Traffic Monitoring Project

Software Engineering 332:452

Group #7
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Website: http://traffichistory.co.nf/

Individual Profiles:

Matt Araneta: I have a decent amount of programming experience; I am proficient when it comes to C++ and Java, and also know some basic HTML. I'm a fast learner and a hard worker, so I'll be able to learn about implementing APIs and help solve problems. I am adept at writing and formatting reports, and I expect to do a lot of work on our project reports.

Kevin Hsieh: I have experience with html, SQL, C#, Javascript, Perl, and PHP. I have worked on website design, Perl script, and databases. I am proficient at programming, software engineering, and acquiring technical details.

Peter Lin: I am a skilled programmer and I have experience in both C++ and Java. I am a fast learner in terms of programming languages and tools, which will be helpful in learning the Google API and the various other tools that the previous group has implemented. I am also a good researcher, which is helpful for problem solving as well as keeping the project moving.

Geoffrey Oh: My programming experience is primarily with Java, and because Android apps are written in Java, I can be an asset for development of the mobile app portion of the traffic monitoring project. I also have some experience with C/C++. I am interested in working on how the data is sent from the mobile device and stored to the database, as well as details of the project like maintaining the database and the project website.

John Reed: I am moderately skilled in programming in Java and C++. I have some knowledge of HTML and API implementation. I'm interested in using the traffic data to form better routes for the user. I want to use the Google API along with the traffic data collection to improve the overall project. I am good at keeping track of project documents and documentation, and I like to keep projects moving as quickly as possible.

Michael Simio: I will be focusing on the development of the mobile aspect of the project. I have programming experience in Java and C++. I also have experience in designing user interfaces and user experiences. I will work on collecting data from the mobile application and adding it to the traffic database. I will also implement the traffic monitoring system on a mobile device.

Project Description:

The purpose of this project is to provide current traffic information based on the history of traffic patterns in a given area. Many current services provide traffic information, but fail to factor in previous traffic data. This can provide an incomplete view of how the traffic is going to develop in that area as time progresses. This project aims to give a complete view of current and past traffic recordings to determine how the traffic in an area will behave.

By analyzing traffic data, areas with traffic advisory histories can be outlined. This can provide a great service to the user, as it tells them to avoid such areas at certain times. This

project aims to differentiate traffic data by time, weather, and the day of the week. This data is taken through a series of continual collections from traffic information sites. Using these differentiations, we can provide a clear representation of how the traffic should behave.

A previous iteration of this project created a visual representation of the traffic that develops on New Jersey's highways. While useful, we found some problems with this implementation. First, many people who drive at times when there is heavy traffic are driving to work, many of whom work in New York City. Giving information solely for the New Jersey Highways does not seem sufficient. Second, only having the results for highways may be insufficient. In order to avoid areas with heavy traffic, the user may have to take local roads, which the current implementation does not allow for. Third, there may be better ways to access current traffic data. If we can access data from users who are currently in traffic, we can better understand the fluctuations of traffic concentrations. This can be done through the addition of a mobile application that can receive the current GPS locations of the user in order to supplement the prior traffic data the program uses.

Projected Additions:

We will be expanding the software to include all of the tri- state area, not just New Jersey, where traffic has many socio-economic implications. While a great tool for people who commute long distances to work, this program can also be utilized for businesses. Deliveries, meetings, and various special events can be better planned. We still start by gathering traffic data for New Jersey and the tri-state area. Afterwards, we will expand to include resources and data from other websites. We will take into account future construction projects, such as those listed on 511nj.org and other public websites, such as nj.com, traffic.com, mapquest.com, fhwa.dot.gov, and Google maps. Gathering data from these websites should allow the user to view a more accurate prediction of the traffic they should expect to encounter.

Within our project of creating a traffic monitoring system for the tri-state area, we hope to add local road data and to implement a directions service. Only using highways can be quite limiting in trying to achieve the optimal route to get to the user's destination. One solution to this problem is to implement traffic data for local roads. There is often no traffic data for local roads, but we can project the expected data quite easily. We can assume that there is the lowest level of concentration of traffic for local roads. This level can be raised if there is a report of an incident occurring on a local road, but otherwise the traffic concentration will be stated as low. Using traffic data for local roads is essential for implementing a directions service. In order to avoid areas with high concentration, the program should be able to guide users along a faster route.

In order to use this rerouting system, we would also need to implement a directions service as well. Only showing the user the traffic data is not useful if the program does not show them how to avoid such areas. A service is needed that can help the user to recognize and avoid areas with heavy traffic. The projected service will give the user an estimated time for arrival for

their current route, and it will suggest one or more routes that avoid areas with heavy concentrations of traffic. Through avoiding these types of areas, the user should be able to find a more optimal route to their destination. This will be done by finding the expected time for routes using the Google Maps API and Mapquest API. Other options, such as finding the shortest distance, and avoiding tolls will also be available, through use of the Google Maps API.

We will also be working with the GUI and cleaning up the website's interface. We are aiming for a very user-friendly interface. The user should be able to quickly and easily access traffic information depending on their needs. For example, if they want to view traffic patterns during a certain day or certain weather conditions, there will be drop-down menus in which they can select any parameters they desire. Additionally, the user can easily input their current location and destination. By looking at the resulting map, it should be easy to decipher which route is the best for them to take. We can also provide pop-up bubbles with severity indices when users click or hover over a marker along their route.

There also other miscellaneous features that can be worked on. We will continue to support options for separate inputs and add more features, such as known accidents. In addition, we will look into the traffic- determination algorithm and possibly improve it based on new data. This could include more detailed weather or accident information. There are currently problems with placing the markers correctly on the map, due to using the Google API. These problems will be confusing for the user, and they must be addressed.

Another addition to the traffic monitoring system will be the extension of a mobile application. The mobile application will give the user the opportunity to get traffic information or report traffic information. The mobile app will take advantage of the phone's built in clock and GPS to automatically collect relevant information.

One function of the application will be to get traffic information for your trip. The user will be prompted to enter their destination. The application will "do the rest" collecting the user's current location and time and sending the values through the web app. The traffic report for their route will be returned on the mobile app.

Another function of the app will give the user the opportunity to share their current traffic information. The user will be asked to select their traffic intensity based on their current driving speed. This information along with their location, time and weather will be sent to the universal database to increase the accuracy of traffic reports. The app will collect data in a private and secure manner. The user's data will be sent to the database and used to refine the traffic information. This information will be anonymous and inaccessible to other users.

Project Ownership:

Addition of Tri-State Area and GUI improvements: Matt Araneta and Peter Lin

Local roads implementation and directions service: Kevin Hsieh and John Reed

Mobile traffic application: Geoffrey Oh and Michael Simio