Video Analytics Towards Vision Zero Partnership

Microsoft

UNIVERSITY of WASHINGTON

WSDOT

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NEW YORK CITY DOT

City of Redmond

Snohomish County

Hamilton

King County METRO

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CITY OF PASADENA

THE UNIVERSITY OF BRITISH COLUMBIA

Lund University

McGill

POLYTECHNIQUE MONTREAL

Portland State UNIVERSITY

ITE

ITS AMERICA

VISION 4:0 NETWORK

METRO LAB NETWORK

cascade bicycle club

people for bikes

WALK FRIENDLY COMMUNITIES
Video Analytics towards Vision Zero

Worldwide problems demands bold action

- Worldwide 1.25 million people are killed annually in traffic accidents
- In 2016, road crashes resulted in 40,000 deaths and 4.6 million injuries in the United States.
- Crashes are preventable and we need not wait for someone to be killed or injured before we take action

Make a difference, teach computers to learn

- Unique opportunity to help prevent traffic crashes and save lives
- “Teach” our computers how to recognize vehicles, people walking and bicyclists
- Cities will be able to rapidly detect road conflicts and traffic engineers can then take preventative action to avoid crashes

Participate starting June
USA: Traffic Fatalities

2006: 42,708
2007: 41,259
2008: 37,423
2009: 33,883
2010: 32,999
2011: 32,479
2012: 33,561
2013: 32,719
2014: 32,675
2015: 35,092
2016: 40,200
Trajectory Detection & Turning Movement Counts
Volume Charts

VEHICLE DISTRIBUTION CHARTS BY TIME OF DAY

MONTH: May, 2016
DATE: 5.1.2016 - 5.1.2016

CARS
- 11pm: 30,000 cars/day
- 12pm: 30,000 cars/day
- 10pm: 30,000 cars/day

BUSES/TRUCKS
- 11pm: 400 buses & trucks/day
- 12pm: 400 buses & trucks/day
- 10pm: 400 buses & trucks/day

PEDESTRIANS
- 11pm: 1,000 pedestrians/day
- 12pm: 1,000 pedestrians/day
- 10pm: 1,000 pedestrians/day

BICYCLISTS
- 11pm: 100 bikes/day
- 12pm: 100 bikes/day
- 10pm: 100 bikes/day
Near-Miss Detection
Near-Miss Detection
Near-Miss Detection
Near-Miss Detection
Near-Miss Detection
Near-Miss Detection

05/19/2016
01:00/02:00

QUANTITY, LOCATION & SEVERITY OF NEAR MISS EVENTS

MONTH: MAY, 2016
DATE: 5.1.2016 - 5.31.2016

1

2

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Near-Miss Detection
How Neural Networks Work

**Training**
- During the training phase, a neural network is fed thousands of labeled images of various objects, learning to classify them.

**Input**
- New image is shown to the pretrained network.

**First Layer**
- Neurons respond to simple shapes, like edges.

**Higher Layer**
- Neurons respond to complex shapes.

**Top Layer**
- Neurons respond to highly complex abstract concepts that we would identify as different objects.

**Output**
- The network predicts what the object most likely is based on its training.

- Example: Bicycle (90% ✓) vs. Running Person (10% ×)
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