Traffic Monitoring Service

Group No. 7

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Breakdown of Contributions

All members contributed equally for this report.

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Customer Statement of Requirements

Many Services that give information about traffic only account for current traffic incidents. The majority of these services collects and releases data at certain intervals and then releases their views of the current traffic concentrations. These services, such as those given by "Traffic.com" and "Yahoo! Maps Live Traffic" use this method to monitor traffic. These types of services are the most widely accepted in terms of traffic aggregation and information.

This project attempts to move away from this method of only using current traffic data to give information about traffic concentrations. If traffic data can be continually taken for long periods of time, the traffic trends can be shown for particular routes. This can be taken further as to collect the weather along the route and the time of day for each piece of data. This new method of traffic monitoring is important to understanding the trends that occur in traffic. Current traffic monitoring services only release incidents and congestions as they occur, which are not as useful to someone looking at the current traffic before leaving for their destination. With this service, the user would be able to see the projected traffic for the roads they intend to travel, and they can find the likelihood of traffic congestions in those areas. To supplement this traffic monitoring system, live traffic updates can be included as well. This can help to account for outliers in the traffic probabilities that are created. One of the main focuses of the project will be giving the user enough information to make the correct route choices for their situation.

While previous iterations of this project have only included highways in New Jersey, we intend to extend the scope of the service to the entire Tri-State area. This area includes New Jersey, New York, and Pennsylvania. This change was made to cater to the expected users of this service. Many people who live in the Tri-State area have to travel to other areas or states for their jobs or schools. Therefore the primary users of this service are expected to be commuters. Temporary visitors, such as tourists would not necessarily find meaning in historical traffic data. However, commuters travel the same route many days a week, and they benefit the most from possible route improvement. The time spent using this service will easily be offset by the amount of time the commuter will end up saving with an improved route.

There are several major scenarios that we consider this traffic monitoring system to be useful. The most important scenario is for the user to be able to monitor traffic on major highways during rush hour. By allowing the user to view previous traffic data, the user can make plans for an alternate route, or to find a time where traffic is at a minimum. Another useful scenario is allowing the user to decide which highway to use under certain weather conditions, time of day, and day of the week for road trips or other planned drives. The user can plan ahead for longer drives and achieve minimal traffic through the use of observing traffic history. A final and more interesting use would be to use the traffic history data to observe if road infrastructure can be improved. Through the collection of traffic incidents, the number of damaged highways could be recorded. Similarly, if a certain area sees constant congestions, a recommendation could

be made to either widen the highway or create an alternate route to move drivers away from the congested areas. The traffic monitoring service has many possible applications.

The desired traffic monitoring service will have multiple ways of viewing the traffic predictions. One of the methods should be to view the traffic projections by state. This should allow the user to view the traffic concentrations in their state, so that the user can avoid the roads that typically have traffic in their local areas. This allows the user to see in a broader scale the traffic concentrations that typically occur in the areas they regularly travel. This process is outlined below:

(1) "Traffic reports within an area" – the user is given the following choices:
- (A) "Select target area"
  a. New Jersey
  b. New York
  c. Pennsylvania
- (B) "Time"
  a. The user can choose from intervals of one hour
- (C) "Type of day"
  a. "Weekday" – The traffic projections for Monday to Friday are shown
  b. "Weekend" – The traffic projections for Saturday and Sunday are shown
- (D) "Show Live Traffic" – The map will display the current traffic conditions in addition to the projected traffic. The current traffic conditions will have some way that they can be differentiated from the traffic projections.

Another method of viewing traffic reports will involve showing the traffic incidents along a route of the user's choice. The user will be able to enter a starting point and a destination, and the service will consult a directions service, such as Google Maps or Mapquest in order to find the fastest route. This route will not consider the traffic projections initially, and it will show the user the expected traffic along the given route. The service will ideally be able to suggest routes that avoid areas with a very high projected concentration of traffic. This will allow the user to find an ideal route with minimal exertion. This process is outlined below:

(2) "Traffic reports along a route" – The user will be able to view traffic along a route
- (A) "Enter Route" – The user will have two text boxes in which to enter their starting location and destination. The service will display the path of the route on the GUI
- (B) "Time"
  a. The user can choose from intervals of one hour
- (C) "Type of day"
  a. "Weekday" – The traffic projections for Monday to Friday are shown.
  b. "Weekend" – The traffic projections for Saturday and Sunday are shown

(D) "Show Live Traffic" – The map will display the current traffic conditions in addition to the projected traffic. The current traffic conditions will have some way that they can be differentiated from the traffic projections.

This method behaves similarly to the first method, but its main function is to allow the user to observe the expected traffic along highways. Commuters generally have to travel along several highways to get to their final destination, and this method will show display the route along with the expected traffic concentrations of the highways they will have to travel on. This can be enlightening information to the user, who might find out that they have been taking a highway that has a substitute with a much lower traffic concentration.

The above descriptions describe the user accessible front-end of the traffic monitoring system. The back-end of the system is comprised of the "Weather collection" and "Traffic collection" services. These services will collect data on weather and traffic conditions, will parse the information into a database, and will perform analyses that can be used to show the traffic projections on the front-end. These back-end services are only accessible by the administrator. The users will not have access to the collection service databases.

The "Weather Collection" provides the following function: it provides the weather along a certain highway, and it gives the time that the weather occurred. This service will update along a time interval of the administrator's choosing. The weather data will be retrieved through a weather forecasting service such as "Weather.com." This collection service will be able to retrieve data only specified highways and areas, and the data will be able to be used in conjunction with the "Traffic collection" service to allow the user to observe traffic patterns in different types of weather.

The "Traffic collection" service provides similar functions to the "Weather collection" service. It retrieves data from traffic incidents or congestions and records it in a database. This service will also update at a specified time interval of the administrator's choosing. This data can be taken from live traffic monitoring services, such as "511nj.org" or "Traffic.com." The service should update every time interval, making sure that it only records new traffic incidents, as multiple instances of traffic incidents would cause false positives to affect the traffic projection algorithms. The traffic and weather collection services can run in parallel in order to achieve a more accurate prediction of future traffic.

In addition to the version of the traffic monitoring service that the users can access on their computers, there should also be a mobile component to the service. The mobile component of the traffic report system should allow users to use the system on the go. The mobile application needs to offer the user the ability to get traffic reports on the go. This will expand the portability of the system and allow the user to get traffic updates no matter where they are. The app should also allow users to share their current traffic status. This will increase the accuracy of traffic predictions and allow future users to get a more accurate reading of their current traffic situation. The application should focus on simplicity and ease of use as the user will most likely

already be travelling. The phone should automatically collect any the data the user does not need to explicitly provide.

The primary function of the mobile application should allow the user to get a traffic report on the go. The user should just need to enter their destination and allow the application to automatically collect the rest of the required information. This data should be sent to the web system and be processed as if a user of the web service had just entered those parameters. The report should then be returned to the user's smartphone and be presented in a clear manner.

Next, the user should be able to send their current traffic status to the database at any time. The accuracy of the database is limited to information pulled from online sources. The addition of real time updates would increase the accuracy of all future traffic conditions. If the user has found a road with high traffic intensity they should be able to warn future drivers. A simple radio button selection should allow the user to select their traffic intensity and have it be sent to the database with one button. Limiting the traffic intensity to a few selections will aid in quantifying the data for analysis in the database.

