Portable Advanced Traveler Information Systems

Redding Deployment Evaluation

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Overview

• Background
• Problem Statement
• Results
• Conclusions
Background

Advanced Traveler Information Systems (ATIS)

• Provide real-time traffic information
  – Different route selection
  – Less aggressive driving behaviors

• Connected to Changeable Message Signs (CMS)
  – Controlled by Traffic Management Centers (TMC)
Background

• Project
  – Evaluation of Portable ATIS systems
  – Caltrans PATH Project
  – California Center for Innovative Technology (CCIT)
  – Demonstration Showcase
    • Redding, CA
Problem Statement

• Lack of research in portable systems
• No extensive research in ATIS system demonstrations or of their capacities
  – (Either portable or fixed)
Performance Measures

- Accuracy
- Reliability
- Usability
- Motorist Reaction*
Demonstration Showcase

- Redding, CA (Caltrans District 2)
- “Dana to Downtown”
  - Reconstruction of the Sacramento River Bridge

Source: Caltrans
Data Collection Methodology

• Offline systems
  – Adaptir only online system
• Two weeks of data collection & maintenance/ service monitoring
• Monitoring setup/ tear-down/ recharging operations
Blufax

- Travel times every 15 minutes
- Bluetooth Detection (Mac IDs)
  - (00:1A:0E:86:81:47 20090707 2349546764)
- Blustats Software (Traffax)
- Installed at 4 locations
iCone

- Average spot speeds every 5 minutes
- Counts every 5 minutes
- Doppler Radar
- Satellite Connection to Server
- Installed at 3 locations
License Plate Reader (LPR)

- Individual Travel Times
- Video images capture license plates
- Matches plates to database
- Installed at 2 locations
  - (3 locations initially)

(0630,1045206: 0630,1045202,1, 4EYV493,82)
Adaptir

- Average spot speeds every 5 minutes
- Remote Traffic Microwave Sensor (RTMS)
- SI-3 Radar Sensors
- RTMS (1 location), SI-3 Radar (2 locations)
GPS Travel Times

• Drove 3 routes and recorded travel times
• Stopwatch and voice recorder
  – Validated stopwatch time with GPS
• Baseline for travel time comparisons
Motorist Survey

• 19 Questions
• Asked about messages on CMS
  – <35 mph
• Demographic questions
• *Was not used in performance measures
Analysis Methodology

• Given 10 mph tolerance for speeds
  – Speed comparisons
    • iCone & Adaptir

• Assumed 10 seconds tolerance for travel times*
  – Travel times comparisons
    • Blufax, LPR, & GPS
Accuracy Analysis

Travel Time Analysis:

- LPR vs. GPS (4-5) 98% <10s (46s)
- Blufax vs. GPS (1-5) 45.5% <10s (108s)*
  * Adjusted 9 sec (average travel time)
  - 100% <10s
- Blufax vs. GPS (2-5) 100% <10s (122s)
- Blufax vs. GPS (3-5) 100% <10s (43s)
Accuracy Analysis

Speed Analysis:
– iCone vs. Adaptir (3,4,& 5) 99% <10mph
Reliability Analysis

Blufax

- Very few problems
- 8-9 day battery life (10-14 expected)
- Difficult to observe power failure in offline mode
Reliability Analysis

iCone

– Very few problems
– Construction worker moved a unit
– 21 hour delay before online again
  • Should have been noticed quicker with online status
Reliability Analysis

LPR
- Several problems
- Faulty wire at location 3
- Adjustment and battery issues at location 2
- High temperatures caused shutoff of cameras at location 5
Reliability Analysis

Adaptir

- No problems during the showcase
- Continuous data collection
- Highest preference of systems*
  • *On-site system manager was a representative from The Scientex Corp. (Adaptir vendor)
Usability Analysis

Blufax

- Preassembled
- Small setup time
- Simple recharging
- Least hassle of systems
Usability Analysis

iCone
- Preassembled
- Weigh 60 lb each
- Truck needed to be transported for charging
- 6 volt charging at secured area
Usability Analysis

LPR

- Most hassle of systems
- Cameras mounted and software calibrated
- Wiring to communication box & power supply
- Recharging of power supplies
Usability Analysis

Adaptir

- Quick setup for speed radars (mounted on trailers)
- RTMS radar mounted on trailer and calibrated
- Ready at the beginning of the showcase*
Conclusions

• All systems found to record fairly accurate traffic characteristics
  – One travel time analysis adjusted
• Further analysis needed for longer testing period and integrated systems
  – Study site with likelihood of traffic delay
  – More rural areas (Blufax)
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Questions?

Sundial Bridge across Sacramento River at Turtle Bay
http://www.redding-real-estate.com/LargePhotoPages/parkmarina2.html