness with which these types of tasks need to be completed.

A post-demo questionnaire was given to the subjects after their interaction with both the BeltLine kiosk and the administrator website. Each subject was asked to rate each task based on a five-point scale. It was observed that ratings increased based on the order that they were completed. For the kiosk user, each task became marginally easier: the first task was given a 3.57 (moderately easy) and the last task was given a 4.93 (extremely easy). The same can be said about the administrator website user: the first task was given a 4.6 and the last task was given a 4.8. This proves that our system has high learnability which was one of the main criteria in the evaluation criteria. It should also be pointed out that the tasks involving emergencies received the highest ratings. Confirming the criteria that the most important tasks be the easiest to complete.

Implications

Our results showed that users were able to submit an emergency call very quickly and at a low amount of clicks. It only took users an average of 9.6 seconds to complete the task, which is less than our expected time. There are two ways to submit an emergency call. Either through the home page or directly from the touch screen. A user would first have to touch the touch screen in order to get to the home screen. From here, a user can select which task he/she would like to perform. We wanted to cut down on the number of clicks and time required to perform the task. Our design choice of having the emergency button on the touch screen allowed the user to get to the emergency call page extremely quickly. In addition, our choice of having the button red and prominent on the home screen ensured that the button would be easily spotted. These design choices helped lead to the quick performance of the task. The importance of performing an emergency call as quickly as possible is very important given the urgent nature of the situation.

Judging from our data, we concluded that the response task for administrators fared better than we expected. This can be attributed to our design choice of having the options conveniently placed as tabs on the side bar. These tabs are very easy to spot, and effectively direct the user to their intended task. In addition, it's very easy for a user to become better at using the system, once he/she gains a bit of experience with it. In our post-demo questionnaire, users rated tasks that were performed at a later order higher than tasks that were performed at an earlier order. We designed the performance of each task very similarly to each other. For example, submitting an update only requires the administrator to click on the tab, enter the updated information and click submit. The same steps can be applied to the other administrator tasks. We made an effort to employ this type of familiarity design so the administrator would be able to complete each task as easily as possible and to provide high learnability.

The results that we obtained showed that when users attempted the trail planning task, they did so with a much higher click count than we expected. We need to attempt to reduce the number of clicks that the user requires to perform the task.

We had questionnaires that allowed users of our system to give us specific gripes or feedback on the system. A recurring issue that kept being brought up is the absence of feedback when administrators are submitting updates on the admin site. Once the administrator clicks submit, there's no form of confirmation or feedback that the task has been accomplished.

However, most of the feedback from this portion of the questionnaire were that most users of our system enjoyed the overall experience of our system. Particularly, they loved the consistency of the theme and the prominent buttons that directly guide the user to the tasks that he/she would like to perform.

Prototype Improvements

The trail planning task required the user to first go through the main page that had the list of all the Beltline locations. After selecting the specific Beltline location, the user would then have to select which trail he/she wanted. This design causes the user to register more clicks than necessary, indicated by the results from our experiments. An improved design choice would be to get rid of the first screen and go straight into the second screen. If each kiosk has a GPS system or gets the location hardcoded into the system, then it won't be necessary for a user to choose a specific Beltline location. Allowing the user to skip the "Choosing location" page and go straight into the trail planning portion of the task will definitely reduce the number of clicks required to perform the task.

We can improve our trail observation page by combining the page where observations that other users have posted observations on the Beltline with the page with text boxes where the user can fill out his/her own observation. The rationale for this decision is that users have expressed feedback on how some pages didn't feel like there were enough content in them. Combining the two pages together would be feasible. By combining the two pages, we would create a more appealing interface as well as reduce the number of clicks and time the user would have to spend to submit an observation.

When we heard about predictive evaluation in class, we decided to perform this type of evaluation. Specifically, we decided to go through a cognitive walkthrough and asked ourselves at each step "Will the user get and understand the task at hand," "Will the user notice that the correct action is available," and "Does the user get feedback." What's great about this form of evaluation is that it was very quick for us to perform and also allowed us to predict the usability of our system ourselves. In addition, this type of evaluation worked to our advantage because we understood the task that was to be performed.

Through the cognitive walkthrough and asking ourselves the question "Does the user get feedback," we feel that it's necessary for us to add an alert box to the admin website, so that every time the administrator submits an update, a box would pop up confirming the administrator's actions.

In addition, we also decided to go with a different-participants design instead of a matched-participants or same-participants design. We concluded that the advantage of no order effects offset the disadvantage of having many subject differences. In addition, we didn't want a same-participants design because of ordering effects and we wouldn't want a matched-participants design because we can't be sure of perfect matching on all differences.

Critique of Evaluation Methods

While our evaluation plan gave us an adequate population size and valid data to run our analysis on, the evaluation would have benefited from more in depth metrics, an application specific user base, and more resources. The main measurement metrics that were used were number of clicks to it takes for a user to complete a task, the time it takes to use to complete a task, and pre and post evaluation questionnaires intended to characterize the participant. These metrics gave a simple understanding of the use of our system. Adding more data about the interaction between the user and the system by looking at what actions the clicks initiated or if system did not accurately direct the user to easy completion of the intended task would have added depth to the study. This depth would have allowed for a greater analysis of the actual use of the system and could be easily used to tweak the system interface.

With the exception of a few, the participants were not representative of the BeltLine user base as we understand it. This is due to the lack of resources to fully understand the BeltLine demographic outside of the causal qualitative information gained from short exposure to BeltLine activities. A larger population size would have benefited the evaluation and analysis of the system given that increase in raw data and an ability to cover the demographics of the BeltLine in a more complete manner. A demographic correlation study involving an involved questionnaire about the habits of the participants and their use of other technology based systems could be used to improved the data that was obtained by giving a more complete view of the user and their actions.

Given more resources a plan could be developed to account for the expansion of the BeltLine and the implementation of the system as the BeltLine grows. In addition to an expansion plan, improved resources would allow for a far greater level of research to be done involving the main tasks that the system would be used for or how long a user would be willing to use the system. All of this research would go towards setting more defined and better quantitative design goals to better implement the system for the user base it will be serving.

Reflections

The final design of this interface is the product of a semester's worth of work. It evolved from the idea of a safety system for BeltLine users into a kiosk that allows BeltLine users to get information pertaining to and actively participating in their own safety on the trail.

The evaluation of this final interface relied on both user feedback and experimenter observation. Through that feedback, we were able to determine that our system is mostly on par with our expectations of it, despite a few hiccups. With this knowledge, we can conclude that our interface is useful in respect to the BeltLine; in the future, it could even be possible to take the interface and create a mobile application out of it, providing access to the system while on the BeltLine and off it.

From this class, all of the members of Team Transmission gained a greater understanding of the process it takes to design a working interface. Interface design, normally perceived to be a mostly purely creative form of work, is grounded in analytical, fact based, impartial analysis of not only the system that you are designing but careful inspection of the user base.