The mobile component of the system will expand the functionality of the entire system. The system will now be available to users on the go from their smartphones. Now if a user does not have access to a computer or has suddenly changed their route they will be able to access the system remotely. Furthermore, the addition of real time traffic updates will greatly increase the accuracy of the system. If a user has encountered heavy traffic, they can send a report to instantly update the database. Future users of the system, using either the mobile app or the website will have a more accurate traffic report.

Glossary of Terms

Administrator - Someone who oversees the website and is responsible for overseeing the data intake and manipulation

Current Traffic – Traffic that is currently stored on the *Traffic Service* websites at the time the user is utilizing the traffic monitoring service. This data is concrete, and describes the known conditions of traffic at the moment

Database - server or entity that will contain user data, traffic information, and weather information

Developer - Someone who is involved with creating the website's front-end and its back-end

Dropdown box - Box with dropdown options that cannot be changed, only selected

Graphical User Interface (GUI) – A type of interface that allows the user to interact with the graphical components, including buttons, dropdown menus, and any maps that appear

Mobile application - Software for an Android smartphone that is available to all users of the traffic system.

Mobile application user - Someone who will use the mobile app

Mobile device - A device that is meant primarily for mobile use, including tablets and smartphones

Mobile friendly site - site which is easier to navigate on a mobile device

Radio Button - A family of buttons from which the user can select their traffic intensity.

Text box - Open text box for which letters and numbers can be typed in

Traffic Service – A website or web service that contains traffic data that can be collected, parsed, and stored into a database

Weather Service – A website or web service that contains weather data that can be collected, parsed, and stored into a database

User – A person who intends to use the traffic monitoring system to access historical traffic data

Functional Requirements Specification

Stakeholders

- User
- Mobile User
- Administrator

Actors and Goals

- User
  - Initiating Actor
  - The user has the ability to access the main Application to receive the traffic and weather reports they desire
- Mobile User
  - Initiating Actor
  - The mobile user has the ability to access the traffic system on the go or to add reports to the database.
- Administrator
  - Initiating Actor
  - The administrator has the ability to run and provide upkeep for the traffic and weather collection services.
- Application
  - Participating Actor
  - The Application is run on a website and can be run on a variety of web browsers. Its purpose is to provide the user with a clear and concise result of their traffic and weather queries
- Mobile Application
  - Participating Actor
  - The goal of the mobile application is to expand the portability of the system and make it available to mobile users.
- Database
  - Participating Actor
  - The goal of the database is to receive and store the parsed weather and traffic data sent by the Weather and Traffic Services. Another goal of the database is to provide the parsed data to the user through the Application
- Mapping Service
  - Participating Actor
  - The goal of the Mapping Service is to present a clear map interface on which the user will be viewing weather and traffic data.

- Weather Service
    - Participating Actor
    - The goal of the Weather Service is to provide weather data concerning the roads used in the Application. This data will be stored in the Database.
- Traffic Service
    - Participating Actor
    - The goal of the Traffic Service is to provide traffic data concerning the roads used in the Application. This data will be stored in the Database.

Casual Description of Use Cases

- UC1: ViewTrafficHistory
    - The web interface will ask the user for the time of day, area, weather, and day of the week. After the user inputs the data, it will display in that area which roads have a history of traffic and how severe it is.
- UC2: GetDirections
    - The web interface will ask the user for the time of day, area, weather, and day of the week. The User will then input their starting location and destination. The interface will display on the map which route Google suggests and which route our system suggests based on the history of traffic along the route.
- UC3: MapInterface
    - Use the Mapping Service to display a clear result of the User's query. The Map Interface will be using the Google Maps API to provide much of its function.
- UC4: GetTrafficData
    - Provide traffic data requested by the Traffic Service. The Traffic Service and its specifications are controlled by the Administrator.
- UC5: GetWeatherData
    - Provide weather data requested by the Weather Service. The Weather Service and its specifications are controlled by the Administrator.
- UC6: GetMobileReport
    - Provides the user with a traffic report along a specified route via the mobile application on an Android smartphone.
- UC7: ReportTrafficCondition
    - Allows the user to report the traffic in their area via the mobile application on an Android smartphone. The mobile reports will be added to the database.

Traceability Table:

	UC 1	UC 2	UC 3	UC 4	UC 5	UC 6	UC 7
REQ 1	X						
REQ 2		X					
REQ 3	X	X	X				
REQ 4				X			
REQ 5					X		
REQ 6						X	X
REQ 7							X
REQ 8	X	X	X				
REQ 9		X				X	
REQ 10						X	
REQ 11				X			
REQ 12		X				X	
REQ 13				X	X		
REQ 14						X	
REQ 15	X	X	X				
REQ 16						X	X
Total PW:	15	20	10	14	9	21	14

Fully-dressed Descriptions of Use Cases

- Use Case 1: View Traffic History

Initiating Actor: User

Goal: To view traffic history or the desired area, weather conditions, and day.

Participating Actors: Application, Database, Mapping Service

Preconditions: Application is available
Database is not empty

Postcondtitions: Traffic history is displayed for the user on the website.

Main Success Scenario:

1) The User uses drop-down boxes to selects the time of day, area (New Jersey, New York, Pennsylvania), weather conditions, and day of the week they would like to view traffic history for.
2) The User clicks the "Show Traffic" button on the Application.
3) The website uses information stored in the database to determine the traffic history and severity along roads in the specified area, time and weather.
4) This information is displayed on a map on the website for the User to see.

Extensions: Nothing to mention.

- Use Case 2: Get Directions

Initiating Actor: User

Goal: To obtain driving directions based on traffic conditions.

Participating Actors: Application, Database, Mapping Service

Preconditions: Application is available
Database is not empty

Postcondtitions: Directions are displayed for the user on the Application.

Main Success Scenario:

1) The User uses drop-down boxes to selects the time of day, weather conditions, and day of the week.
2) The User uses text boxes on the website to input their starting location and their destination.
3) The User clicks the "Show Traffic" button on the Application.
4) The Application uses traffic information stored in the database to determine the quickest way for the User to drive to their destination.
5) The Application displays the recommended route on the map for the user to see.

Extensions: If the User asks for directions to an area not included in the Application, they will be asked to use a different location and try again.

- Use Case 4: Get Traffic Data

  Initiating Actor: Administrator
  Goal: To obtain traffic data
  Participating Actors: Database, Traffic Service
  Preconditions: Database is available
  Traffic site is available
  1 hour has passed since last call.
  Postcondtitions: Traffic data stored into database
  Begin countdown to next call
  Main Success Scenario:
  1) Administrator executes the script that obtains the traffic data.
  2) The script queries the traffic site and obtains data
  3) The script parses the data to be used in the database.
  Extensions: Nothing to Mention.

- Use Case 5: Get Weather Data

  Initiating Actor: Administrator
  Goal: To obtain weather data
  Participating Actors: Database, Weather Service
  Preconditions: Database is available
  Weather site is available
  1 hour has passed since last call.
  Postcondtitions: Weather data stored into database
  Begin countdown to next call
  Main Success Scenario:
  1) Administrator executes the script that obtains the traffic data.
  2) The script queries the weather site and obtains data.
  3) The script parses the data to be used in the database.
  Extensions: Nothing to mention.

