

SafeRoadMaps: A GIS-based Mashup

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Overview

Road traffic injuries are a major but neglected public health challenge that requires concerted efforts for effective and sustainable prevention.

In 2006, in the United States, there were

38,588 accidents, which resulted in

42,642 fatalities, involved

57,943 vehicles and

98,040 people.

Thus, there is an urgent need for governmental agencies, and other key institutions, to increase and sustain action to prevent motor vehicle injuries.

Overview

This presentation reports on a Geographic Information System (GIS) that is currently under development to communicate public health issues related to rural and urban road transportation safety through a publicly accessible website (www.saferoadmaps.org).

This GIS integrates a range of spatial data regarding motor vehicle crashes, transportation policy legislation, and driver behavioral data.

It is anticipated that this GIS will help raise awareness and change fundamental perceptions regarding the magnitude, risk factors, and impacts of motor vehicle crashes.

GIS Solution Development

A prototype, interactive, traffic fatality GIS is being designed and developed using newly available Internet technologies; specifically, Web 2.0 technologies:

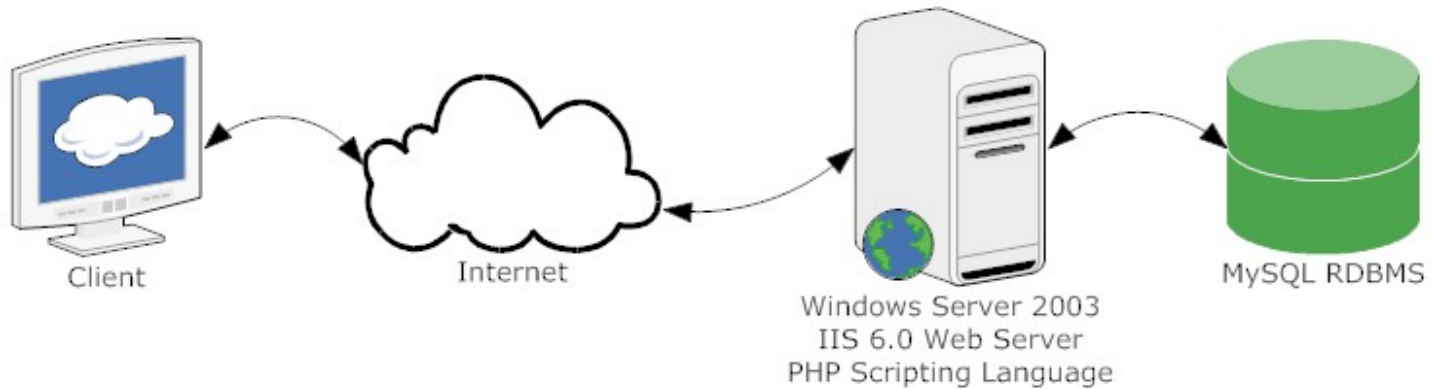
Asynchronous JavaScript and XML (AJAX) – Allows developers to create very responsive end-user interfaces and facilitates the creation of community pages and mashups.

Community Pages – Allow contributors to collaborate and share information easily.

Mashups – Incorporate data and services from different websites in novel and innovative ways.

GIS Solution Development

Prototype System Architecture:



Mapping Mashup Platforms:

This prototype is utilizing Google’s “Google Maps” API and Microsoft’s “Virtual Earth” API.

GIS Solution Development

Functional Requirements identified as key to communicating public health issues related to rural and urban road transportation safety:

Behavior – A fundamental requirement for improving rural transportation safety and health is to understand the human behaviors that affect rural travel. Behavior can involve driving patterns by specific driving groups (e.g., teenagers) or can be more general transportation attitudes and predispositions, including citizen attitudes about rural safety, rural roads, and health issues.

Legislative – Specific to the legislative mandate to examine rural safety and economic development, there are pressing issues regarding the changing social demographics of rural areas and its implications for transportation investments, performance, and safety.

Visual Display – It is critical to portray rural safety issues in a manner that is both comprehensible to a broad audience and at the same time brings together a range of related disparate data.

GIS Solution Development

Functional Requirements identified as key to communicating public health issues related to rural and urban road transportation safety:

Human – It is critical to humanize the tragedy behind road crash statistics. This might be accomplished via a link to a website for each tragic event.

Policy – Policy related to rural traffic fatality reduction has focused on seat belt laws, impaired driving laws, graduated driver's license programs, and speeding enforcement laws. These policies were identified as having significant legislative and safety impact.

Integrated Analysis – Allow for a profile of rural driving behavior, accidents, and fatalities. This will lay the groundwork for developing a regional vision and action plan with regional policy leaders and transportation and safety professionals.

GIS Solution Development

SafeRoadMaps interface elements include:

Map – functionalities include: zoom-in and zoom-out, panning, geocoding, toggling various basemap layers, and an overview map

Safety Policy – functionalities include: toggling various safety policy layers currently Aggressive Driving Law, Administrative License Suspension Law (i.e., driving under the influence of alcohol), and Primary Seat Belt Enforcement Law

Safety Profile – predefined, illustrative, queries such as: “Minnesota, Rural Road, Speeding, Alcohol Involved, No Restraint Used, Driver, Age 17 - 21, Male”

GIS Solution Development

SafeRoadMaps interface elements include:

Safety Statistics – ad-hoc queries utilizing:

- **State**
- **Road Types (Rural, Urban)**
- **Speed Types (Speeding, Not Speeding)**
- **Drinking Types (Alcohol Involved, Alcohol Not Involved, Not Reported, Unknown)**
- **Restraint Types (No Restraint Used, Restraint Used, Unknown)**
- **Person Types (Driver, Not a Driver)**
- **Ages (Age 0 - 16, Age 17 - 21, Age 22 and Above, Age Unknown)**
- **Sex (Male, Female, Unknown)**

KML File – download static safety policy layers and/or dynamically generated layers from Safety Profile or Safety Statistics queries

GIS Solution Development

Data:

The mission of the Fatality Analysis Reporting System (FARS) is to make vehicle crash information accessible and useful so that traffic safety can be improved.

Fatality information derived from FARS includes motor vehicle traffic crashes that result in the death of an occupant of a vehicle or a non-motorist within 30 days of the crash.

FARS contains data on all fatal traffic crashes within the 50 states, the District of Columbia, and Puerto Rico.

This prototype is utilizing FARS data from 2006; the most currently available.

Conclusion

It is expected that GIS-based tools such as the SafeRoadMaps Mashup will help to:

Create greater levels of awareness, commitment, and informed decision making at all organizational levels,

Contribute to a change in thinking about the nature of the problem of road traffic injuries and what constitutes successful prevention, and

Strengthen institutions and create effective partnerships to deliver safer road traffic systems.

www.saferoadmaps.org