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Video Data Collection: More Than Just Volume Counts



Typical uses for video data collection

- ▶ Turning Movement Counts (TMC)
- ▶ Average Daily Traffic (ADT/ATR)
- ▶ Length Based Vehicle Classification
- ▶ Pedestrians and/or Bicycles
- ▶ Parking Utilization
- ▶ License Plate Data
 - ▶ Origin-Destination
 - ▶ Travel Times

Kansas Turnpike Authority (KTA)

- ▶ Wanted more information about their cash customers (non-KTAG)
 - ▶ Vehicle Classification
 - ▶ State of Origin
 - ▶ County of Origin (Kansas Customers)
- ▶ Need both front and rear license plates
 - ▶ Front plates are used for semis as KTA wants the state of origin of the cab, not the trailer



Challenge #1 - Matching Vehicle Class with a License Plate

Setup

Place a Miovision Scout Unit next to Miovision ALPR cameras (one per lane)

Sync

Sync the time on each of the Scouts

Use

Use Miovision PVR (Per Vehicle Record) Engine – They can do it, but you have to ask for it!

Compare

Once the data is processed, compare the vehicle class data to the license plate data to find the time offset (usually 1-12 seconds)



Per Vehicle Class and Plate



Back_Plate_Time_Stamp	Back_License_Plate	Back_County	Back_State	Class
1:10:13 PM	797HAT	OS	KS	Lights

Challenge #2- Separating Cash Customers

- ▶ Each toll plaza has 4+ lanes for cash customers but only 1 lane for KTAG customers
- ▶ ALPR cameras have a fixed focal length of 50 feet so it's not realistic to capture across 4+ lanes
- ▶ KTA couldn't provide us the license plate numbers for KTAG customers which could have been used to filter them.



Separating the Cash Customers Approach

Capture ALL

Capture vehicle class and license plate video upstream from toll plaza to capture ALL vehicles

Capture KTAG

Capture vehicle class and license plate video again in the single KTAG lane at the toll plaza

Identify

Identify all license plates in the KTAG lanes as a KTAG customer

Filter

Use the KTAG identification to filter vehicles from the data captured upstream from the toll plaza



Back_Plate_Time_Stamp	Back_License_Plate	KTAG ID
8:00:10 AM	634642	
8:00:13 AM	HOMERT	KTAG
8:00:15 AM	GHR	
8:00:17 AM	634EZR	KTAG
8:00:29 AM	215EEF	KTAG
8:01:01 AM	4139LB	KTAG
8:01:10 AM	T4596	
8:01:12 AM	70137	
8:01:19 AM	D1723A	KTAG
8:01:26 AM	281BRP	
8:01:31 AM	14802	KTAG
8:01:41 AM	435GEE	KTAG
8:01:42 AM	489GRZ	KTAG
8:01:48 AM	603EVR	KTAG
8:02:16 AM	253ASP	KTAG
8:02:19 AM	136GNG	KTAG

Filtering the KTAG Customers from the Data Set

Challenge #3 – Identifying County of Origin

- ▶ Most Kansas license plates have a 2 character county code somewhere on the plate
- ▶ Miovision was able to read this county code when they read the license plate, but they had didn't have a data field in their reports where they could put it
- ▶ We agreed that they would add the county code to the license plate and use three zeroes to separate it from the license plate
 - ▶ E.g. RL000389AGR
- ▶ Manual check of license plate video showed that Miovision was ~80% accurate identifying county codes
 - ▶ Most inaccuracies stemmed from similar letters (e.g. SN vs SV)



Challenge #4- Identifying State of Origin

- ▶ Required manual review of every captured license plate
- ▶ Took a lot longer than estimated



