

# Stop Sign Annotation Task Guidelines

## Goal:

This is an annotation task for a an AI-integrated dashcam, with the goal of enhancing road safety. To do that, our machine learning models need to understand what driver behaviors look like on the road, so that they can alert dangerous behaviors in real time.

One of the most dangerous and accident-prone areas are stop signs – as drivers don't always adhere to them and that increases the likelihood of a crash.

The goal of this task is to annotate videos for driver behavior around stop signs with enough detail to help our models understand it.

## Instructions:

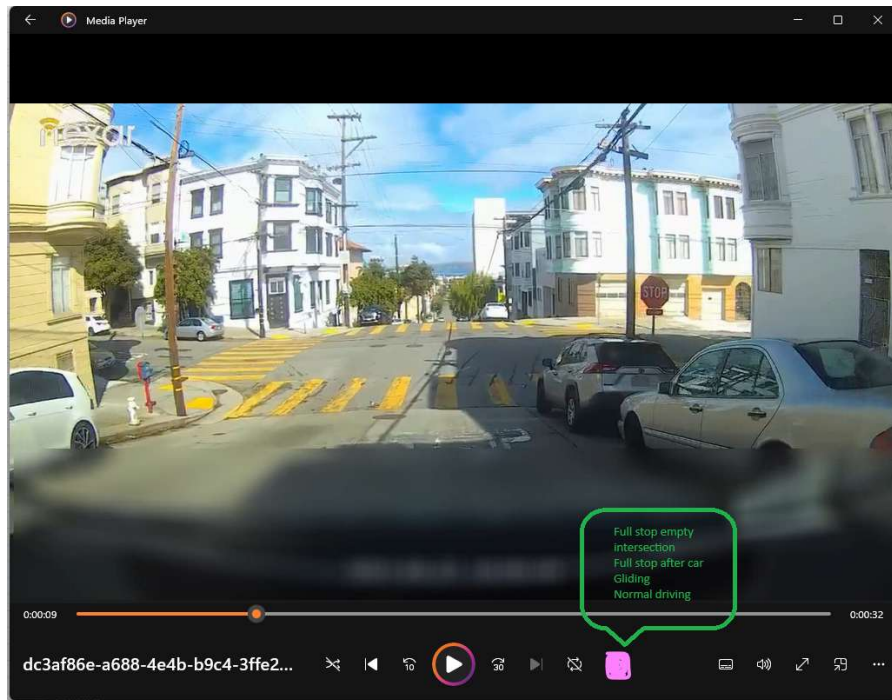
You will receive short 30-40 second video clips that were automatically flagged as having potential stop sign driver interactions.

### *Your objective:*

Label the relevant seconds in the video where the stop sign interaction is happening and which type of interaction it is.

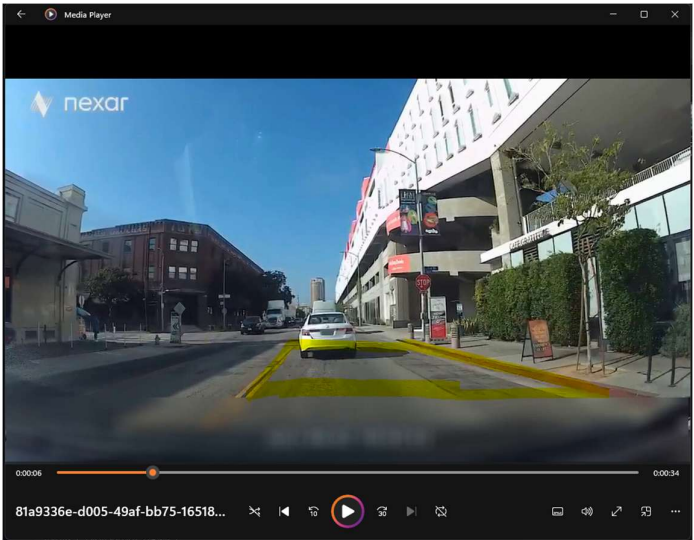
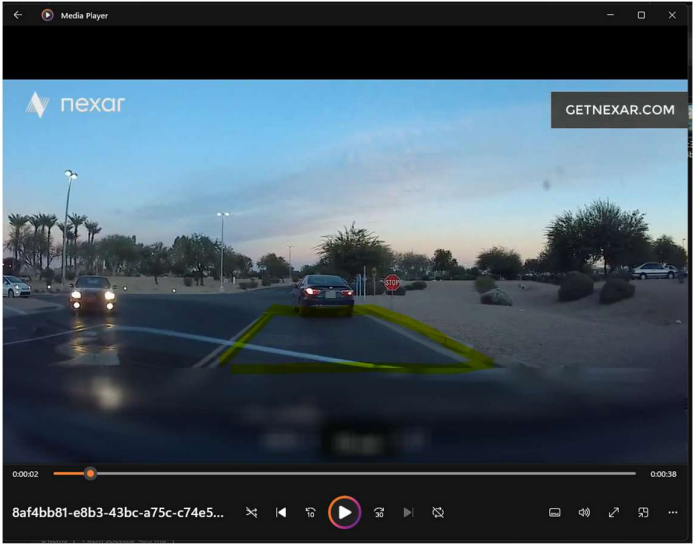
### *How to Label an Event*

