

# The Importance of Video Inspection in Naturalistic Driving Studies



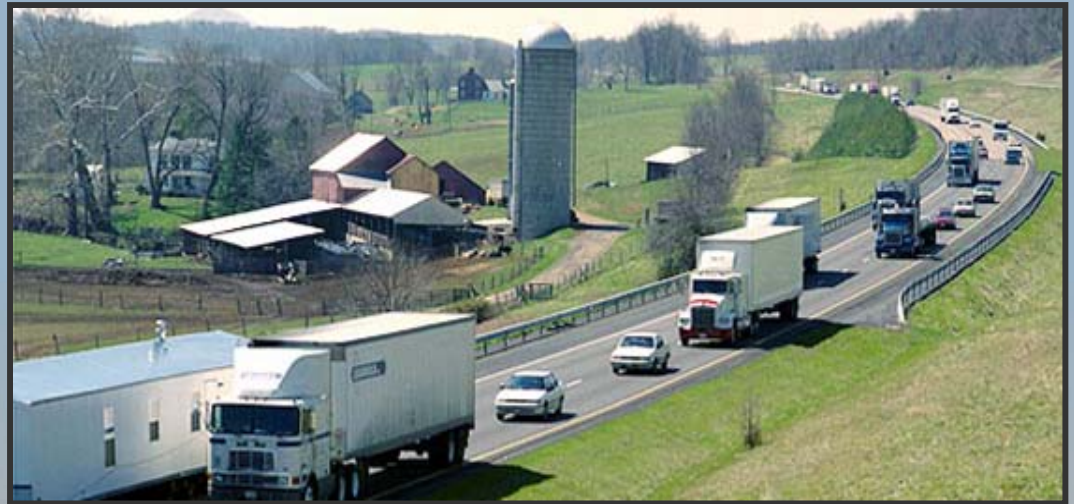
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# Overview

- Background
- Examples
- Discussion
- Conclusion



# Background

- Heavy Vehicle - NDS datasets
  - Data from over 200 drivers
  - ~ 3M miles of driving data
  - ~ 20 TB of data from video and dynamic sensor files
- Algorithms/models used to
  - Identify potential events
  - Remove non-threatening events

# Considerations

- Algorithms are not always reliable
  - Benign targets can appear threatening when video data not referenced
- Need video data to evaluate performance of algorithms and models
- Why video is important?
  - Identifying sensor artifacts
  - Validating model\data mining
  - Detection of unanticipated cases

