Westernite

Official Publication of District 6 of the Institute of Transportation Engineers January-February 2007 Vol. 61 No. 1

President's Message

Dalene J. Whitlock, President

In my last message I discussed some of the ways that the District has committed itself financially to supporting Student Initiatives. This time I'd like to tell you about the ways that our members are contributing their time to this important effort as well as provide more information about the programs that result from their hard work. Thanks to Student Initiatives Chair Alyssa Reynolds and Career Guidance Committee Chair Craig Grandstrom not only for providing input on the content of this message, but for the tremendous jobs they are doing in their respective positions.

Student Initiatives

The Student Initiatives program includes a number of different awards and cash prizes. Among these are the prizes for the Best Student Chapter Report, Best Student Paper, Best Student Chapter Website, Outstanding Graduate Student, and Outstanding Undergraduate Student. Additionally, contests held in conjunction with the annual meeting include the Kell Competition Design, where student chapters design a fun, real-world transportation-related activity for the

(Continued on page 5)

What's In This Issue

Transportation Gets Googled

Managing Traffic Data Using a Web-based Map Interface

The transportation engineering profession has transitioned from a data poor environment to a data rich environment where data management is an increasing challenge. Transportation professionals are constantly collecting, processing, and managing more and more data to support planning, operations, and design projects. Convenient access to fundamental traffic count data is critical for ever more detailed transportation analysis. Currently, most transportation organizations and firms have some amount of paper-based transportation data, or their transportation data is stored digitally, but it is restricted to a limited number of people and many times buried in files. Either way it is difficult for an individual to know exactly what data is available without a system for organizing it. Some systems do exist for accessing that data, but often the interface is difficult to use.

Portland State University partnered with practicing professionals to explore a system that provides rapid, simple, and ubiquitous access to location-based traffic. The system provides a web- interface allowing the viewing, insertion, and management of transportation data using only a web browser. This allows the data to be made available to anyone with access to an internet connection. The idea of using the internet to provide access to transportation data and tools is not new [1, 2]. The purpose was to make transportation data available in a novel way: using web-based mapping. This allows the user to interact with a map and retrieve data spatially by simply zooming to the location they are interested in and querying the types of traffic data that are available. Constraints

(Continued on page 2)

International Director's Report

Fall Board of Direction Meeting

The International Board of Direction (IBOD) met on Friday and Saturday October 27-28, 2006 in Washington, DC. This was the third and final meeting of the IBOD in 2006 and District 6 was well represented. International President Rich Romer presided eloquently over the meeting with his usual humor and wit. Past International President Tim Harpst once again helped facilitate in his distinguished role of the wise sage. In addition, all three District 6 International Directors (Rock Miller, Rory Grindley, and I) were in attendance. During the Friday Board meeting, the IBOD had the opportunity to hear a panel presentation on the Vehicle Infrastructure Integration Initiative in addition to discussing existing, new, and potential MEGA Issues, while Saturday's meeting focused on running the institute. The highlights of those presentations and discussions follow.

Julia Townsend, International Director

Vehicle Infrastructure Integration (VII) Initiative Overview

Bill Jones, Technical Director for the USDOT Joint Programs Office, provided an overview of the VII Initiative. He indicated that a significant reduction in highway fatalities and traffic congestion

(Continued on page 4)

Transportation Gets Googled
Managing Traffic Data Using a Web-based Map Interface

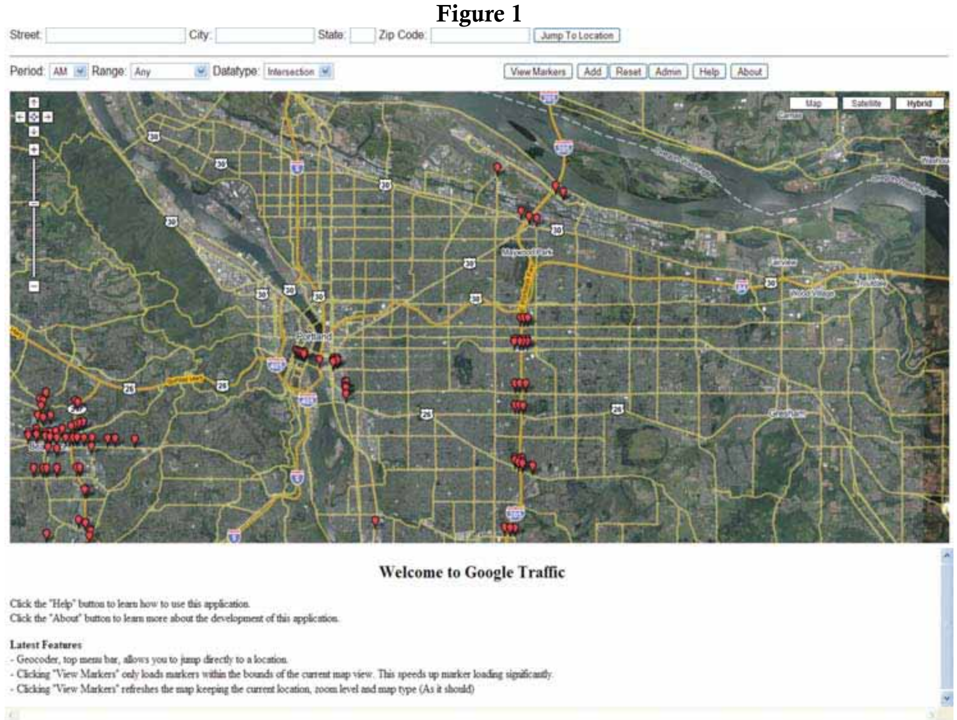
(Continued from page 1)

