I-35 Traveler Information During Construction Connected Work Zone

Utility Of Third-Party Data (Task 6)

FHWA Peer Exchange Meeting

November 15-16, 2022
## Data Sources Available for Queue Detection

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<th>Data Source</th>
<th>Data Type</th>
<th>Example data</th>
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<td>Infrastructure sensors</td>
<td>Point-detector data</td>
<td>Spot speed, volume, occupancy (lane-by-lane)</td>
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<td>Third-party data providers</td>
<td>Crowd-sourced probe data</td>
<td>Segment speed, segment travel time</td>
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<td>Connected vehicles (Wejo)</td>
<td>Vehicle trajectory and operational data</td>
<td>Vehicle position, speed, acceleration, braking, etc.</td>
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Queue Detection Using Crowd-Sourced Probe Data

IF $v > V_{queue}$ NO Queue

IF $v < V_{queue}$ Queue

Probe Data Segments

1 2 3 4 5 6 7 8

X1: Distance to BOQ
CWZ Device

- Get PCMS Location Coordinates
- Identify INRIX Segments

INRIX

- Rel-time Data feed
- Full INRIX Data for Each Segment

Evaluate Segment State Based on speed threshold(s)

At least one segment Congested?

YES

- Determine
  - BOQ Position
  - PCMS to BOQ Distance (X)

NO

- t = t + dt
- Default Message: (e.g., “Road Work Ahead”)
- Queue Warning Message (e.g., “Slow Traffic X Miles”)
Queue Analysis Using Data from INRIX Segments
Segment Speeds (1-min average)
Queue Analysis Using Data from INRIX Segments

Speed Heatmap (1–min average)
Queue Characteristics from INRIX Data

Initial shockwave speed = 6 mph

Max. queue 5.5 miles

Queue cleared

Incident occurred

Incident cleared

Incident at MM 334
Queue Verification Using TMC Cameras
Connected PCMS – Flow Diagram

1. Send Location to Application Server
2. List PCMS in Available Signs
3. Select Sign from List, Set Work Zone Parameters and Deploy
4. Query INRIX API for XD segments along the selected corridor
5. Respond to API Call
6. Run Congestion Detection Algorithm on Received Data
7. Display Posted Message
Connected PCMS – Deploy Sign
Connected PCMS – Analysis Tool
Connected PCMS – Analysis Tool
Connected PCMS – Analysis Tool
Connected PCMS – Analysis Tool
Connected PCMS – Analysis Tool
Connected PCMS – Analysis Tool
Connected PCMS –Demo

https://pcmsappserver.southcentralus.cloudapp.azure.com/
Connected PCMS – Next steps

- Data analysis
- Data verification with videos
- Field deployment and testing
Connected PCMS – Feedback

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