

Using Video for Counting Vehicles, Bicycles and Pedestrians

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What should we talk about?

- Data Collection Tools/Methods
- Defining Video Technologies
 - Examples of each
- Benefits of Video Technologies
- Challenges with Video Technologies for bike/ped
- HDR Manhattan Case Study
- Questions?

Data Collection Sensor Options

- **Video** - Miovision
- **Bluetooth** – Blue TOAD
- **Radar** - Wavetronix
- **Electro Magnetic** – Eco Counter
- **Leddar** - LeddarTech
- **Pneumatic** – MetroCount
- **Manual** - Jamar
- **WIM** - Transmetric

Video Data Collection Technologies

- **Background Subtraction**
 - which identifies moving objects from the portion of a video frame that differs significantly from a background model.
- **Zone Detection**
 - user must specify regions of the video frame where something is expected to happen (zones), and a method is used to detect object presence in the zone.
- **Object Tracking**
 - A method of following an object through successive image frames to determine how it is moving relative to other objects.

Examples of Video technologies



Study Dashboard (Boca Raton Test -- Existing CCTV facility)

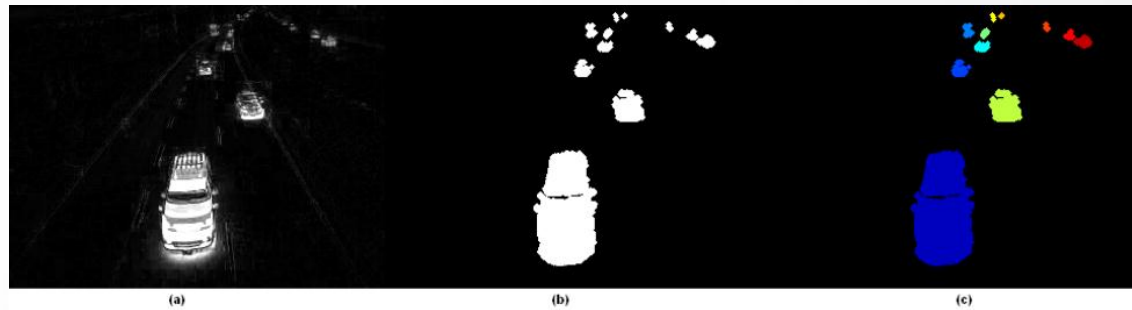
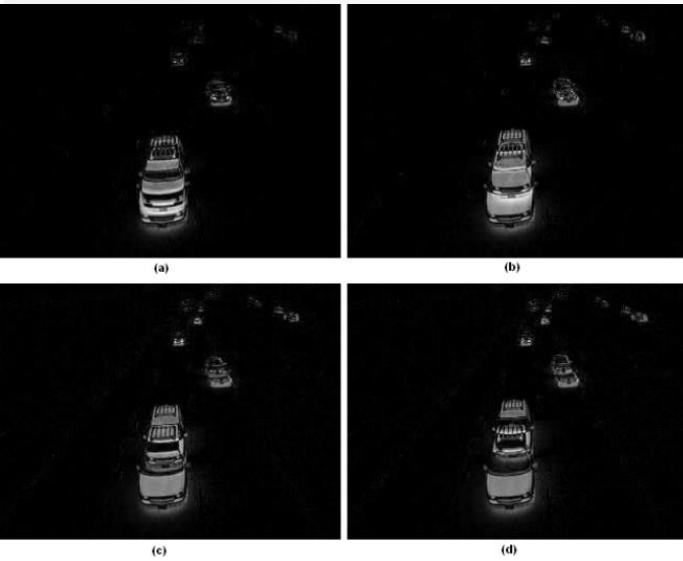
Actions: [Edit Approaches](#) [Edit Data](#) [Advanced Reporting](#) [Basic Reporting](#) [Recent Reports](#)

Summary	Study ID: 32359	Status: Complete	Hardware ID: Bosch CCTV
Annotation	Count Name: Boca Raton Test -- Existing CCTV facility		Setup Rating: ★★★★★
Study Rating	Project: (none)		Classification Options
Location	Start Date: Friday, February 11, 2011 3:59 PM		Vehicle: C / T / Pbi
Sharing	Upload Notes:		Ped (with direction): P
Video Sharing	<input type="button" value="Save"/>		Study Type: TMC
Video Playback			Total Length: 01:25:32
Video Download			Number of Trims: 1
Video Storage			Turnaround Time
Export Options			Selected: 72 hours
Chart Export			Delivered: 70.2 hours
Billing			