can be placed on the queries allowing the user to quickly access only the data they want. The system is designed so that the data itself can be stored anywhere as long as it is accessible via the internet (via a URL).

We envision this system being used by all types of transportation professionals as a central place to store and access fundamental traffic data. For example, analysts often need traffic data for generating reports and forecasts, planners need traffic count data for justifying design decisions. This type of data is fundamental to the modeling and decision-making process and would benefit from being available through a single system.

This article describes the initial implementation of this system that supports the storage and retrieval of traffic count data for intersections and roadways. We describe the main features of the interface and how to use them including querying, viewing and insertion of traffic data. This system was developed within the Portland State University Portal system (http://portal.its.pdx.edu) which provides the foundation for the system including user management, database access, storage and network resources.

Figure 1



SYSTEM DESIGN

Google Local was used for the mapping component because it is easy to use. The objective of this transportation data source was to provide speed for the user in retrieving information in a platform that requires little or no instruction to utilize. Google maps met this requirement. The second key design element was to provide flexibility that would allow various transportation data to be accessible using the same interface (going beyond vehicle, bike and pedestrian counts to other transportation data sources). This aspect of expanded data accessibility will be subject of future research.

Google Local provides the necessary features for the initial system implementation, is widely used by the public, and provides a public application programming interface (API), allowing the service to be used by any web application as long as Google's API Terms of Use are met [4]. The Yahoo! Geocoding web service was used to translate location information into latitude and longitude coordinates. This service is also provided through a public API which is easy to use and well-documented[5]. The user provides a street address, intersection, city or state and a request is sent to Yahoo! If the location given is valid then its latitude and longitude is returned.

USING THE SYSTEM

Querying Traffic Counts

To query for traffic counts the user specifies where to look using the Google map, the central part of the user interface (Figure 1). The controls in the top left corner of the map allow the user to pan and zoom to the location and level of detail that they want. In addition, the Yahoo! geocoder interface, located in the top of the browser window (Figure 2), allows a user to type in a location and jump directly to it on the map. The user can give a specific address/intersection or simply a city or state. Once the desired area has been brought up on the map, the user can then specify the type of data that they are interested in. They can specify the time of day (AM, PM), range of time (last 2 years, last 6 months, etc.), data type (intersection or roadway) and finally a specific roadway type if the roadway data type was chosen (classification count, tube count, etc). Selecting "view markers" then queries the system's traffic count records and refreshes the map with markers. Each marker represents a location that contains traffic counts that meets the user's criteria.

Viewing Traffic Counts

Markers can be selected to reveal additional information about the location including a descriptive name and the types of actions that can be taken (See the marker info "bubble" in Figure 2, similar to other Google map applications). Selecting "View Counts" loads the bottom frame of the application with a tablet of available counts where each row provides metadata and options for each count available at the location selected (See bottom of Figure 2). The metadata consists of essential information about a given count including the count type, day of the week it was collected, year, start time and end time. In addition, a "File" link is provided in each row allowing the user to download the count and a "More Info" link is provided in each row allowing the user to view additional metadata and options available for an individual count. By clicking on the specific count, the data is displayed on the screen. This can be in the native format (an Excel spreadsheet, a .pdf file or other electronic file). The analyst can then print or save the file for their use. Future research considerations would be to develop methods by which data is extracted for use within transportation analysis models and tools.

Clicking the "More Info" link in any row of the table shown in Figure 2 reloads

(Continued on page 3)

Transportation Gets Googled
Managing Traffic Data Using a Web-based Map Interface

(Continued from page 2)

the bottom frame of the application with a new table containing all of the metadata and options available for that count. The additional metadata includes the "essential" information listed previously and also includes the file format that the count is in, the username of the person that inserted the count, a timestamp of when the count was received, the city, state, and country that the count is located within and finally any additional comments. All of this information is collected at the time that the count is inserted into the system, some of it in an automated way. In addition this table provides links for downloading the count and, if the user is a moderator, options for editing and deleting the count from the system.