# Examples

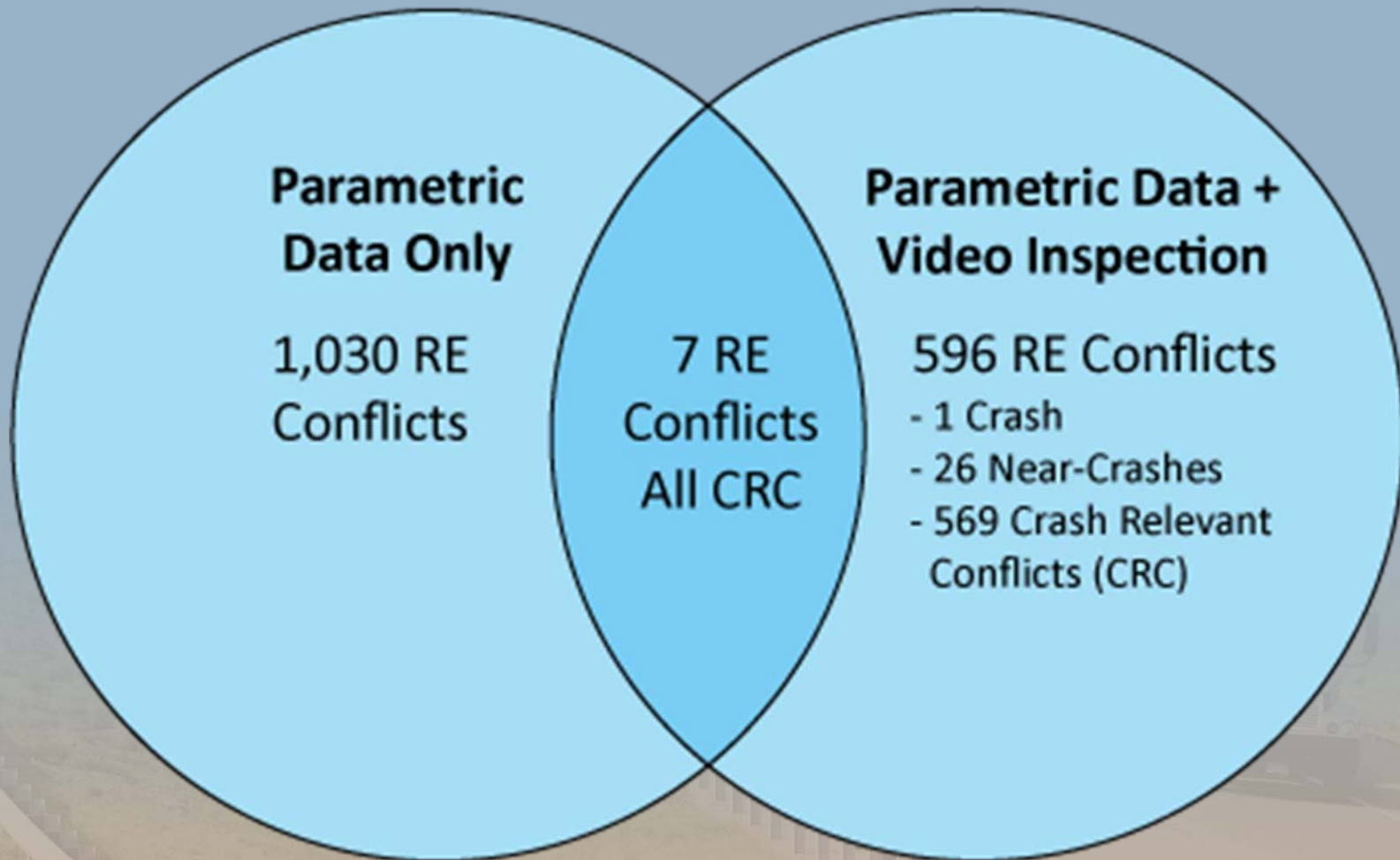
- Sensor artifacts
  - Toll booth
  - Overhead sign
  - Adjacent vehicle
  - Bridge
- Validation
  - Intentional short TTC
  - Intentional high lateral acceleration
- Unanticipated cases
  - Deer hit



# Removing Non-Threatening Events

- Remove events in which:
  - Tracked target was oncoming
  - Tracked target was in the same lane as the FV for less than 4 s
  - Tracked target accelerated
  - FV decelerated before a tracked target appeared
  - Tracked target was outside of the FV's lane and the FV did not make a lane change
- However, valid events can be omitted as a result of additional criteria