Location

Show Approach Labels

Background Subtraction Methods

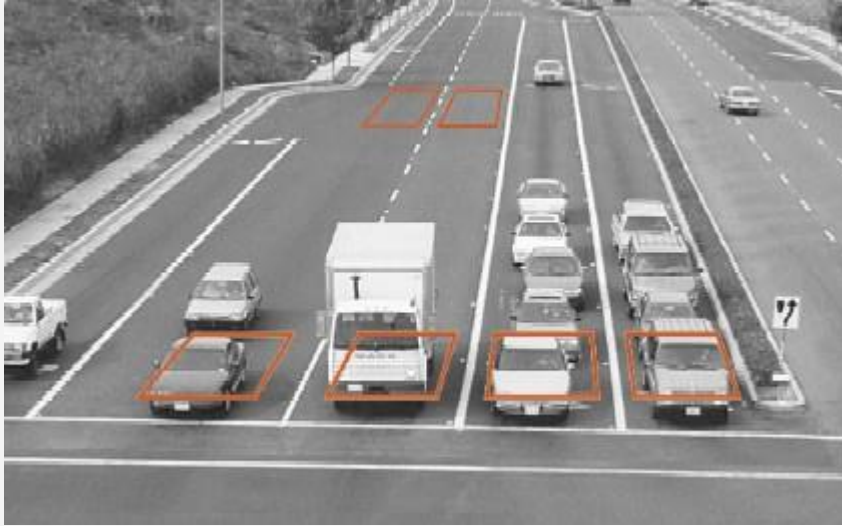


(a)

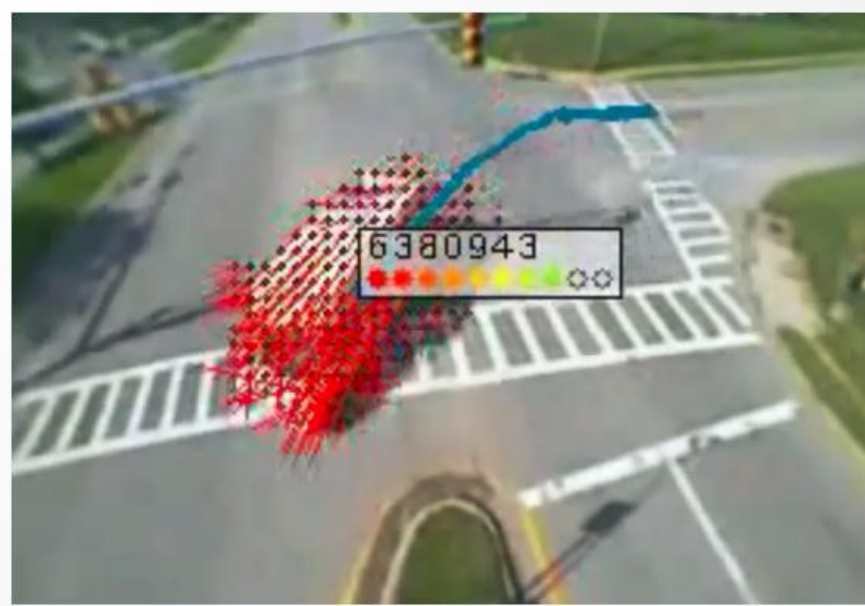
(b)

(c)

Zone detection



Examples of Object tracking & Motion Estimation



Benefits of Video

- Auditable
- Non-invasive
- Low installation cost
- Safe deployment
- Qualitative analysis
 - Manual ped/bike classifications?
- Large field of view
- Multi-functional
 - Ped/bike/vehicle studies simultaneously

Downfalls of Video Ped/Bike Counting

- Ped scrambles
- Grouping of peds/bikes
 - How are they separated?
- Weather and visibility
- Reporting
 - How do you standardize and automate the reporting of scatter and unorganized movements?