- Use Case 6: Get a Traffic Report on a Mobile Device

  Initiating Actor: Mobile User
  Goal: To obtain a traffic report on a mobile device
  Participating Actors: Mobile Application, Database, Mapping Service
  Preconditions: Network communication available
  Postcondtitions: Nothing important to mention
  Main Success Scenario:
  1) User enters destination.
  2) Application collects location and time from phone.
  3) Application sends data to web based system.
  4) Web based system returns report to application.
  5) Application displays the results.

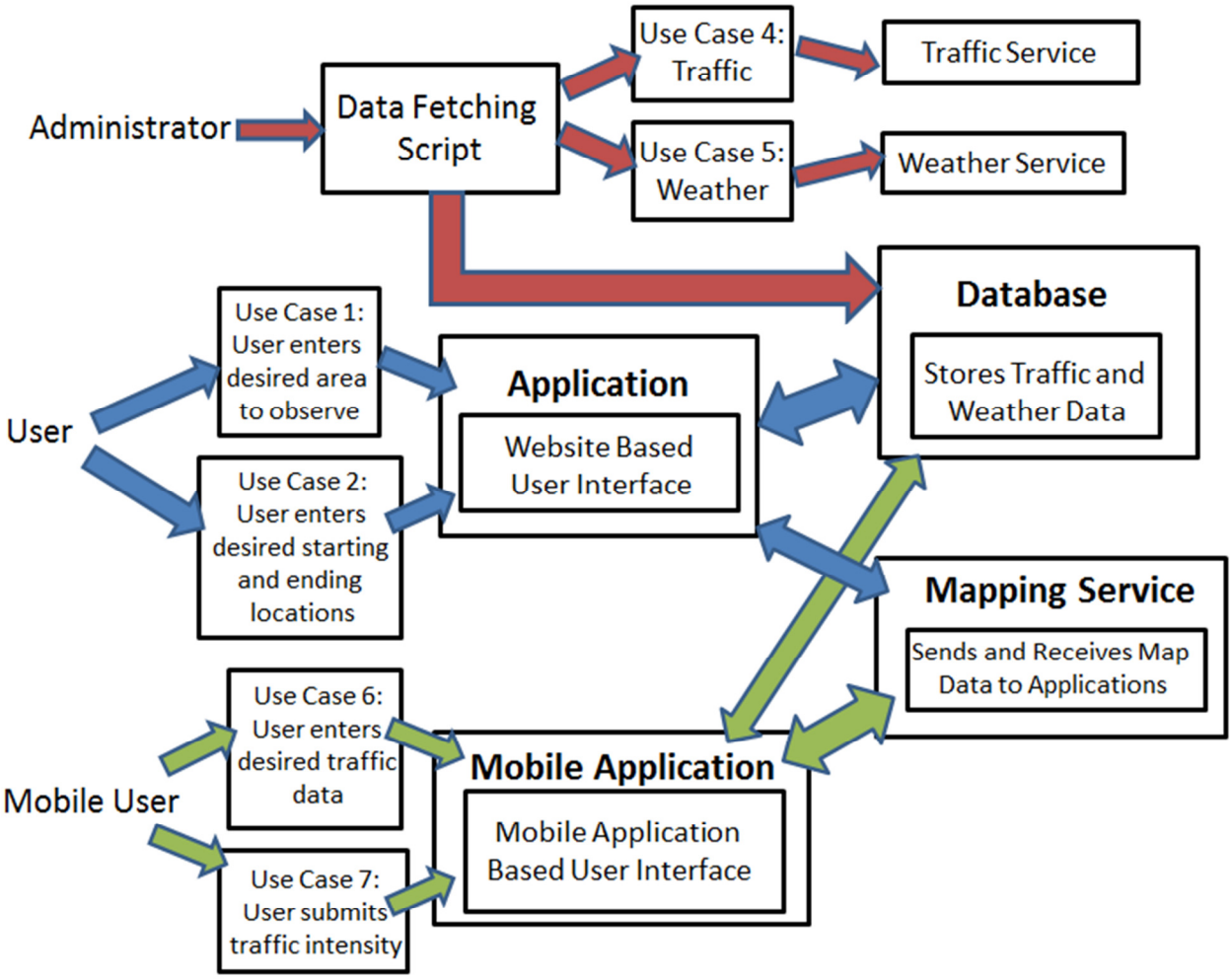
  Extensions: The user enters an invalid destination. The user is notified and asked to try again.

- Use Case 7: Report a Traffic Condition from a Mobile Device

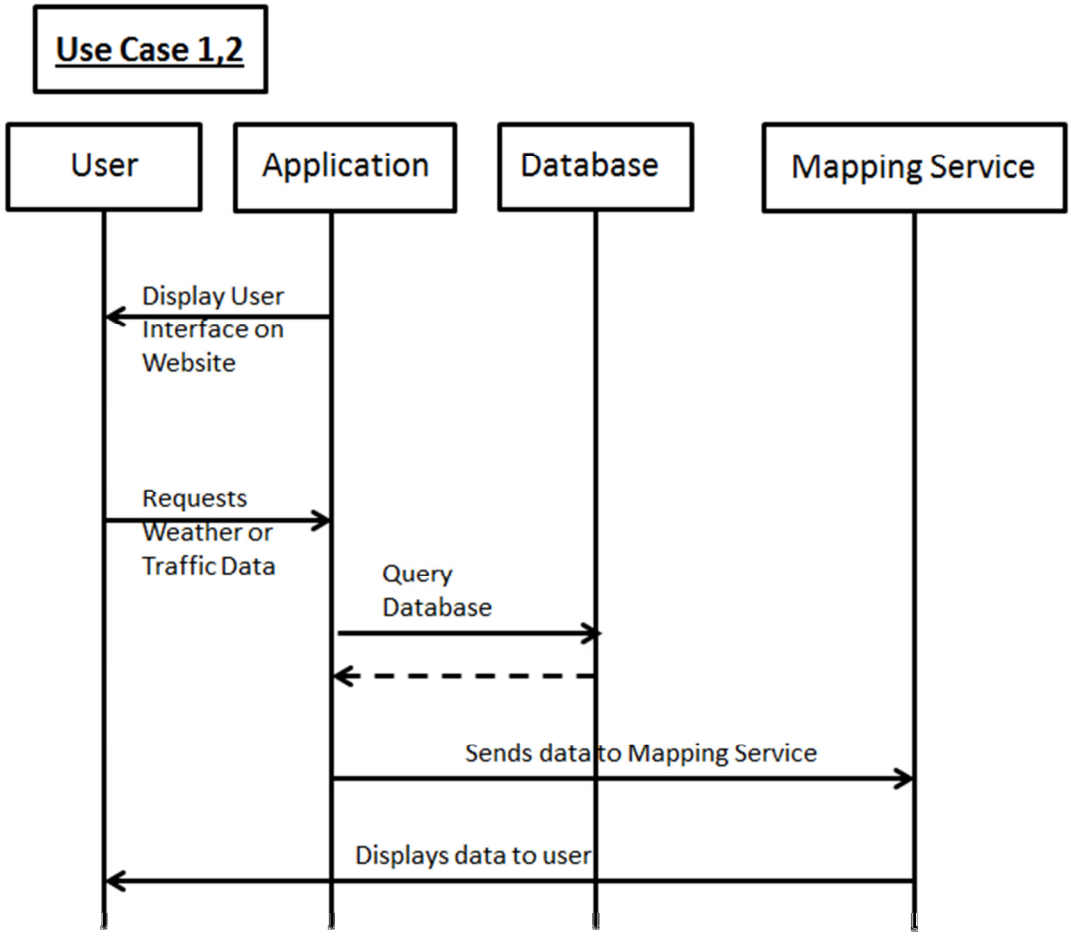
  Initiating Actor: Mobile User
  Goal: Allow User to share traffic condition
  Participating Actors: Mobile Application, Database, Mapping Service
  Preconditions: Network communication available
  User is located in an area mapped by Mapping Service
  Postcondtitions: Nothing important to mention
  Main Success Scenario:
  1) User selects traffic intensity from a variety of choices.
  2) Report is sent to the database