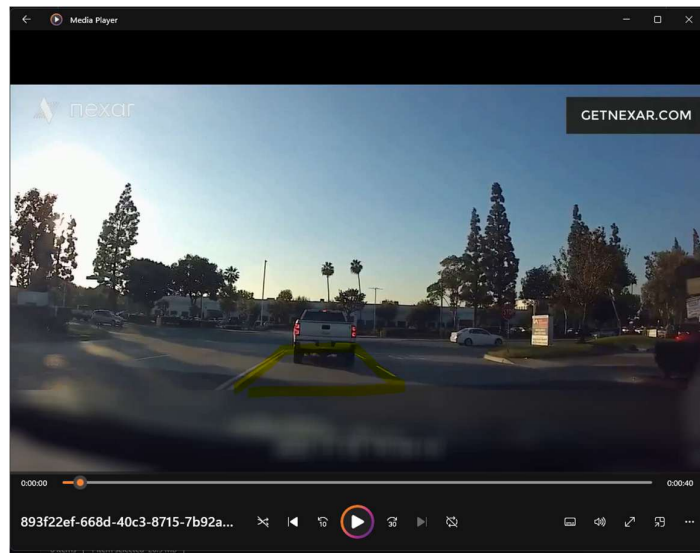
- 1) Pause the video on the starting point.
- 2) Click the pink button and the event type option will appear, click the appropriate one and click the pink button again:



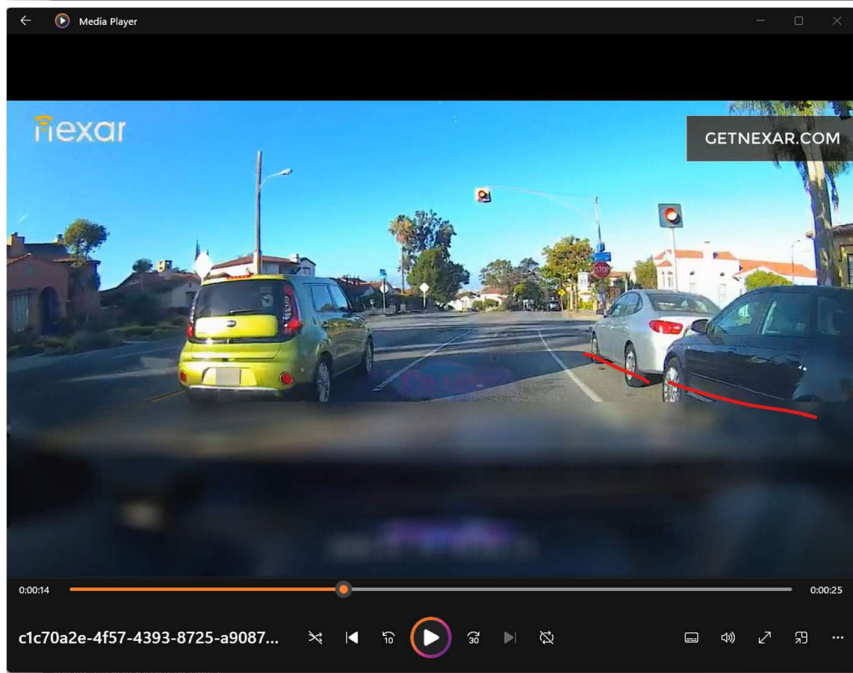
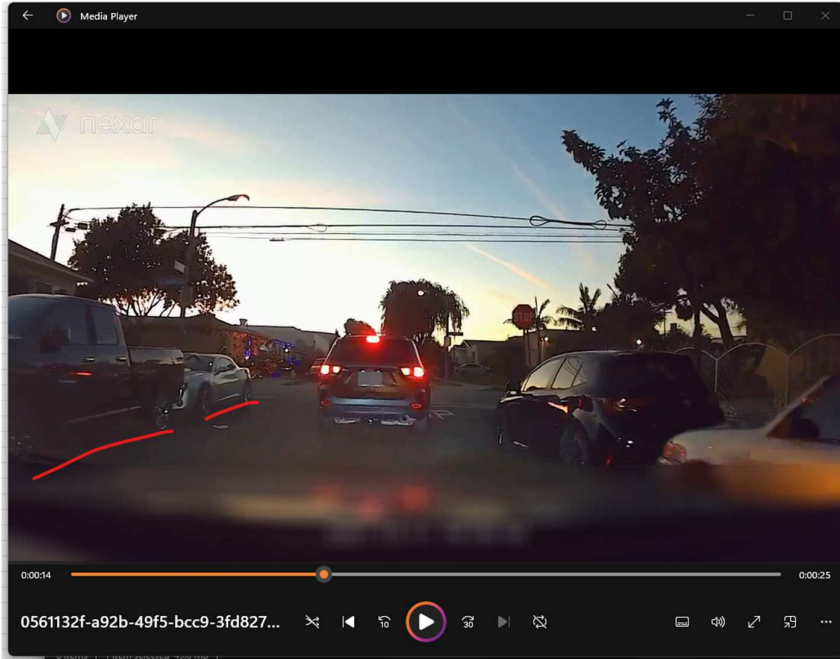
#### *Timeframe definitions:*