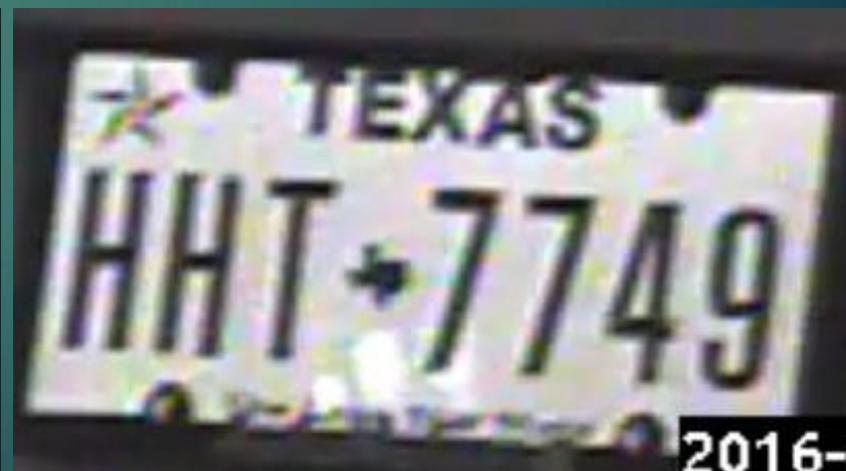
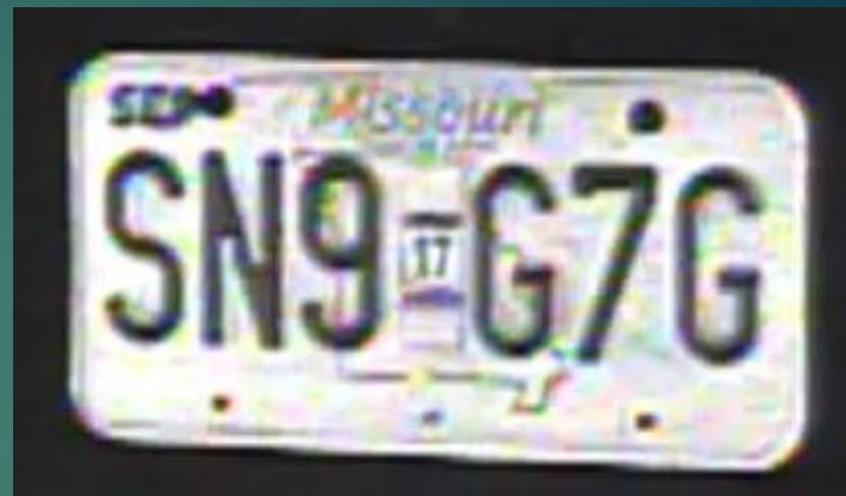
Identifying States

- ▶ Infrared Camera – Great to reading the license plate characters, Not so great for determining the state
- ▶ The colors wash away leaving us to search for letters and symbols

