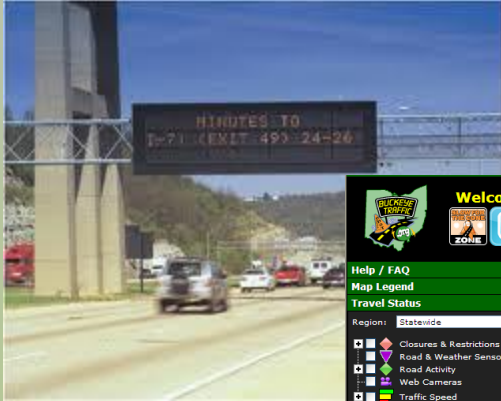


Travel Time Estimation



A screenshot of a web-based travel time estimation application interface. The interface features a map of the United States with a highlighted route from Chicago to Columbus, Ohio. On the left side, there is a navigation menu with options such as "Help / FAQ", "Map Legend", "Travel Status", "Region: Statewide", "Closures & Restrictions", "Road & Weather Sensors", "Road Activity", "Web Cameras", "Traffic Speed", "Dynamic Message Signs", "Highway Advisory Radios", "Winter Conditions", "Update Map", "Text-Only Version", "Travel Advisories", and "Options". The map shows major cities and highways, with a green line indicating the travel route. At the bottom of the map, there are coordinates: Latitude: 40.01921307686764 and Longitude: -84.18823242187501. The map is credited to "John R. Kasich, Governor" and "Jerry Wray, ODOT Director".

A digital highway sign with a green background and white text. The sign displays "TRAVEL TIME" at the top. Below this, there are two digital displays showing "25 MIN" and "30 MIN". The sign also features a shield logo for Interstate 90 (I-90) and the text "VIA I-90". The sign is mounted on a metal structure.

Travel Time Estimation

- Why is it important
 - Intelligent Transportation Systems
 - Evaluation of ITS Importance
 - Driver Information
 - Route Selection
- Incidents
 - Accidents
 - Construction



Travel Time Estimation

- How accomplished?
 - Vehicle Tracking
 - Review of Speed
- Data Analysis



Vehicle Tracking

- Test Vehicles
 - Travel Time Study
 - Baseline of comparison
- License Plate
 - Recognition Software
 - Toll Plaza/Tag Readers



Vehicle Tracking

- GPS Tracking
 - Vehicle or Cell Phone
 - Utilized by some mapping software



Review of Speed

- Loop Detectors
 - Pros: Ease of installation & Reliability
 - Cons: Maintenance, Installation & Power
- Microwave Detectors
 - Pros: Ease & Cost of installation
 - Cons: Reliability



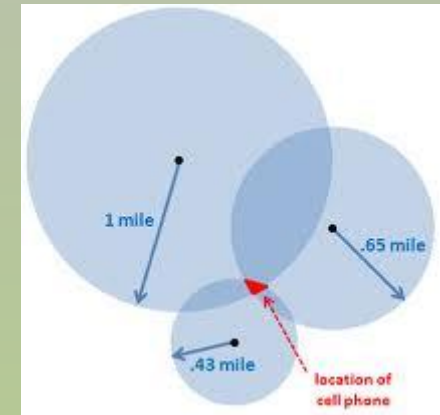
Review of Speed

- Video Detection
 - Pros: Reliability
 - Cons: Cost of Installation
- Doppler Radar
 - Pros: Reliability & Ease of Installation



Review of Speed

- Cell Phone Probing – using cell phone infrastructure to track cell phones & determine travel times
 - Pros: No infrastructure
 - Cons: Privacy Laws & Reliability

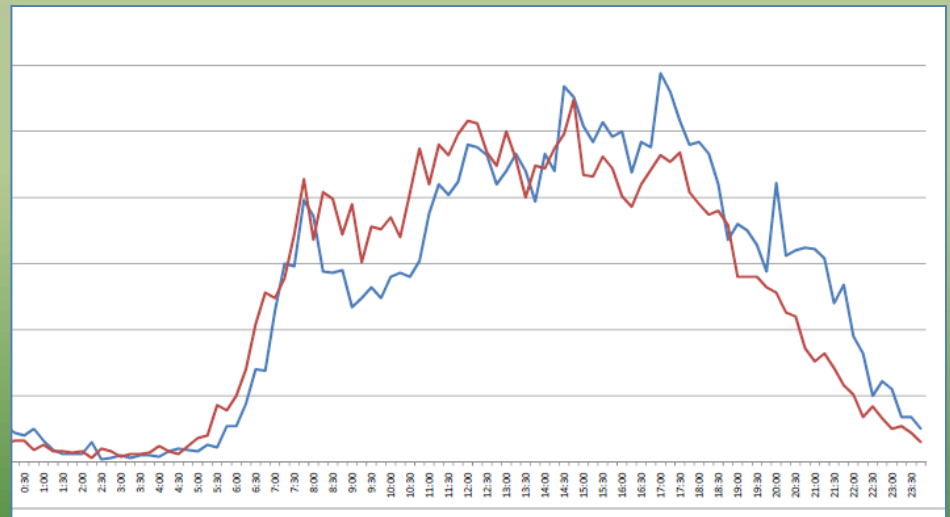


Equipment Placement

- Determination of Coverage Area
- Determination of Problem Areas
 - Congestion
 - Construction

Data Analysis

- Algorithm
 - Based on Equipment Placement
 - Simplistic vs. Detailed Analysis
 - Could Include:
 - Min & Max Speeds
 - Data Smoothing



New Technologies

- Privatization
 - Private Agencies collecting data & selling
 - Counts
 - Speed & Travel Time
 - New equipment within Right of Way

New Technologies

- MAC Address Tracking
 - Based on Device Bluetooth Signals
 - Allows for unique identification of drivers
 - Can use for O&D Studies



Travel Time Estimation

- Benefits
 - Reduction in:
 - Emissions
 - Queues
 - Collision/Crashes
 - Lost Time
 - Delay