Sample Report

Turning Movement Peak Hour Data (5:00 PM)

Start Time	Great Lakes Blvd Southbound						Nautical Blvd Westbound						Great Lakes Blvd Northbound						Creek Path Ave Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
5:00 PM	35	48	29	0	0	112	15	1	0	0	0	16	1	33	3	0	0	37	0	1	9	0	0	10	175
5:15 PM	36	63	25	0	1	124	13	1	0	0	0	14	1	26	1	0	2	28	0	0	21	0	0	21	187
5:30 PM	31	68	28	0	0	127	9	0	0	0	0	9	0	34	2	0	0	36	0	0	17	0	0	17	189
5:45 PM	34	61	34	0	2	129	13	0	0	0	0	13	0	50	1	0	1	51	0	1	20	0	0	21	214
Total	135	240	115	0	3	492	50	2	0	0	0	52	2	143	7	0	3	152	0	2	67	0	0	69	765
Approach %	27.6	48.8	23.6	0.0	-	-	96.2	3.8	0.0	0.0	-	-	1.3	94.1	4.6	0.0	-	-	0.0	2.9	97.1	0.0	-	-	-
Total %	17.8	31.4	15.2	0.0	-	64.3	6.5	0.3	0.0	0.0	-	6.8	0.3	18.7	0.9	0.0	-	19.9	0.0	0.3	8.8	0.0	-	9.0	-
PHF	0.944	0.862	0.853	0.000	-	0.953	0.833	0.500	0.000	0.000	-	0.813	0.500	0.715	0.583	0.000	-	0.745	0.000	0.900	0.796	0.000	-	0.821	0.894
Car	135	239	115	0	-	491	49	2	0	0	-	51	2	139	7	0	-	148	0	2	67	0	-	69	759
% Car	100.0	99.6	100.0	-	-	99.8	98.0	100.0	-	-	-	98.1	100.0	97.2	100.0	-	-	97.4	-	100.0	100.0	-	-	100.0	99.2
Medium	0	1	0	0	-	1	1	0	0	0	-	1	0	2	0	0	-	2	0	0	0	0	-	0	4
% Medium	0.0	0.4	0.0	-	-	0.2	2.0	0.0	-	-	-	1.9	0.0	1.4	0.0	-	-	1.3	-	0.0	0.0	-	-	0.0	0.5
Heavy	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	2
% Heavy	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0	1.4	0.0	-	-	1.3	-	0.0	0.0	-	-	0.0	0.3
Ped	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	-	3	-	-	-	-	0	-	-
% Ped	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-

HDR Ped Case Study - Manhattan

- May 2009 – 2nd Ave @ 34th Street
- 1 hour count 12:45-1:45pm



- Counts included:
 - Miovision VAS
 - HDR manual field count
 - HDR manual video count
 - NYC DOT historical data comparison

HDR Ped Case Study – Manhattan (Results)

TOTAL VEHICULAR TURNING MOVEMENT COUNT COMPARISON
2nd AVENUE AND 34th STREET
12:45 PM - 1:45 PM

DATE	SOURCE	EASTBOUND		WESTBOUND		SOUTHBOUND			Total Volume	Total Percent Change
		THRU	RIGHT	LEFT	THRU	LEFT	THRU	RIGHT		
10/18/2008	NYCDOT (TCC)	526	131	103	256	189	1,847	104	3,156	-12.3%
5/30/2009	HDR Field Count	595	124	119	217	263	2,169	112	3,599	1.6%
5/30/2009	HDR Video Count	594	126	127	202	257	2,145	145	3,596	1.5%
5/30/2009	VCU (Miovision)	578	127	125	200	230	2,151	132	3,543	---

HDR Ped Case Study – Manhattan (Results)

**PEDESTRIAN COUNT COMPARISON
2nd AVENUE AND 34th STREET
12:45 PM - 1:45 PM**

		Southbound Street		Westbound Street		Northbound Street		Eastbound Street		
		Southbound		Westbound		Northbound		Eastbound		
DATE	SOURCE	Peds CCW	Peds CW	Peds CCW	Peds CW	Peds CCW	Peds CW	Peds CCW	Peds CW	Total Volume/ Percent Change
5/30/2009	VCU (Miovision)	173	144	112	137	180	259	239	226	1470
5/30/2009	HDR Video Count	162	131	133	139	181	260	233	239	1478
Percent Change by Movement		6.7%	9.9%	15.8%	1.4%	<1%	<1%	2.5%	5.4%	<1%

Thank you!

- Questions?
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