- Beginning of stop sign interaction –
  - The aim is to start the interaction about 15 meters before the junction. This is of course hard to measure over video.
  - For non-urban roads and urban streets without parking cars in the frame – pause the video when the edges of the lane look like a normal trapezoid
  - Example:

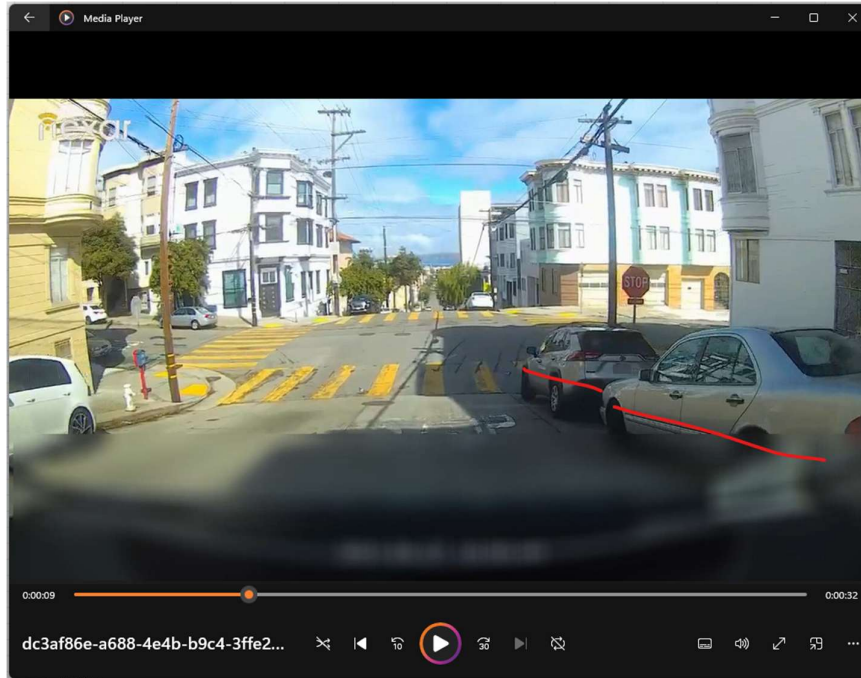




- For residential streets we'll want a distance of about 2 cars to the intersection. Try to pause on the first edge of the second car from the intersection.
- Example:







