



BELLEVUE
**PEDESTRIAN
& BICYCLE**
IMPLEMENTATION INITIATIVE

DATE: October 8, 2015

TO: Members of the Transportation Commission

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SUBJECT: Pedestrian & Bicycle Implementation Initiative Status Update
Video Analytics Research Partnership with Microsoft

The City of Bellevue's Transportation Department is working with Dr. Victor Bahl, Director of the Mobility & Networking Research Group at Microsoft, in developing video analytic techniques for pedestrian and bicycle traffic data collection and conflict detection.

Background

Video analytics is the computerized processing and analysis of video streams to determine events, trends, and other factors over a given time and in a given location. Although stand-alone data processing systems exist for analyzing traffic from pre-recorded video these methods are limiting and costly as data can only be captured for a discrete number of sites and time-periods. This research partnership explores the potential to leverage a city'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.

If this data can be automatically analyzed continuously across a city's entire existing traffic camera system there are great opportunities for public works departments to better understand and optimize transportation systems (without waiting for collisions to happen).

Our partnership with the Microsoft Mobility & Networking Research Group is approached incrementally:

- **Milestone 1:** Demonstrate the capability of vision technologies by detecting relevant events in the sample traffic videos (e.g., detecting cars, pedestrians, and bikes and tracking their movements).
- **Milestone 2:** Demonstrate an end-to-end system that will, continuously in real-time, detect and store the events, and present aggregated information.
- **Milestone 3:** Pilot deployment of end-to-end system (running on servers provided by Microsoft) in the City of Bellevue traffic control center. The system will run off of a live feed.
- **Milestone 4:** Support additional scenarios (e.g., near-collisions of cars with pedestrians and bikes or patterns of bikers crossing a busy intersection).

This research partnership arises from the City of Bellevue's Pedestrian and Bicycle Implementation Initiative (PBII) which aims to generate better data on pedestrian and bicycle activity, crashes, and infrastructure, and build partnership opportunities to advance the implementation of non-motorized projects and programs. The City's contributions to this partnership include access to recorded and real-time video from the City's traffic camera system and staff time for the coordination of resources and the assessment of milestone outcomes and their applicability to the PBII.