# A Coarse-to-Fine Boundary Localization method for Naturalistic Driving Action Recognition

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## Problem Statements

**Dataset(SynDD1):**

Each participant continuously performed eighteen distracted driver behavior for a small-time interval.

**Challenges:**

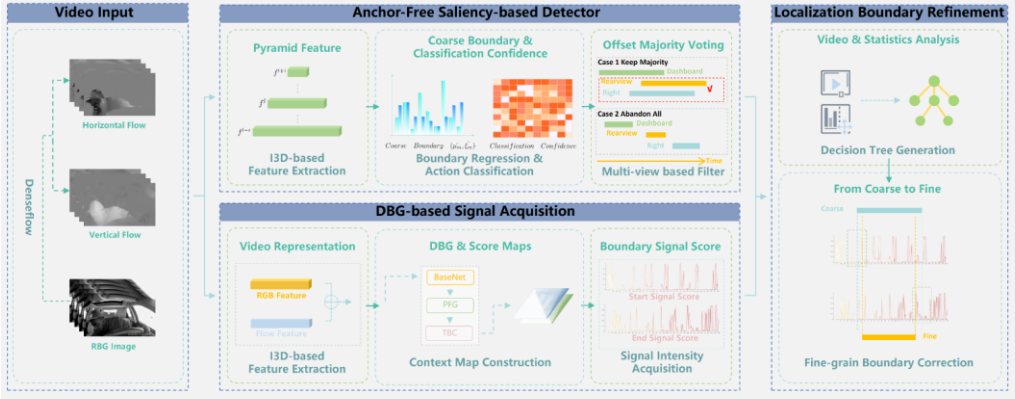
**· Large intra-class variation**

It may puzzle the model to divide one action segment into different parts.

**· Multiple camera views**

It is challenging to effectively combine the information of multiple camera views.

## CFBL: A Coarse-to-Fine Boundary Localization method




**Pipeline:**

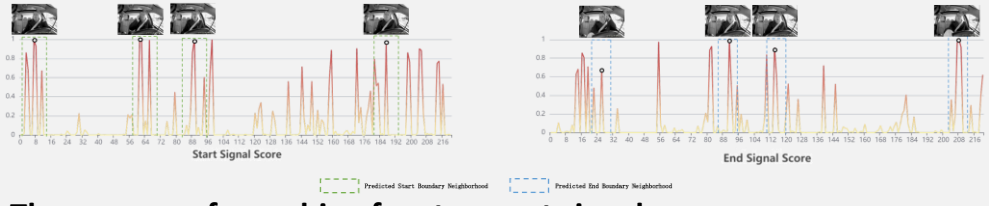
· DenseFlow for optical flows Extraction

· Anchor-Free Saliency-based Detector(AFSD) for coarse boundary prediction and classification result

· DBG-based Signal Acquisition Module for starting and ending signals

· Localization Boundary Refinement Module for fine boundary

## Localization Boundary Refinement Module




**The process of searching for strongest signal:**

We search the pre-defined neighbors in order to get the strongest signal that indicates the starting or ending points.

## Metrics & Results

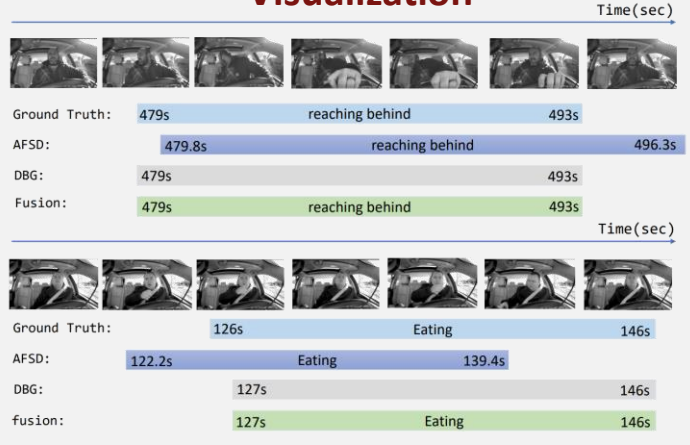
$$F1 = \frac{2TP}{2TP + FP + FN}$$

| F1-Score | Precision | Recall |
|---|---|---|
| 0.2902 | 0.4868 | 0.2067 |

**Explanation:**

A true-positive(TP) action identification will be considered when the action was correctly identified as starting time within one second and ending time within one second of the action. Our methodology obtain F1-Score at 0.2902 on the test set.

## Visualization




**Explanation:**

Our model can accurately localize the action boundary due to the introduced of DBG-based Signal Acquisition module.