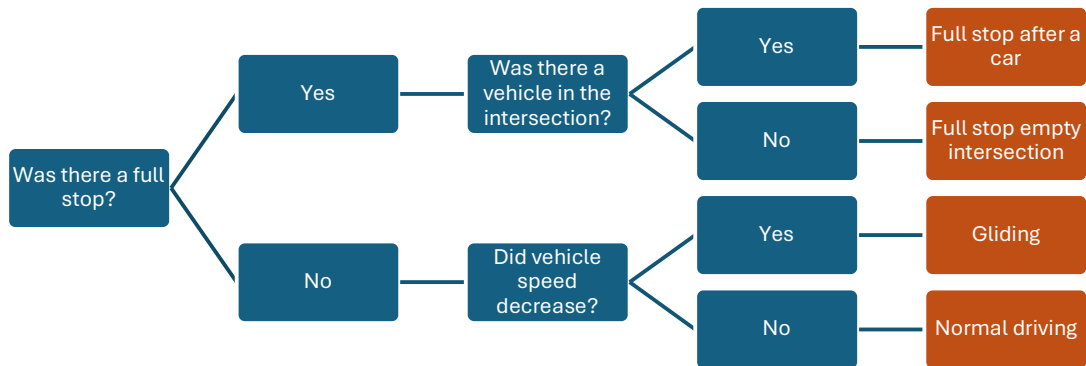
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- End of stop sign interaction –
  - The goal is to pinpoint the exact time where the driver is no longer “impacted” by the stop sign.
  - once the stop sign is not visible anymore and the car is in motion
  - Example:



### *Interaction type definitions:*

- Full stop empty intersection – the driver stopped fully next to the stop sign, before entering the intersection.
  - Identify by:
    - No car in front
    - All motion stops for at least 1 second
    - Example: see files " 3e120c7f-d830-4ee9-b9fb-f3e2781b8e7e.mp4" + " 81a9336e-d005-49af-bb75-165180205572.mp4"
- Full stop after a car – the driver stopped after a car stopped at the stop sign before, waiting for their turn.
  - Identify by:
    - The back side of a car directly in front of the windshield
- Gliding – the driver decreases speed before driving by the stop sign, could come to almost a complete stop or not
  - Identify by:
    - Motion slows down before stop sign, accelerates immediately after stop sign
    - Example: see file " 8af4bb81-e8b3-43bc-a75c-c74e568336ae.mp4"
- Normal driving – driver continues to drive normally around the stop sign
  - Identify by no or almost no change of velocity
  - Example: see file " b68b2d97-c4f4-4d61-88e5-c5c7ef0ff000.mp4"

This visual explains the difference between the 4 types:



#### *Edge cases/exceptions*

- Car bumped into the car in front of it in the intersection – do not label this, skip it and use the comment space to mention an accident happened at the intersection, and this video should be sent to the crash labeling team.
- Unexpected behavior from a car in front of the dashcam such as reverse or stopping altogether – do not label this. Make a note to send it for further inspection.
- Dirt road
- Dirt roads, stop signs not on a pole to the right side of the road and other use cases not covered by these guidelines – skip, and comment “not covered by guidelines”

#### Assumptions:

- There’s no need to do object detection such as stop signs or cars, the objects are detected automatically (for simplicity)
- Events can be labeled with a starting and ending point with a “pause” button in Windows Media Player and a Paint-generated pink button



- The relevant event here is a bit before the stop sign (10-15 meters) and until the car is in the intersection – this is agreed upon with product/algo/anyone else who's involved.
- Cars crashing into each other is not driver behavior, therefore these types of events belong in a different task.
- Uncharacteristic behavior due to other drivers (such as a driver in front reversing) should probably be discussed with the product/algo team, so right now this is excluded from the task.

## How these labels support model training

As the goal is to detect driver behavior, which is hard to define exactly, I had to choose a time frame that would be relatively easy to identify – I chose 15-20 meters before the junction and based on the provided examples I could define a simple framework on when to hit pause. My instructions are limited by the data I had available, I'm sure there are plenty of cases where these instructions do not work.

I chose to instruct the annotators to skip anything not covered by instructions as I'd rather rethink the labels when I can see the data than have bad labels that will later need to be fixed.

The labels chosen: based upon my worldly experience and the data I had available. The choice to split "Full stop" to 2 use cases (with and without a car in front) is because other cars heavily influence driver behavior, and for a car to be able to glide or drive normally there is probably no other vehicle affecting that decision (more things to be validated in more data), So labeling these events covers all the normal every day cases. I excluded uncharacteristic behaviors such as crashes and other drivers unexpectedly doing a reverse because I need to understand more about the model and the goals in order to determine what should be the label in those cases.

All in all, the labels reflect the 4 everyday common cases, with a detailed definition, hopefully with enough data this should be able to teach the model these patterns.