

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

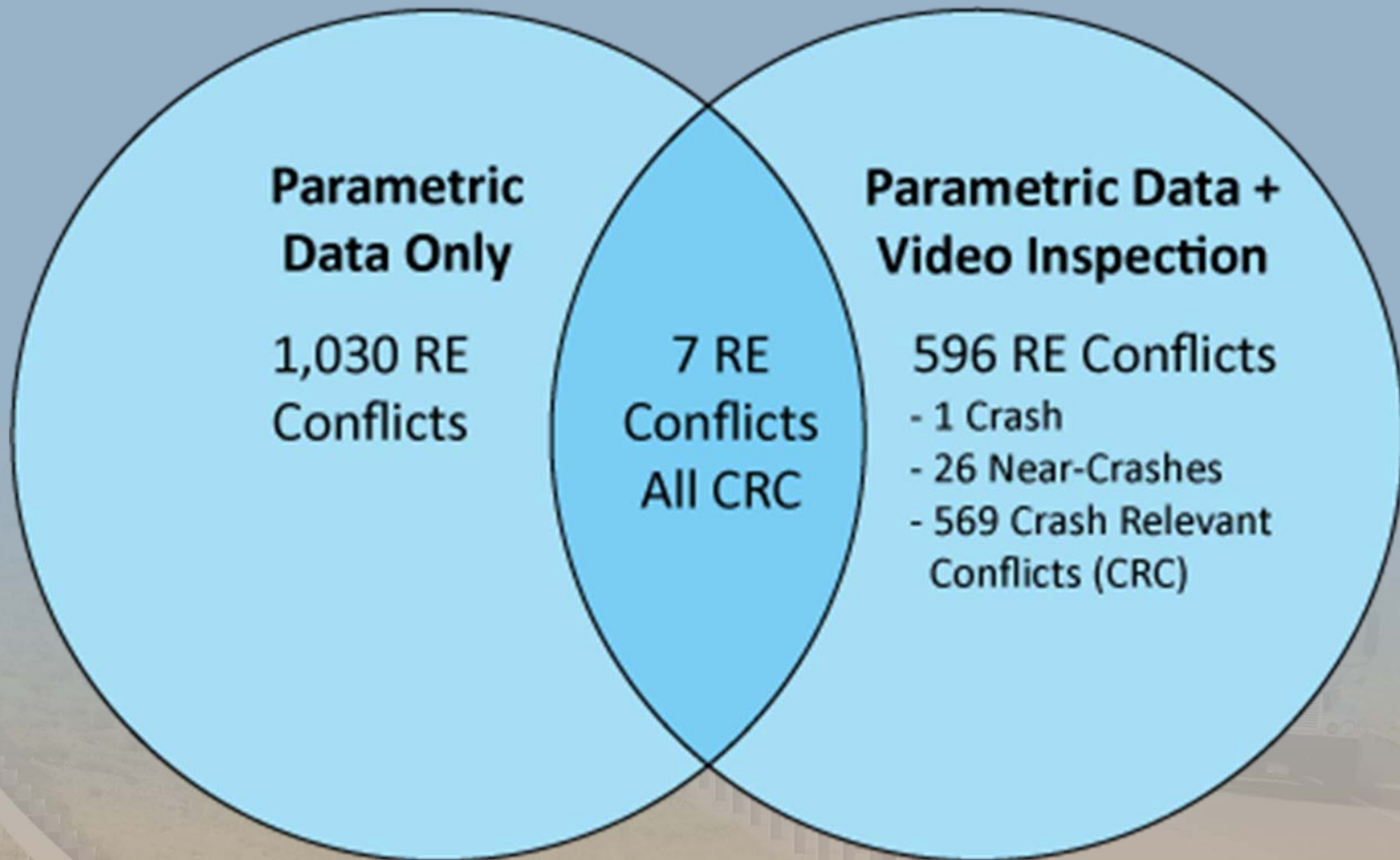
Examples