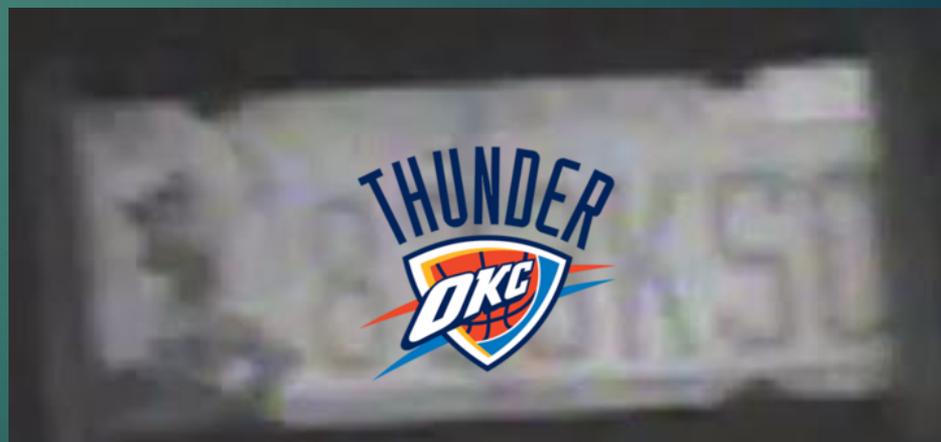
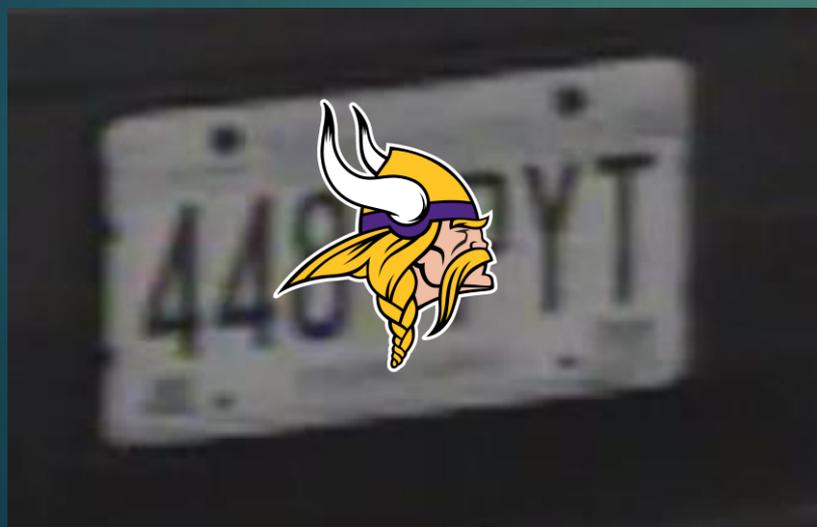
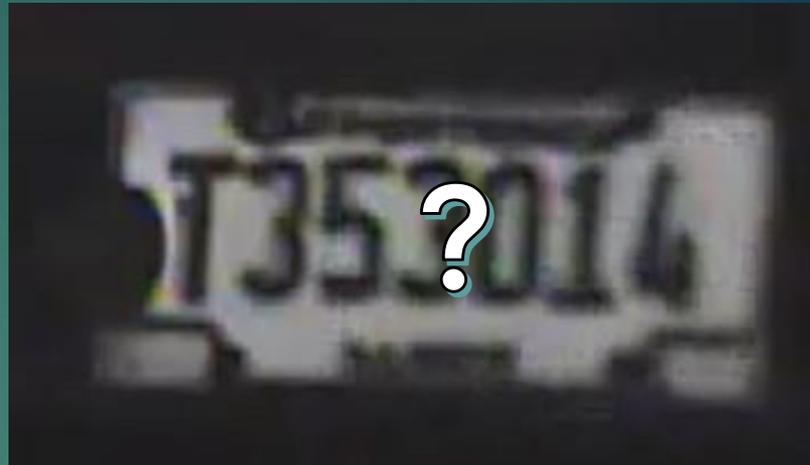
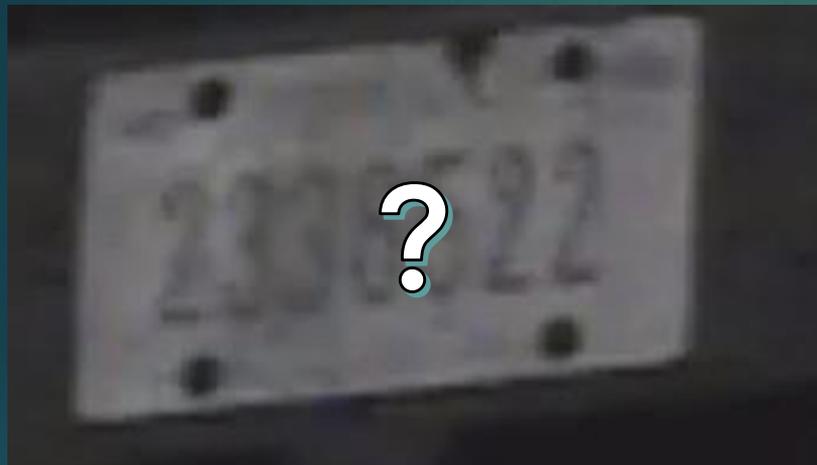


Any Guesses?

Sometimes it's easy...



Sometimes it's not



Results

Time Stamp	Back_License_Plate	Back_County	Back_State	Class	Front_License_Plate	Front_State	KTAG ID
8:00:10 AM	634642		KS	Lights			
8:00:13 AM	HOMERT	BU	KS	Lights			KTAG
8:00:15 AM	GHR	JO	KS	Lights			
8:00:17 AM	634EZR	SG	KS	Lights			KTAG
8:00:29 AM	215EEF	SG	KS	Lights			KTAG
8:01:01 AM	4139LB		OK	Articulated Trucks	WP18779	OK	KTAG
8:01:10 AM	T4596		IL	Articulated Trucks			
8:01:12 AM	70137		KS	Lights			
8:01:19 AM	D1723A		KS	Lights			KTAG
8:01:26 AM	281BRP	SG	KS	Lights			
8:01:31 AM	14802		KS	Lights			KTAG
8:01:41 AM	435GEE	BU	KS	Lights			KTAG
8:01:42 AM	489GRZ	BU	KS	Lights			KTAG
8:01:48 AM	603EVR	SG	KS	Lights			KTAG
8:02:16 AM	253ASP	SG	KS	Lights			KTAG
8:02:19 AM	136GNG	SG	KS	Lights			KTAG
				Articulated Trucks	543676	KS	
8:02:27 AM	848JEL	SG	KS	Lights			KTAG
8:02:30 AM	626560		KS	Articulated Trucks			KTAG
8:02:35 AM	207BLK	BU	KS	Lights			

Lessons Learned

- ▶ Video data is empowering!
- ▶ Manual processing of video data requires a different skill set than field data collection
- ▶ Plan ahead and double-check your estimates