  Extensions: The database fails to collect the data. The user is informed and instructed to try again.

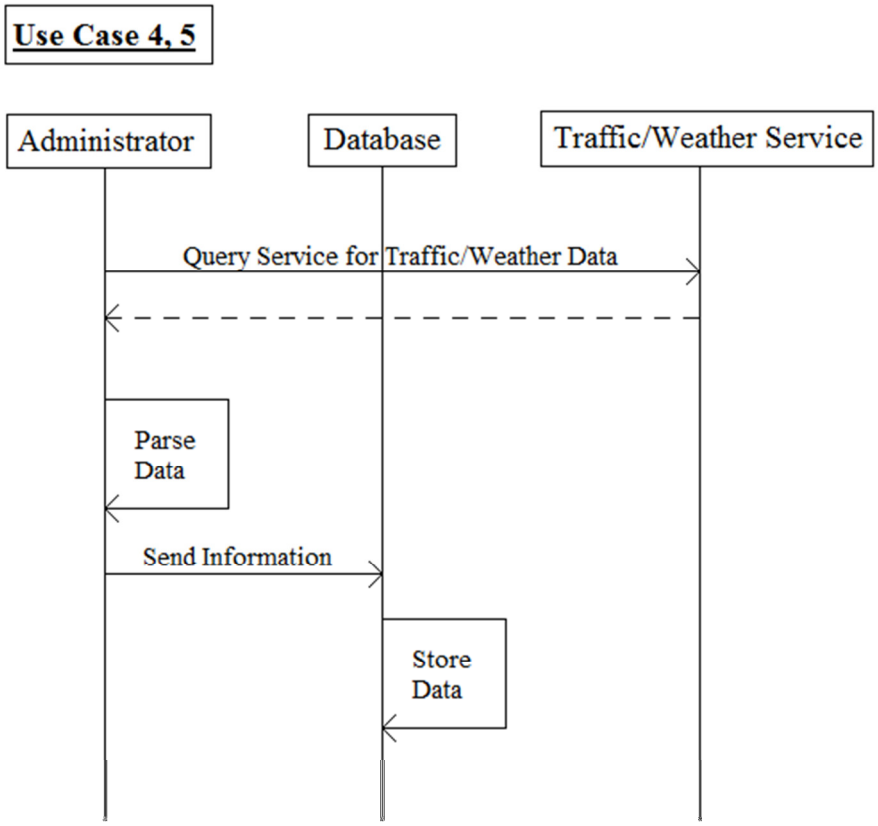
Use Case Diagram



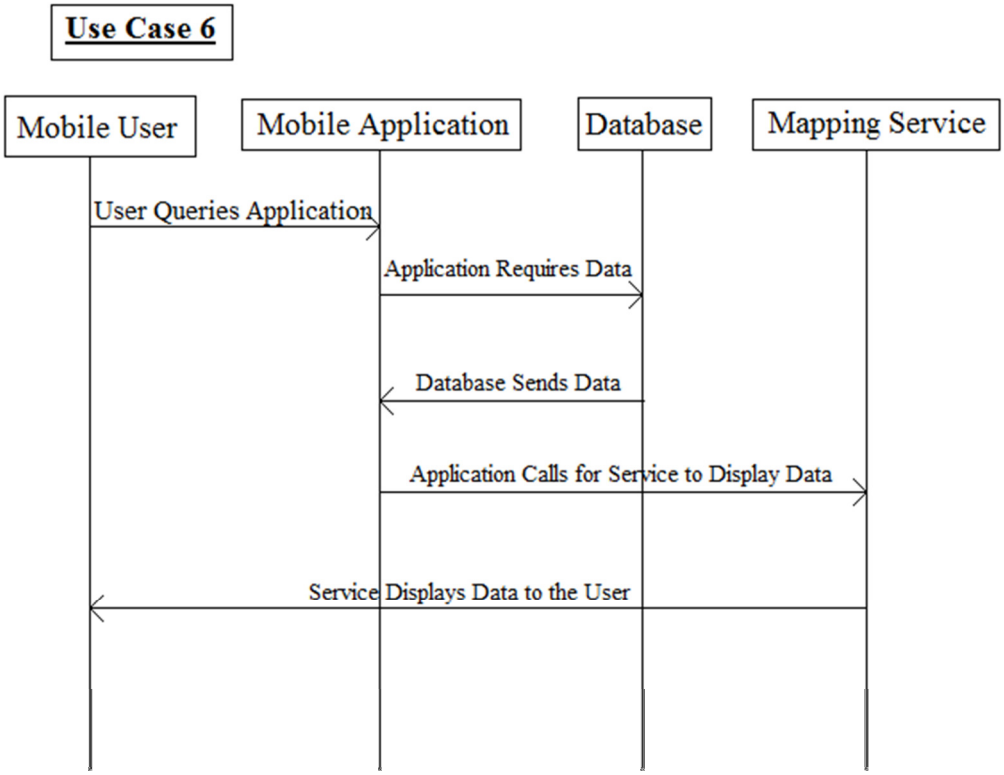
System Sequence Diagrams



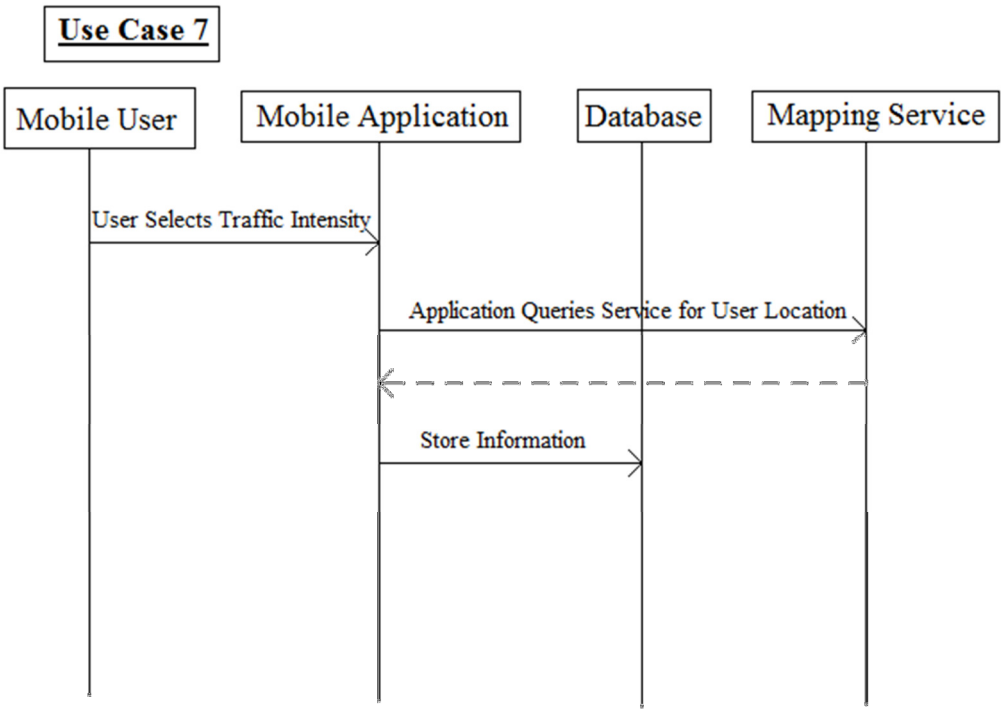
Use Cases 1 and 2 have similar input scenarios, so their system sequence diagram can be linked. The Application displays the starting interface to the User, and the User must select the options they wish to show traffic history for. In Use Case 1, the User has the option of choosing which state they wish to show, and in Use Case 2, the User must input their starting location and destination. Once the data is sent back to the Application, the Database is queried to find information relevant to the User. The Application then sends this data to the Mapping Service. In Use Case 1, the traffic history is shown for the state selected. In Use Case 2, the Mapping Service finds the directions the User should take. The Mapping Service sends the necessary data to the User.



Use Cases 4 and 5 are very similar and can be explained using only one system sequence diagram. The Administrator asks the Weather and Traffic Services for data at regular intervals. The Administrative program then parses the data to be stored in the Database. The Database receives the parsed weather and traffic data, and stores it accordingly.



In Use Case 6, the User enters information to the Mobile Application to receive data on the traffic and weather conditions for the roads they desire. The Mobile Application sends which data is required to the Database, and the Database returns the needed data. The Mobile Application calls for the Mapping Service to display the necessary data to the User, and a map containing the desired information is then shown to the User.



In Use Case 7, The User desires to enter the traffic intensity of the area they are currently in. The User chooses an option for traffic intensity and sends it to the Mobile Application. The Mobile Application receives the data, and queries the Mapping Service to find where the User is located. This data is sent back to the Mobile Application, and the Mobile Application stores the User's location and entered traffic intensity into the database.

System Requirements

Functional Requirements:

Identifier	PW	Requirement
REQ1	5	The system's interface shall allow the user to select pre-populated options for traffic history based on time, area, and weather.
REQ2	4	The system's interface shall include text boxes in which the user can input their starting location and destination for directions.
REQ3	3	The system shall allow the user to view any part of the map and zoom in and out of different areas.
REQ4	5	The system shall pull data from various traffic sites (511.nj.org, google.maps.com, mapquest.com, and others) to be stored in the database.
REQ5	5	The system shall pull data from weather sites every 1-6 hours.
REQ6	5	The system shall have a mobile app with capabilities similar to that of the website version of the traffic monitoring service
REQ7	5	The system shall collect user data from the mobile app

Non-Functional Requirements:

Identifier	PW	Requirement
REQ8	2	The system shall provide a non-cluttered, user friendly, easy to understand web page.
REQ9	4	The system shall display Google Maps' suggested route as well as the suggested route to take based on traffic history.
REQ10	2	The system shall provide a mobile friendly website which can be viewed on a mobile device.
REQ11	5	The system shall use an algorithm which determines the intensity of traffic.
REQ12	2	The system shall have preferences for route such as toll roads.
REQ13	4	The system shall allow the administrator to control the frequency and time of data gathering scripts.
REQ14	4	The mobile application shall provide a traffic history report and any current traffic in the user's current area.

On-Screen Appearance Requirements:

Identifier	PW	Requirement
REQ15	5	The system shall use a display containing the Google Maps interface.
REQ16	4	The system shall have a concise and simple mobile app GUI similar to the website version of the traffic monitoring system