- 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

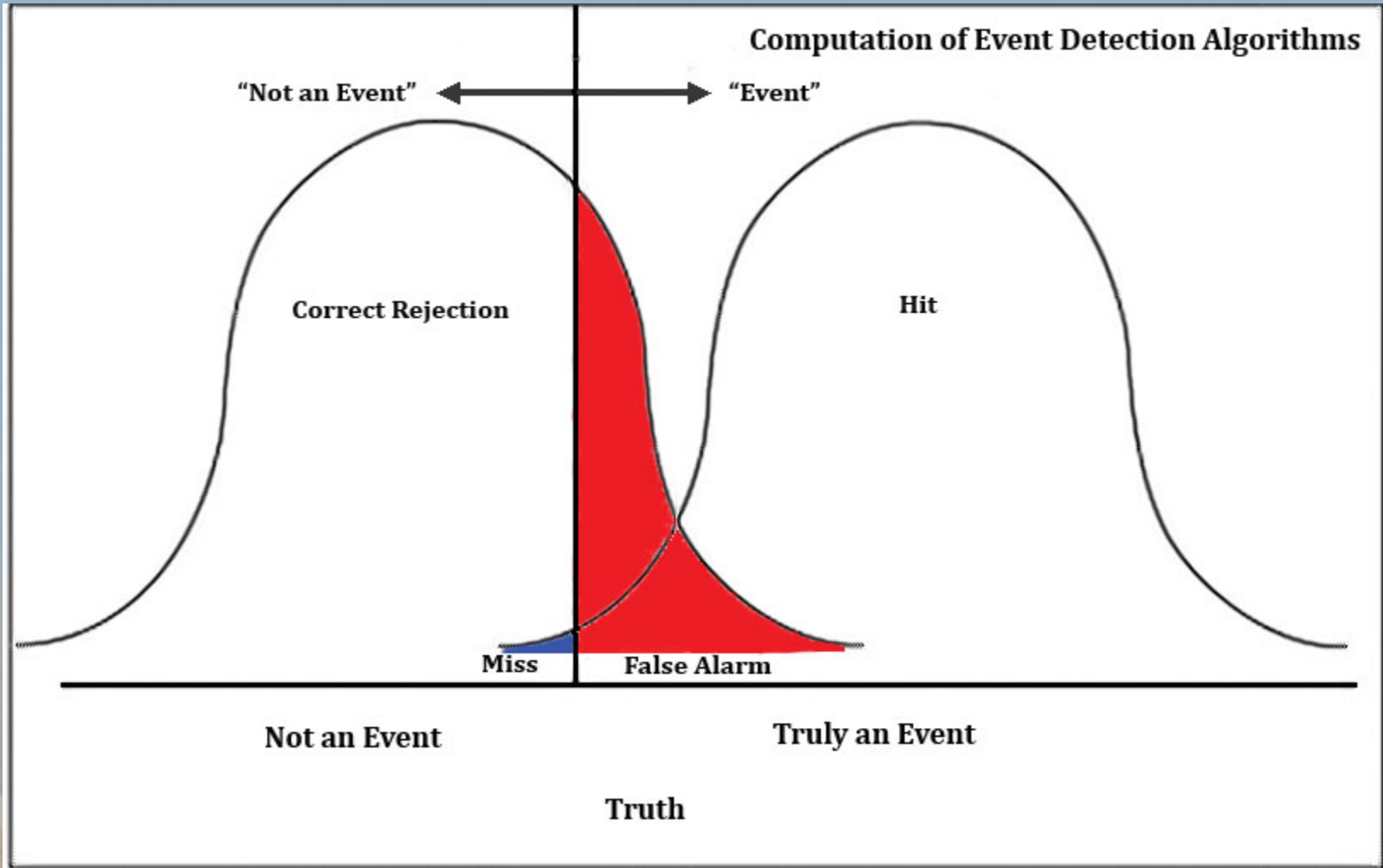
Why Video Inspection?



