Video Analytics Towards Vision Zero

TRB Pedestrian Committee (ANF 10)
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Principal Transportation Planner
Every 17 days, someone is killed or seriously injured on Bellevue’s streets
Bellevue: A Smart City

Level 1 – Ad Hoc
Basic access to essential services

Level 2 - Opportunistic
Efficient operations and service delivery using targeted performance measures to improve services

Level 3 - Repeatable
Defined and measured processes and systems performance to consistently meet standards of services or performance benchmarks

Level 4 – Managed
Integrated systems focus with cohesive and optimized strategy, planning and execution to consistently exceed standards of services or performance benchmarks

Level 5 - Optimized
Predictive, proactive and adaptive urban systems creating interoperable systems for the highest levels of performance, optimal customer experience and resiliency from major disruptions
Crash-Based (Ad-Hoc) Approach

1. Crash occurs
2. Police officer collects information
3. Accident report completed by police officer
4. Copy of accident report submitted to the transportation dept.
5. The transportation dept. enters select crash information into database
Hyden’s Safety Pyramid (adapted from Hyden, 1987)
Leverage Bellevue’s existing traffic camera system to simultaneously:

- monitor counts and travel speed of all road user groups (vehicle, pedestrian, and bicycle);
- document the directional volume of all road user groups as they move through an intersection; and,
- assess unsafe “near-miss” trajectories and interactions between all road user groups.
Traffic Analytics Dashboard (Overview)

Busiest Intersections

<table>
<thead>
<tr>
<th>Location</th>
<th>Last Hr Total</th>
<th>Week ADT</th>
</tr>
</thead>
<tbody>
<tr>
<td>150th SE38th</td>
<td>1949</td>
<td>40062</td>
</tr>
<tr>
<td>BellevueWay NE8th</td>
<td>1172</td>
<td>48201</td>
</tr>
<tr>
<td>150th Eastgate</td>
<td>1047</td>
<td>34215</td>
</tr>
<tr>
<td>116th NE12th</td>
<td>882</td>
<td>30960</td>
</tr>
<tr>
<td>150th Newport</td>
<td>776</td>
<td>19068</td>
</tr>
</tbody>
</table>

Alerts

- **High Traffic**
  - 150th SE38th 3RIDE WBL
    - Last 15min: 45
    - Mean 15min: 19.4
    - Deviation: 112.0%
  - 150th SE38th 3RIDE WSR
    - Last 15min: 63
    - Mean 15min: 29
    - Deviation: 117.2%
  - 150th SE38th 3RIDE WBT
    - Last 15min: 37
    - Mean 15min: 12.8
    - Deviation: 180.1%
  - 150th SE38th 130ths NBR
    - Last 15min: 23
    - Mean 15min: 10.6
    - Deviation: 117.0%
Traffic Analytics Dashboard (Bellevue Way & NE 8th)
### Traffic Analytics Dashboard (Overview)

![Traffic Analytics Dashboard](image)

### Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Intersection</th>
<th>Alert Type</th>
<th>Direction</th>
<th>Period</th>
<th>Alert Value</th>
<th>Absolute Value</th>
<th>Traffic Volume</th>
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<tbody>
<tr>
<td>12/05/2017</td>
<td>116th NE12th</td>
<td>High Traffic</td>
<td>12th E WBR</td>
<td>12/05/2017 08:00 - 08:30</td>
<td>8</td>
<td>28.3</td>
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<td>Newport WBL</td>
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<td>32</td>
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</table>
Enhancing Pedestrian & Bicycle Accuracy

Case Study: 108th Avenue Demonstration Bikeway
Data Acquisition Systems

Bluetooth antennas

SCATS & loop detectors

Thermal sensors & detectors

Video analytics from 360 cameras
Notes:  Pre-project counts (5/10-6/10); and, post-project counts (8/1-9/14). “Cycling on streets” includes both bike lane and travel lane usage.
Version 2.0 Partnership

- Network-wide traffic safety monitoring (both limited duration and continuous analysis).
- Dashboard displaying safety results for intersections + crash-prediction scores + stored video of conflicts.
- Countermeasure recommendations proposed for highest conflict locations.
Brisk Synergies is a software company that transforms video data into knowledge for road safety monitoring, hazardous location identification, safety diagnosis, and project evaluation.
Bellevue Dashboard with BriskSCORE
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