Illustration of REQ15

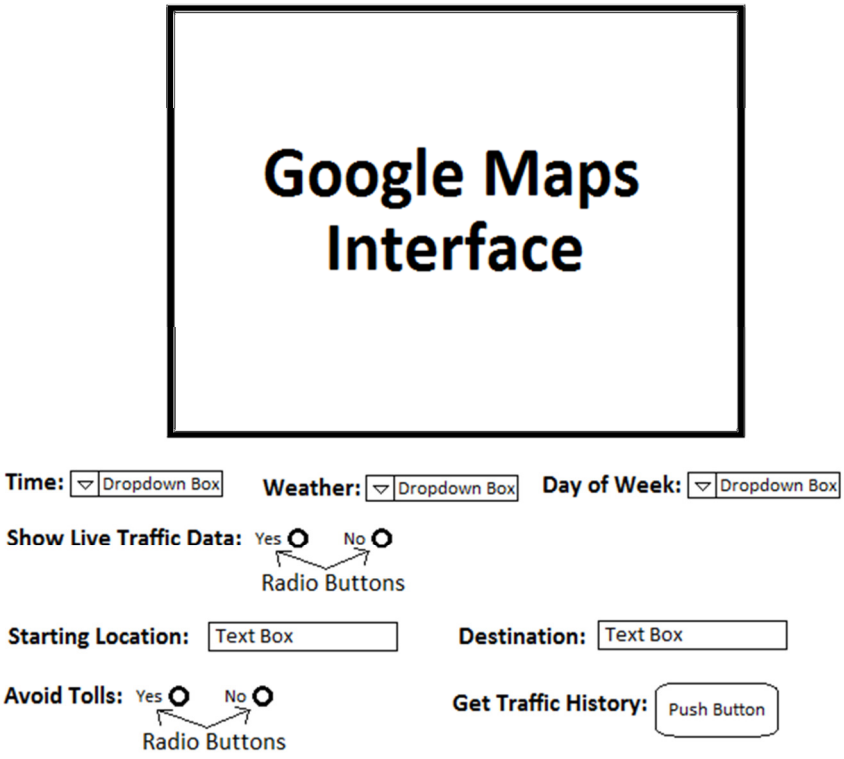
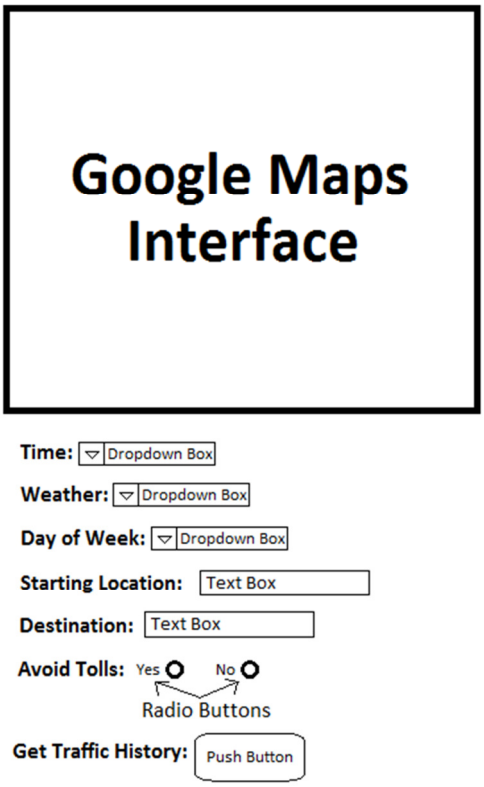
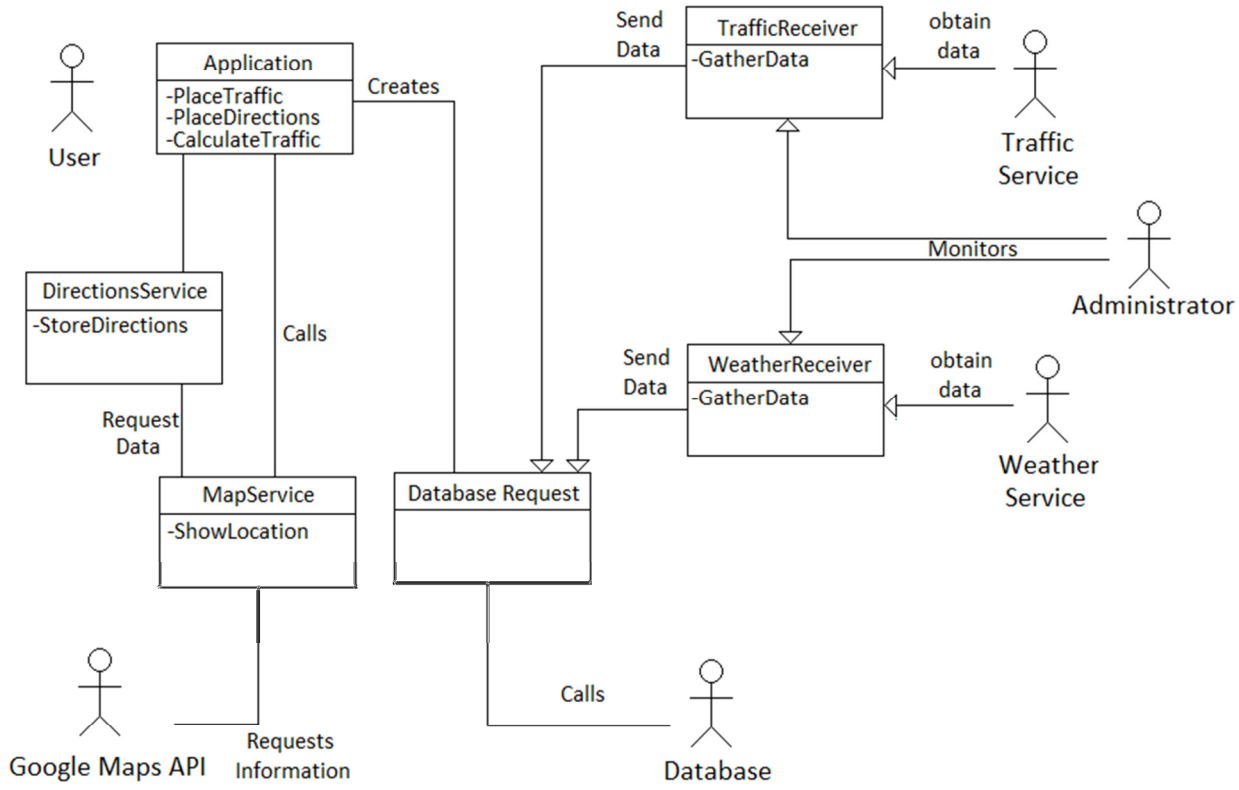


Illustration of REQ16

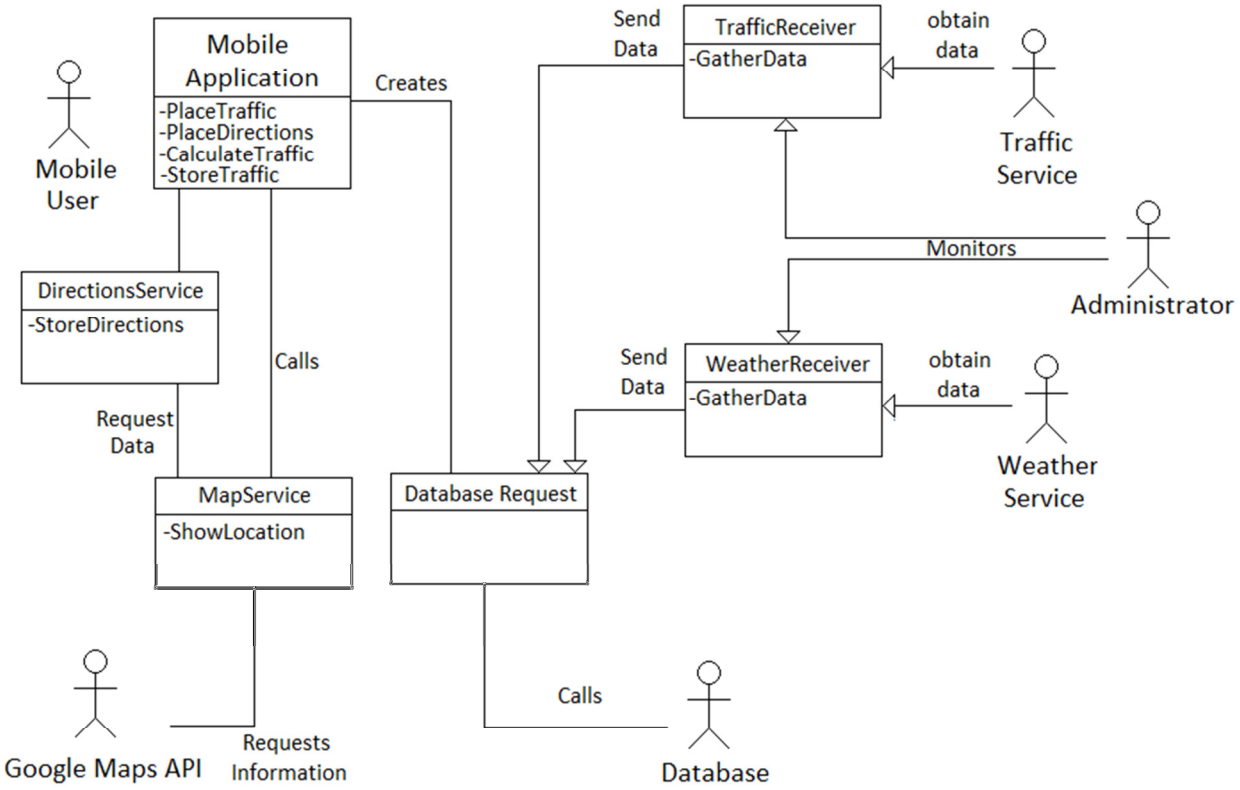


Domain Analysis

Domain Analysis for Website Users



Domain Analysis for Mobile Users



Use Case 1: View Traffic History

Concept Definitions

Responsibility Description	Type	Concept Name
Takes in user input to find which areas the user is requesting traffic history. Outputs traffic information once the data is processed	D	Application
Uses the Google Maps API to display the areas the user is requesting.	D	MapService
Contains the traffic and weather data relevant to the user. This data can be accessed by the application	K	Database