Insertion of new locations into the system is done by selecting the "Add" button in the top menu and clicking a spot on the map to place the marker. This brings up a form in the bottom window frame allowing the user to provide information about the location and type of data then submit it. The latitude and longitude of the spot clicked is stored with the location record in the database. Once submitted the new location marker can be seen by clicking "view markers" to refresh the map.

Inserting Traffic Counts

If the user is a moderator or administrator, then every marker info window will give them the option to add a count to that location. Selecting "Add Count" loads a form in the bottom window frame and allows the user to enter all of the required parameters for a count record. First, if the count file is located on the user's local machine, and they want to upload and store it on the central file server, then they browse and select the appropriate file. If the file is stored on a remote web server then the web address of the count is provided. Finally, the user enters the start time, end time and data type of the count and submits the data.

When a user inserts a traffic count, a check is first done for duplicate counts of the same type at the same location. If any duplicates exist then the user is queried for whether they want to continue inserting the count. Automatic checks such as this are essential to maintaining the integrity of the data.

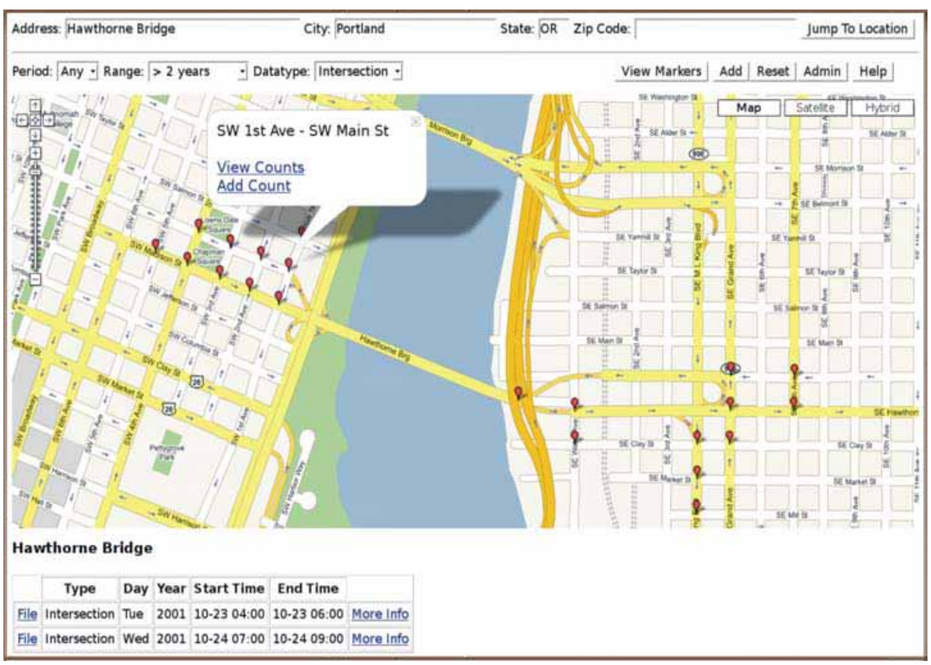
CONCLUSION

Overall, the system is a step toward an ambitious goal of providing open ubiquitous access to a broad amount of traffic data in the easiest way possible. Throughout the development of the current system the main focus was on the user interface. The combination of a mapping component and the ability to view the data in progressively greater detail allows the user to quickly query the system and access the data they need in an efficient manner. Most users are able to use the web interface right away. The system in its current state is not a complete solution. More work needs to be done to streamline the insertion process by automating as many steps as possible.

In addition, research can be done on methods for sharing between servers hosting traffic data records. It's not feasible to store all records on one server, but if a server could query other known traffic data servers then the data would be truly ubiquitous. This would also allow the participating entities to contribute their resources in a distributed network while still maintaining control over their own data.

Future work could also include adding support for additional types of traffic data to the system. This could include crashes, traffic signal timing cards, freeway management system data, transit stop data, speed limit conditions, traffic control conditions, probe vehicle data and automatic traffic recording stations. Steps should be taken to require the data be provided in formats that maintain the underlying structure of the data. This would make the data much more valuable because it can then be analyzed further using additional software by the user. For example a user could download a spreadsheet, database, CAD drawing, or GIS layer. Ultimately the goal would be to develop interfaces that could extract information from the database directly into analytical applications, eliminating data entry errors and labor costs.

Figure 2



Acknowledgements and Disclaimers

The National Science Foundation has funded this research. The contents of this article reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The National Science Foundation assumes no liability for the contents or use thereof. The contents do not necessarily reflect the official views or policies of the National Science Foundation. This report does not constitute a standard, specification, or regulation.

