

Florida Department of Transportation Research

Integrated Environment for Performance Measurements and Assessment of Intelligent Transportation Systems Operations

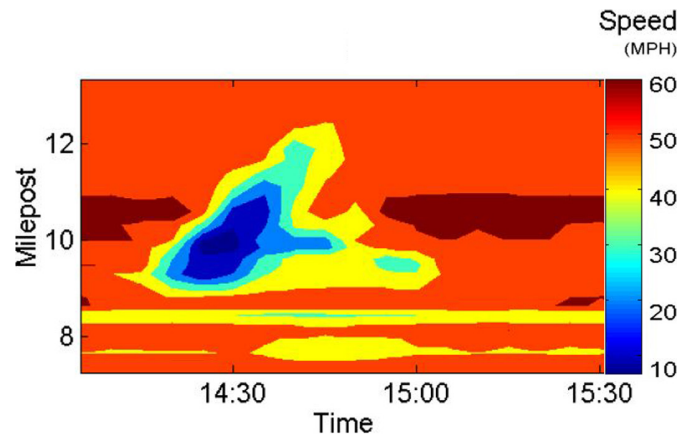
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The intelligent transportation system (ITS) includes detectors that capture data from Florida's transportation network and computer hardware and software that process these data. Data processed in real-time can, for example, be used to develop messages displayed to motorists on dynamic message signs. Accumulated data, with traffic analysis, simulation modeling, data fusion/data mining, and optimization, can support performance measurement, planning, operations, and management. Advanced software can yield innovative analyses, which can help improve transportation system performance.

As expertise and familiarity with ITS devices, systems, and strategies grow, there is an ongoing need for tools and methods to exploit the vast data collected by the ITS system. In this project, researchers from Florida International University developed an integrated ITS data analysis tool, the ITS Data Capture and Performance Management Tool (ITSDCAP). Development was built on existing efforts for archiving and using ITS data, notably FITSEVAL, the Florida ITS Evaluation Tool, a framework for integrating data sources, data analysis, and user interfaces.

The project goal was to create tools and methods that work with the ITS system to manage and condition data for use in transportation modeling, performance measurement of the transportation system, performance measurement of the ITS system itself, and to support discovery of new relationships and associations within ITS data, using data mining and visualization techniques.

The researchers worked with stakeholders to identify system requirements. Results of a stakeholder workshop became the basis for the system design. Many needs were identified: capture and integrate data from multiple sources; data for sophisticated transportation models, such as traffic demand forecasting, dynamic traffic assignment, etc.; advanced data mining techniques to allow discovery of patterns in the



Data mining shows vehicle speeds during an incident on I-95. The scale on the right reveals that traffic near milepost 10 slowed from about 60 mph to 10 mph for about 20 minutes and cleared around 3:05 PM.

data; advanced decision-making tools; and others.

Components of the system were data capture and preprocessing, estimation of performance measures, modeling support, and visualization. As developed, ITSDCAP accepts data from over a dozen sources, including SunGuide Transportation Sensor System (TSS), Statewide ITS Data Warehouse, Florida Department of Transportation Crash Analysis Reporting System (CARS), and others. Users access and import data from the desired databases through the software's interface. A variety of performance measures can be estimated using ITSDCAP, such as mobility, travel time reliability, safety, energy, and emissions. The visualization module allows data to be mapped onto streets or graphed. The researchers conducted a number of studies to demonstrate the software's ability to analyze and compare data from multiple sources in order to address complex questions about the transportation system.

Combining ITS with powerful analysis tools, such as ITSDCAP, will give decision-makers new insights, leading to more efficient transportation of Florida's people, goods, and services.

Project Manager: Mark Plass, FDOT Traffic Engineering and Operations Office
Principal Investigator: Mohammed Hadi, Florida International University
For more information, visit <http://www.dot.state.fl.us/research-center>