Association Definitions

Concept Pair Name	Associated Definition	Association Name
Application ↔ Map Service	Application sends user locations to the MapService. The MapService returns the map of the area to the user.	Provides Data
Application ↔ Database	The Application reads the weather and traffic data relevant to the user.	Provides Data

Attribute Definitions

Concept	Attributes	Attribute Description
Application	Weather	Weather of the area the user requires
	Time	Time of day user requires
	Day of Week	Day of the week user requires
	Area	Location user desires
Database	Traffic Data	Traffic intensities associated with times and locations
	Weather Data	Weather history linked to stored locations

Use Case 2: Get Directions

Concept Definitions

Responsibility Description	Type	Concept Name
Takes in user input to find which areas the user is requesting traffic history. Outputs traffic information once the data is processed	D	Application
Uses the Google Maps API to display the areas the user is requesting.	D	MapService
Contains the traffic and weather data relevant to the user. This data can be accessed by the application	K	Database
Receive starting location and destination from the user. Return list of directions user can take.	D	DirectionsService

Association Definitions

Concept Pair Name	Associated Definition	Association Name
Application ↔ DirectionsService	Application sends user starting location and destination. DirectionsService returns list of directions user can take	Provides Data
DirectionsService ↔ MapService	DirectionsService requests access of the MapService in order to retrieve directions for the user.	Convey Request
Application ↔ MapService	Application sends user locations to the MapService. The MapService returns the map of the area to the user.	Provides Data
Application ↔ Database	The Application reads the weather and traffic data relevant to the user.	Provides Data

Attribute Definitions

Concept	Attributes	Attribute Description
Application	Weather	Weather of the area the user requires
	Time	Time of day user requires
	DayOfWeek	Day of the week user requires
	Area	Location user desires
	StartingLocation	Starting location of the user
	Destination	Requested Destination of the user
Database	TrafficData	Traffic intensities associated with times and locations
	WeatherData	Weather history linked to stored locations
DirectionsService	ListOfDirections	List of directions user can take to get to their destination

Use Case 4: Get Traffic Data

Concept Definitions

Responsibility Description	Type	Concept Name
Retrieves traffic history from traffic service websites.	D	TrafficReceiver
Contains traffic history previously sent in by TrafficReceiver	K	Database

Association Definitions

Concept Pair Name	Associated Definition	Association Name
TrafficReceiver → Database	TrafficReceiver obtains information from traffic service websites and stores data into the database.	Provides Data

Attribute Definitions

Concept	Attributes	Attribute Description
TrafficReceiver	Location	Location of traffic that occurred
	Time	Time of traffic that occurred
	TrafficType	Type of traffic that occurred
Database	TrafficData	Traffic intensities associated with times and locations

Use Case 5: Get Weather Data

Concept Definitions

Responsibility Description	Type	Concept Name
Retrieves weather history from weather service websites.	D	WeatherReceiver
Contains weather history previously sent in by WeatherReceiver	K	Database

Association Definitions

Concept Pair Name	Associated Definition	Association Name
WeatherReceiver → Database	WeatherReceiver stores information of weather associated with stored locations into database.	Provides Data

Attribute Definitions

Concept	Attributes	Attribute Description
WeatherReceiver	Location	Location of weather that occurred
	Time	Time of weather that occurred
	WeatherType	Type of weather that occurred
Database	TrafficData	Weather history linked to stored locations

Use Case 6: Get Mobile Traffic Data

Concept Definitions

Responsibility Description	Type	Concept Name
Takes in user input to find which areas the user is requesting traffic history. Outputs traffic information once the data is processed. Application is accessed on a mobile device instead of a website.	D	MobileApplication
Uses the Google Maps API to display the areas the user is requesting.	D	MapService
Contains the traffic and weather data relevant to the user. This data can be accessed by the application	K	Database
Receive starting location and destination from the user. Return list of directions user can take.	D	DirectionsService

Association Definitions

Concept Pair Name	Associated Definition	Association Name
MobileApplication ↔ DirectionsService	Application sends user starting location and destination. DirectionsService returns list of directions user can take	Provides Data
DirectionsService ↔ MapService	DirectionsService requests access of the MapService in order to retrieve directions for the user.	Convey Request
MobileApplication ↔ MapService	Application sends user locations to the MapService. The MapService returns the map of the area to the user.	Provides Data
MobileApplication ↔ Database	The Application reads the weather and traffic data relevant to the user.	Provides Data

Attribute Definitions

Concept	Attributes	Attribute Description
MobileApplication	Weather	Weather of the area the user requires
	Time	Time of day user requires
	DayOfWeek	Day of the week user requires
	Area	Location user desires
	StartingLocation	Starting location of the user
	Destination	Requested Destination of the user
Database	TrafficData	Traffic intensities associated with times and locations
	WeatherData	Weather history linked to stored locations
DirectionsService	ListOfDirections	List of directions user can take to get to their destination

Use Case 7: Submit Mobile Traffic Report

Concept Definitions

Responsibility Description	Type	Concept Name
Allows user to submit the traffic intensity of the area they are currently in.	D	MobileApplication
Uses the Google Maps API to detect the location of the user.	D	MapService
Stores the location and traffic intensity submitted by the user.	K	Database

Association Definitions

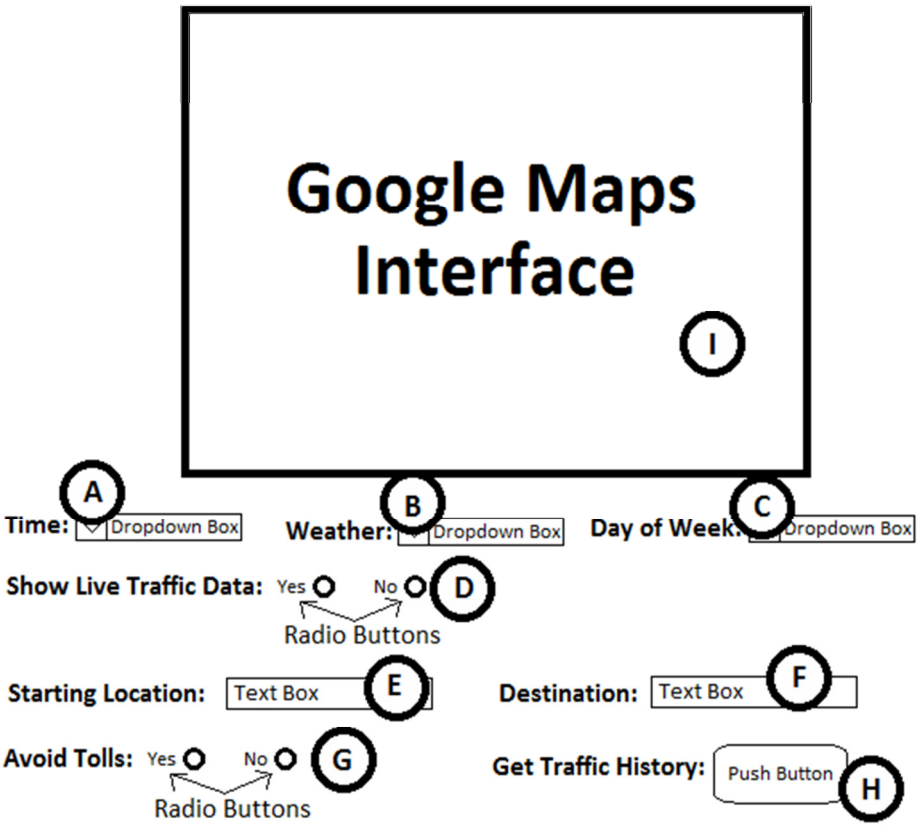
Concept Pair Name	Associated Definition	Association Name
MobileApplication ↔ MapService	MobileApplication accesses the MapService in order to find the current location of the user.	Provides Data
MobileApplicaiton ↔ Database	MobileApplication submits the traffic intensity report along with a location into the database.	Provides Data