References

1. Flammia, G. and Rabinowicz, A. Turning Transportation Planning Data into Effective Websites. In Proceedings of the Ninth TRB Conference on the Application of Transportation Planning Methods, April 6-10, 2003, Baton Rouge, Louisiana. CD-ROM. Transportation Research Board of the National Academies, Washington, D.C., 2004.
2. Bertini, R. L., S. Hansen, A. Byrd, and T. Yin. PORTAL: Experience

Transportation Gets Googled
Managing Traffic Data Using a Web-based Map Interface

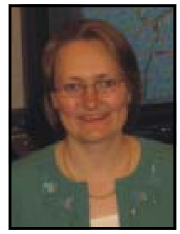
About the Authors:

Randy McCourt

Ransford S. McCourt, PE, PTOE, is a principal of DKS Associates and manages their west coast operations. He holds a BSCE from Oregon State University and a MSCE from the University of California, Berkeley.

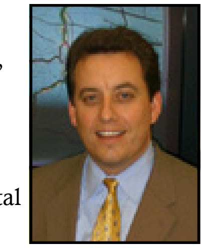
Tim Welch

Timothy J. Welch is from Warrenton, Oregon. He received his BS in Computer Science from Portland State University and is currently pursuing a graduate certificate in geographic information systems. He was president of the PSU chapter of the Association for Computing Machinery and worked in the ITS Lab.



Kristin Tufte

Kristin Tufte, PhD, is a post-doctoral Research Associate in the Departments of Computer Science and Civil and Environmental Engineering at Portland State University where she specializes in database systems. She received her BS in Mathematics from St. Olaf College, and her MS and PhD in Computer Science from the University of Wisconsin, Madison.



Bob Bertini

Robert L. Bertini, PhD, PE, is an Associate Professor of Civil and Environmental Engineering and Urban Studies and Planning at Portland State University, and is also the director of the Oregon Transportation Research and Education Consortium. He received his BSCE from the California Polytechnic State University, San Luis Obispo, an MSCE from San Jose State University and a PhD from the University of California at Berkeley.

(Continued from page 3)

Implementing the ITS Archieved Data User Service in Portland, Oregon. In *Transportation Research Record: Journal of the Transportation Research Board*, No. 1917, Transportation Research Board of the National Academies, Washington, D.C., 2005, pp. 90-99.

3. Ahmadi, M. Regional Screenline Traffic Count Program. Proceedings of the ITE District 6 Annual Meeting, Honolulu, Hawaii, 2006.
4. Google Maps API. *Google*, 2006, http://www.google.com/apis/maps/. Accessed July 19, 2006.
5. Yahoo! Maps Web Services, Geocoding API. Yahoo! Inc., 2006, http://developer.yahoo.com/maps/rest/V1/geocode.html. Accessed July 20, 2006.

International Director's Report

(Continued from page 1)

could be achieved through implementation of a national wireless communications infrastructure that would allow communication between traveling vehicles and between vehicles and the roadside. The short-range communications and GPS are to be installed by the automobile companies while the public sector is to install the communications in the roadways. A total of 250,000 hotspots (much like WiFi) are planned that can gather communications from the 15-17 million new vehicles that are being put on the roadways each year. Bill stressed that information that is gathered will be "anonymous". Emil Wolanin, of Montgomery County, Maryland discussed the structure and organization of the program. An Executive Leadership Team has been established as well as local working groups and subcommittees. District 6 is represented in the process with Wayne Tanda (Monterey County, CA) serving on the Work Group and John Fisher (Los Angeles, CA) serving on the Technical Subcommittee. Gary Euler, of Parsons Brinkerhoff, followed with a presentation on the applications and use of the VII system. Shelly Row, ITE Associate Executive Director for Technical Programs, reported on the current and potential future role of the Institute. She indicated that Tom Brahms, Executive Director and CEO of ITE serves as a non-voting member on the Executive Leadership Team. A decision will be made in late 2008 and a roll out of the system could be on the street and in new vehicles by 2011 with minimal infrastructure in place. ITE will continue to be involved in the VII initiative and the ITE membership should be kept informed of the initiative and how it may impact our profession.

Mega Issue: Is the Institute an International organization or a North American organization with International members?

The Board discussed this Mega Issue in great detail. It was concluded that the Institute was a source of information to and a network for the transportation profession and thus the Institute should continue to focus on International activities. In order to implement International ties to other organizations, task driven strategic partnerships are to be explored to assist in the mining of relevant technical information from around the world to share. ITE will also pursue and publish additional "international content" in the ITE Journal, e-newsletter and on the ITE website.

MEGA Issue – Public Relations

The Mega Issue of Public Relations is scheduled to be formally discussed by the IBOD later in 2007. However, as this Mega Issue has such a broad array of components, preliminary discussions have already been initiated in order to narrow the topic for meaningful future discussions.

Institute Finances

Vice President Earl Newman presented an update of the ITE Finances for 2006. Based on the 2006 budget and subsequent

(Continued on page 5)