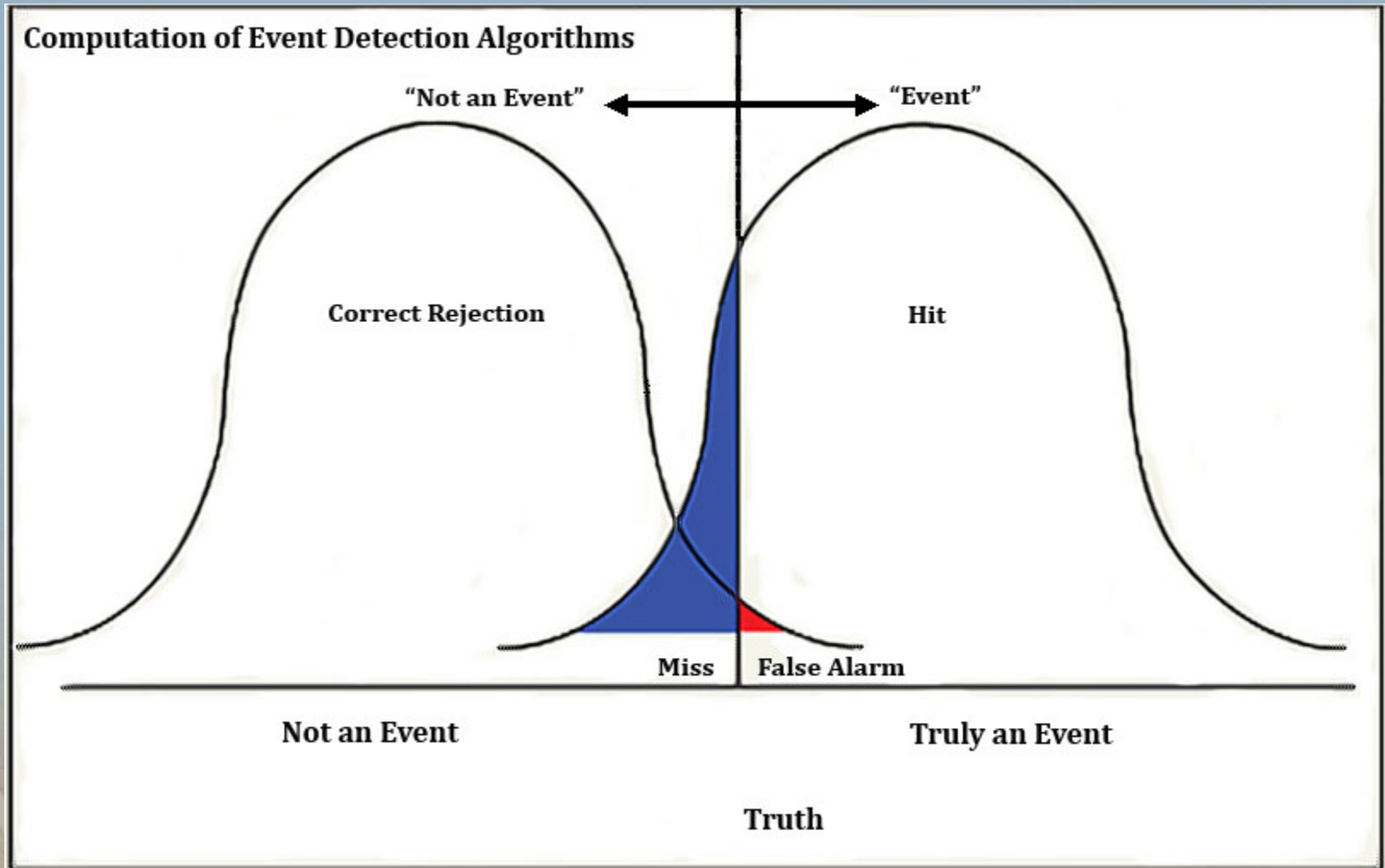
Discussion

- 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

