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CALTRANS DIVISION OF RESEARCH, INNOVATION AND SYSTEM INFORMATION

Research Notes

Improving the Safety and Efficiency of Work Zones in California

Development and Demonstration of a Tool to Improve Safety and Efficiency at Work Zones and Incident Scenes on California Roadways

Advanced Research

MAY 2024

Project Title:
Work Zone Research

Task Number: 3933

Start Date: October 3, 2023

Completion Date: November 30, 2024

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WHAT IS THE NEED?

Senate Bill 1 (SB1) provides approximately $5 billion/year for essential transportation improvements including highway maintenance and repair. This increase in highway funding will result in Caltrans or contractors increasing the number and frequency of work zones and lane closures on California's roads, subjecting additional highway workers to traffic risk. Further, increased work zones will have significant impacts on traveler mobility.

To help mitigate these negative consequences, this research aims to improve the knowledge and notification of work zone and lane closures through advanced communications and enhanced data collection and sharing. The researchers will leverage existing Federal Highway Administration (FHWA) and UC Berkeley (UCB) projects and tools to accomplish these benefits.

WHAT ARE WE DOING?

The research will develop and demonstrate a Smart Work Zone application that will improve how data about work zones (location, geometry, personnel locations, schedules, lane configuration) is collected and disseminated in California. It will leverage and integrate key technologies, knowledge, and systems at UC Berkeley, the FHWA and the Crash Avoidance Metrics Partners (CAMP). If widely deployed, the application will improve the safety and efficiency of work zones on California roadways by gathering more detailed and more current information on road and lane status affected by work zone activities and providing that data in a real-time manner for distribution in Caltrans Quickmap, Caltrans Connected Fleet, and third-party information providers. This also prepares California for dissemination of critical and detailed work zone safety information and configuration to connected and automated vehicles.

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WHAT IS OUR GOAL?

The main deliverable from this project will be a server application developed by Partners for Advanced Transportation Technology Resource Center (PATH) that collects work zone/lane closure data and roadside safety messages (RSMs) in a standardized format and disseminates the data to FHWA's Work Zone Data Exchange (WZDx) (https://www.transportation.gov/av/data/wzdx) and traveler information service providers (ISPs).

WHAT IS THE BENEFIT?

The research will yield significant safety and efficiency improvements for Caltrans Maintenance and Construction activities and the traveling public, particularly in and around work zones and has the potential to improve Automated Vehicles (AV) situational awareness as well. Since this is a demonstration, there will be insufficient data to measure the impact on safety, however PATH will contact states that have implemented similar WZDx efforts to provide some measure of expected safety improvements. This is critical as Caltrans works to address its critical SB1 mandate.

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WHAT IS THE PROGRESS TO DATE?

The researchers from PATH developed the framework for a work zone application. This research includes developing of the functional requirements and interfaces development for the work zone application server and work zone mapping tool. The mapping tool being developed intends to collect lane-based geometry information from the work zone. This is an important supplement for the existing Caltrans Lane Closure System (LCS), since LCS does not contain lane-based data. In particular, automated vehicles can directly use messages from the work zone application to plan their trajectories near work zones.

The researchers are also testing Framework of Work Zone Server using 511 San Francisco Bay Open Traffic Data, which provides all planned and active road closures and detours throughout the San Francisco Bay Area. All data is placed into a database. The database is continuously updated every 15 minutes from 511.org, and it stores only current work zone data. The database is cleaned up after each update. Any of the duplicate records are removed so it retains only records with the latest timestamps. PATH then updates work zone status when necessary and remove outdated records.

Due to the delay in contract execution the project is behind schedule, and therefore will be requesting a no-cost time extension.

IMAGE

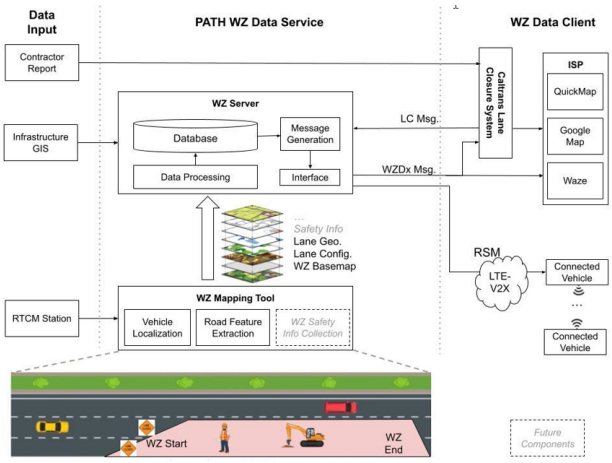

Image 1: Framework of PATH Work Zone Application

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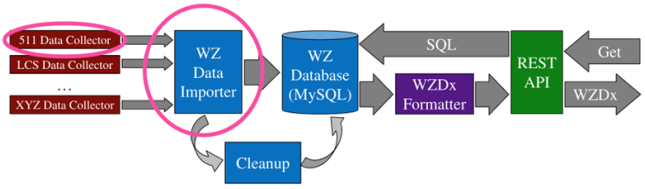

IMAGE 2: Framework of Work Zone Server

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