# Why Video Inspection?

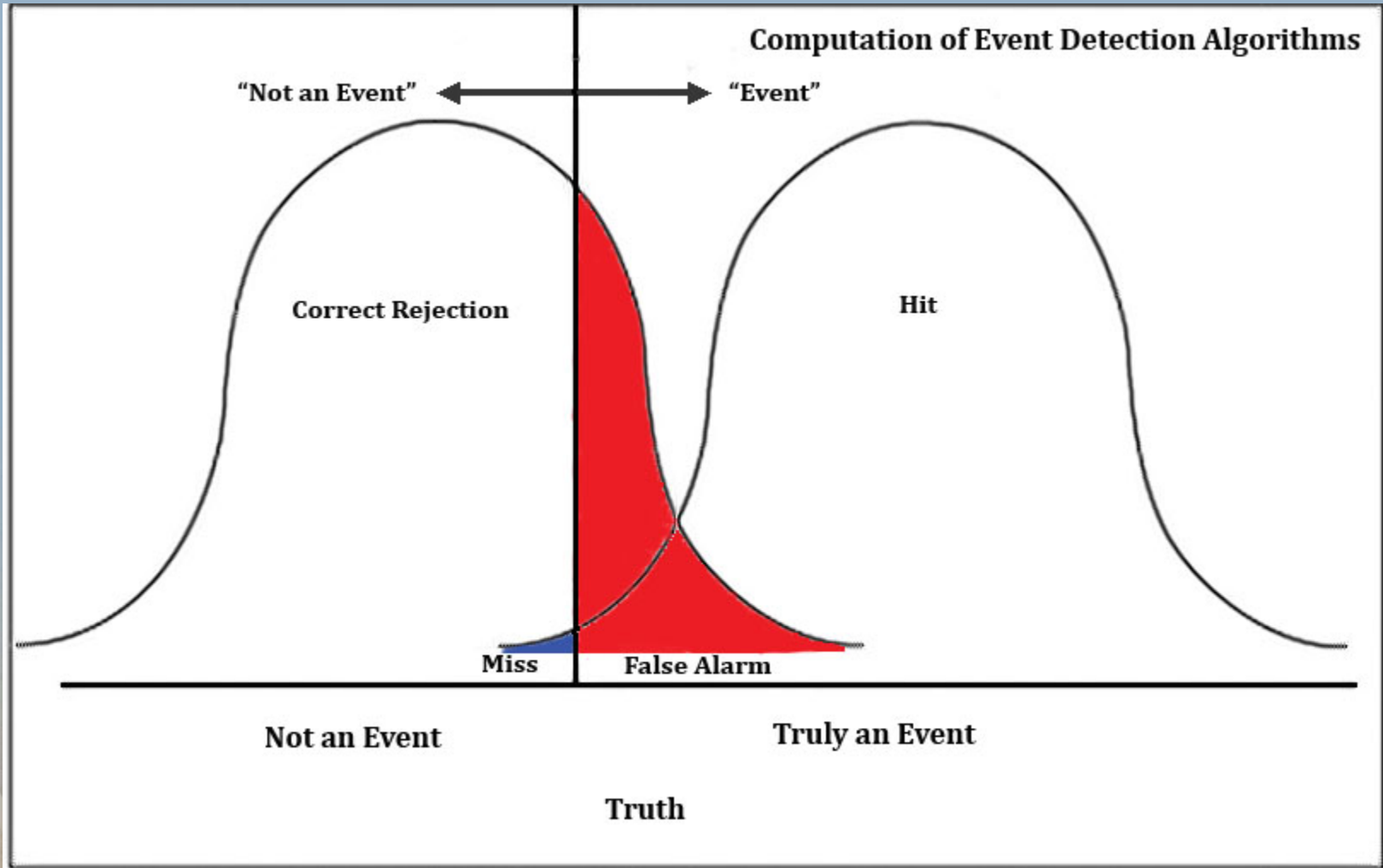


# Discussion

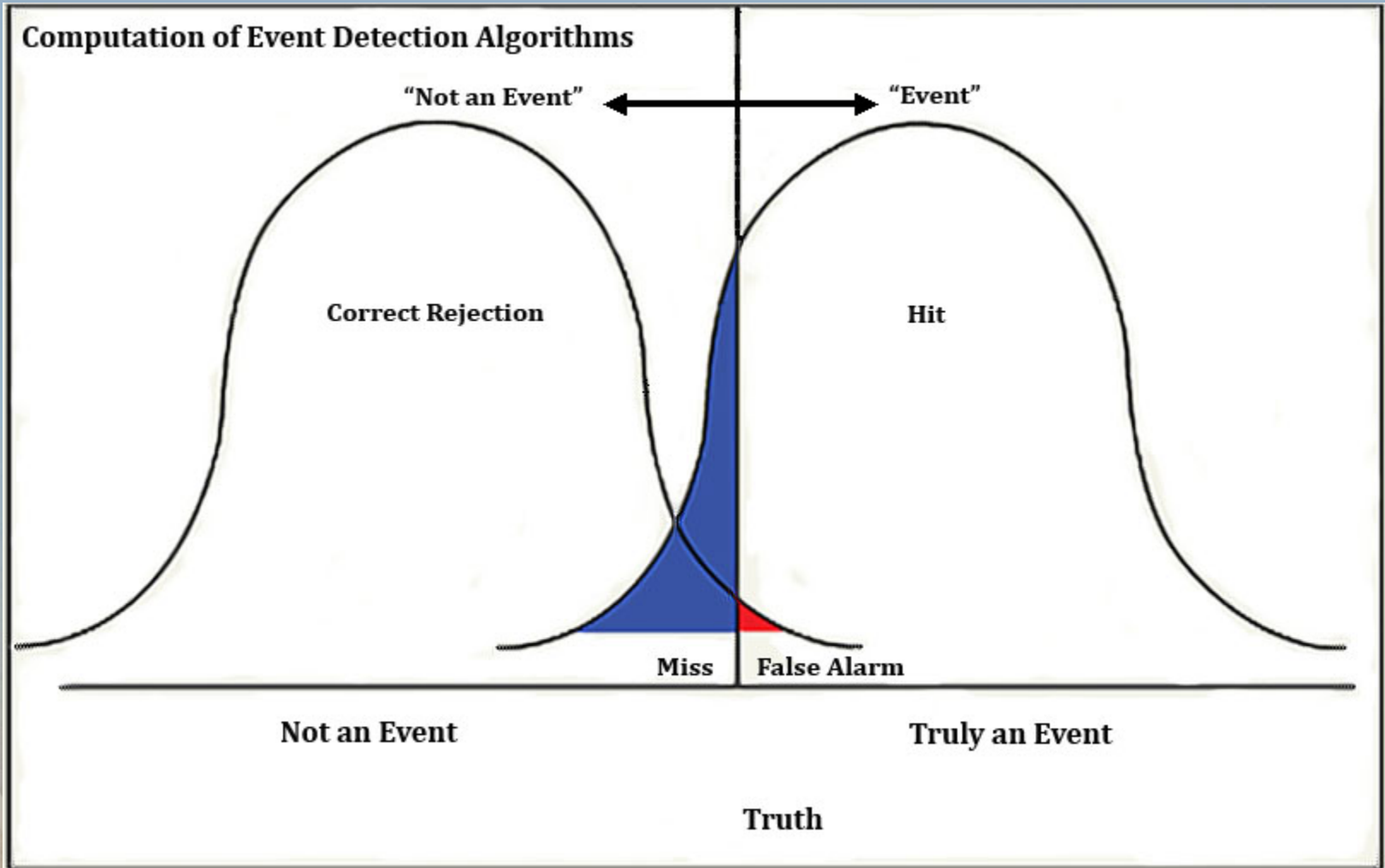
- Algorithms that draw the line between crash threat and false alarm will either
  - Fail to detect crash threats
  - Falsely assess targets as a crash threat



# Selection Criteria Tradeoff



# Selection Criteria Tradeoff



# Discussion

- Selection criteria depending on objective
- Cast a wide net, use liberal selection criteria to find potential events
- Inspect each identified event with video data to assess severity
  - Crash
  - Near Crash
  - Crash Relevant Conflict
- Inter\Intra rater reliability performed

# Discussion

- Other reasons to perform video inspection include:
  - Sensor Reliability
    - Sensors do not always accurately measure reality
    - Sensors can fail
  - Driver Behavior
    - Distraction
    - Drowsiness
    - Aggression

# Discussion

- Data mining or model development requires video inspection to check model/assumptions
- Video data allows models developed to answer current and future research questions to be validated



# Conclusion

- “Blind” algorithms\event selection criteria could either miss critical events or falsely assess targets as a crash threat
- Valid data required to draw valid conclusions from NDS data
- Video inspection provides a way to obtain valid data

# Questions