Attribute Definitions

Concept	Attributes	Attribute Description
MobileApplication	Time	Time of day user submits
	TrafficIntensity	Level of traffic user observes
	Location	Location of the user
Database	TrafficData	Traffic intensities associated with times and locations

User Interface Specifications

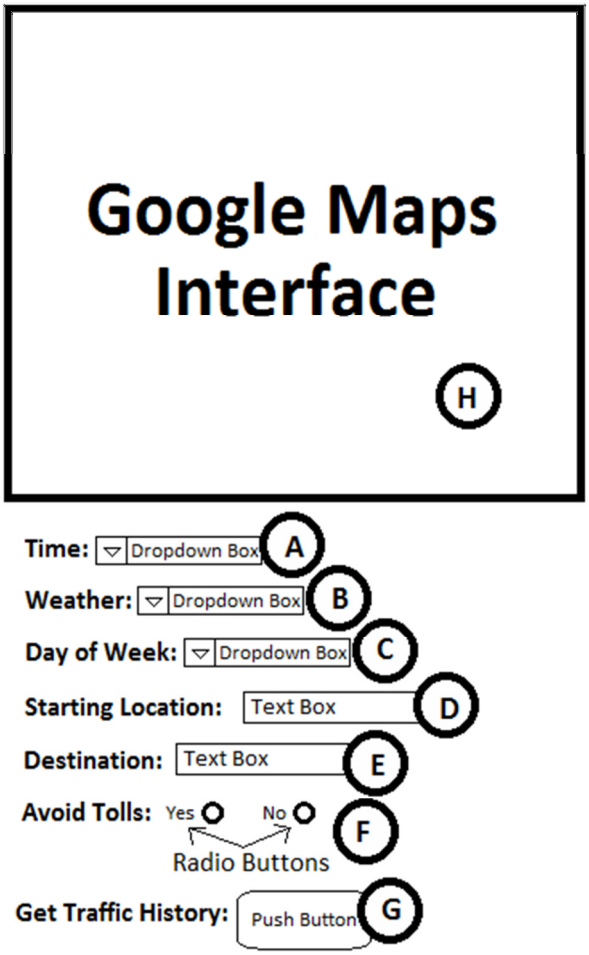
Website Application:



Example of User Inputs:

User selects "5:00 PM" in dropdown box A, "Sunny" in dropdown box B, and "Weekday" in dropdown box C. User declines to show live traffic data by clicking "No" on radio button D. User enters "New York City, New York" as Starting Destination in text box E. User enters "Trenton, New Jersey" in textbox F. User declines to avoid tolls by clicking "No" on radio button G. User submits this information by clicking push button H, and the information about the user's route and the traffic and weather history selected is shown on interface I.

Mobile Application:



Example of User Inputs:

User selects "8:00 AM" in dropdown box A, "Rainy" in dropdown box B, and "Weekend" in dropdown box C. User enters "Harrisburg, Pennsylvania" as Starting Location in text box D. User enters "York, Pennsylvania" as Destination in text box F. User wants to avoid tolls, and does so by selecting "Yes" on radio button F. User submits this information through push button G. The information about the user's route and the traffic and weather history selected is shown on interface H.

Effort Estimations:

Effort estimation for UC-1:

- 2 mouse clicks per drop-down box, 6 in total.
- 1 mouse click to select "Show Traffic" to display traffic in the selected region.

Effort estimation for UC-2:

- 1 click per text box for Starting Location and Destination
- 1 click to select "Get Directions"
- Around 5+ keystrokes per text box to enter their Starting Location. Once the user begins to type their starting location, multiple options matching their search should drop down from the text box. The user can then choose to click on the correct location, which saves them typing (requires an additional mouse click).

Effort Estimation for UC-6:

- Navigation: One button press.
- Select the button on the main menu labeled "Get Traffic Report"
- Data Entry: Total of one text entry and one button press.
- Enter the destination in the text field labeled "Destination"
- Press the button labeled "Get Traffic Report"

Effort Estimation for UC-7:

- Navigation: One button press.
- Select the button on the main menu labeled "Submit Traffic Report"
- Data Entry: Total of two button presses.
- Select a traffic intensity from the radio buttons available.
- Press the button labeled "Submit Traffic Report"

Project Management

Peter Lin and Matt Araneta are a team that will be working on web design and gathering data for traffic and weather. They will be in charge of use case 4 and 5. They will collaborate with Kevin and John on use cases 1, 2, and 3.

Geoff Oh and Mike Simio are a team that will be working on the mobile application of the project. They will be in charge of use case 6 and 7.

Kevin Hsieh and John Reed will be working on implementing an algorithm for finding the fastest route for directions, and managing the data gathered. They will work with Peter and Matt on use case 1, 2, and 3.

Plan of Work

• By 2/28 Peter and Matt should be done with scripts that gather data from websites. They will begin setting up the website and designing how it should look.

• By 3/7 Geoff and Mike should be done with the basic mobile application which would include gathering data such as GPS location and speed from the user. They should also have a basic reporting form for users to enter traffic information. They should also have a way to store the data or send it somewhere to be stored.

• As soon as Peter and Matt have defined the format of the data, Kevin and John will begin work on how to interpret the data from Peter and Matt along with the data from the mobile application and apply it to an algorithm. Constructing the algorithm should be done by 3/14 if not earlier.

• Also by 3/14 the basic website functionality should be done which includes a map, options for the user to choose from, and an outline of code to call for data from the server.

• Once the algorithm is complete Peter, Matt, Kevin, and John will select a method to display the data on the map whether it be points on the map or an overlay.

• By 3/21 the website should be complete.

• By 3/21 Geoff and Mike should have added a map to the device that should mirror the same or most of the functionality of the map on the website.

• After 3/21 the team will get to together to discuss any other problems or more added functionality.

References

1. Marsic, Ivan. *Software Engineering*. 2012.
2. View Traffic Incidents. <511nj.org /IncidentList.aspx>.
3. View weather. <weather.com>.
4. Google Maps. <maps.google.com>.
5. Yahoo! Live Maps. <maps.yahoo.com>.
6. View Traffic Reports. <traffic.com>.