Stop Sign Behavior Annotation Protocol

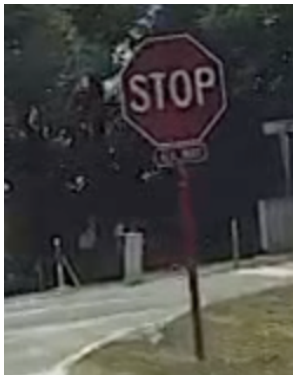
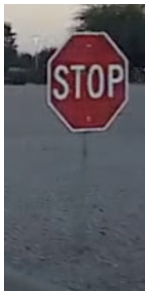
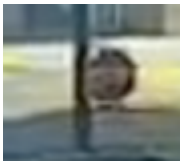
Objective

This annotation protocol defines how remote annotators should label **driver behavior around STOP signs** in dashcam videos. The goal is to extract high-quality, structured labels that support training machine learning models for driver behavior analysis and risk prediction.

Annotation Overview

This section provides the annotation guidelines, including examples of STOP signs to be identified, the annotation field schema, important notes, and a sample annotation.

Examples of STOP Sign Identification

STOP Signs to be annotated		**Stop Signs *not* to be annotated**
		
		

Field Specifications

Each video may contain **multiple STOP sign interactions**. For **each interaction**, you must record the following:

1. Interaction Metadata

- `interaction_id`: A unique identifier for each STOP sign interaction in the video (e.g., 1, 2, 3...).

2. STOP Sign Visibility

- `sign_visible`: `yes` / `no`: Was a STOP sign visible during the interaction? If that's true, select `yes`.
- `sign_visible_start_time`: First frame the STOP sign is visible in seconds *(if applicable)*.
- `sign_visible_end_time`: Last frame the STOP sign is visible in seconds *(if applicable)*.
- `visibility_obstructed`: `yes` / `no`: Was the sign partially or fully obstructed? If that's true, select `yes`.

3. Driver Behavior

- `driver_behavior`: One of:
  - `full_stop`: Car comes to a complete stop.
  - `rolling_stop`: Car slows but doesn't fully stop.
  - `no_stop`: No noticeable slowing or stopping.
  - `unclear`: Driver behavior cannot be reliably assessed.
- `stop_start_time`: Frame when the car begins significant deceleration in seconds *(if applicable)*.
- `stop_end_time`: Frame when the car resumes motion in seconds *(if applicable)*.

4. Collision Annotation

- `collision_occurred`: `yes` / `no`: Did a collision occur during or immediately after the interaction? If that's true, select `yes`.
- `collision_frame`: Frame of collision impact *(if visible/known)*.

5. Optional

- `comment`: Free-text field for anything unclear, uncertain, or noteworthy.

Notes

- Use frame-by-frame view if necessary to verify stops.
- **STOP signs painted on the road** (floor markings) are **not** annotated.
- Signs may be obscured, far away, or only appear briefly. You should still label if visible.
- Even if the STOP sign is not fully clear, still record driver behavior if it seems probable.
- If the sign is never seen but the car slows/stops unusually, label as `unclear`.
- Please enter times **in seconds, with two decimal places** (e.g., 5.30 means 5 seconds and 300 milliseconds).

Example

interaction_id	sign_visible	sign_visible_start_time (s)	sign_visible_end_time (s)	visibility_obstructed	driver_behavior	stop_start_time (s)	stop_end_time (s)	collision_occurred	collision_time (s)	comment
1	yes	0.42	0.57	no	full_stop	0.58	0.71	no	-	Clear STOP, proper behavior
2	yes	0.10	0.12	no	no_stop	-	-	yes	0.13	Driver ignored sign, collision occurred
3	no	-	-	-	full_stop	0.15	0.17	no	-	STOP sign not visible, but car still stopped

How to Submit Annotations

- Together with this protocol, you have a **spreadsheet** to fill out, with one row per STOP sign interaction.
- For each interaction, fill in all required fields, as stated in Annotation Overview section. Use the dropdown menus where available to select options.
- After completing the spreadsheet, please add it to the Google Drive folder shared on the e-mail sent together with this protocol.

Any questions please reach out to Nexar, through the following e-mail —-.

Assumptions and Tradeoffs

- Every video is pre-selected as *likely* involving a STOP sign.
- Only the video is available: no GPS, speed, or sensor data. Annotators do not know car speed, only visual deceleration.
- Annotators may see **multiple** STOP signs per video, all must be labeled.
- **STOP signs painted on the road** (floor markings) should **not** be annotated, as they are not consistently visible in the footage. It is assumed that whenever a floor marking exists, a corresponding pole-mounted STOP sign is also present.
- STOP signs **may be visible or not**, **partially occluded**, or seen from either side (left or right)**, always standing in a front view**.
- Collision annotation is included due to its importance for training risk-aware models.
- We do not require bounding boxes, pixel-level annotations.
- We focus on observable driver behavior, even if the STOP sign is barely visible or appears late.

How the labels support training an effective model

The labels capture structured information about STOP sign interactions, including sign visibility, driver behavior, and collisions, which enables machine learning models to:

- Learn patterns of safe vs. risky behavior near STOP signs.
- Recognize non-compliance, such as rolling stops or no stops.
- Correlate environmental visibility with behavioral outcomes.
- Incorporate outcome-based supervision through collision labels.
- Handle real-world uncertainty through options like `unclear`.

This will help to train models that are accurate and aware of risk and context, making them more robust in real-world driving scenarios and supporting other use cases, such as accident prediction and risk assessment.