

Temporal Segmentation of Egocentric Videos

VIVEK PRADHAN

A solid green horizontal bar at the bottom of the slide.

Problem Statement



(a) Car



(b) Bus



(c) Walking



(d) Sitting



(e) Wheels



(f) Standing



(g) Static

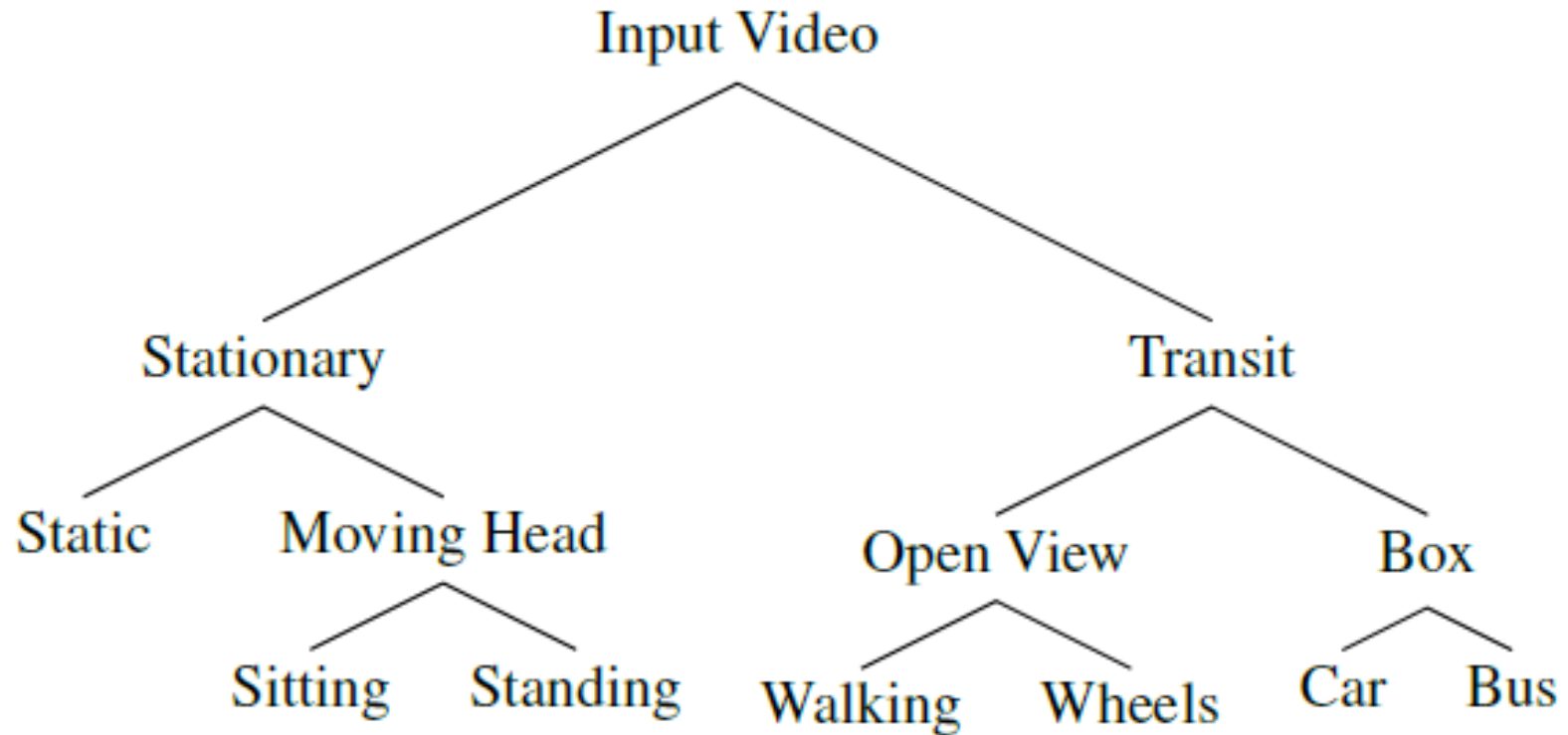
DataSet



DataSet

➤ Show External Video.

Problem Statement



Problems with Short Term motion detectors



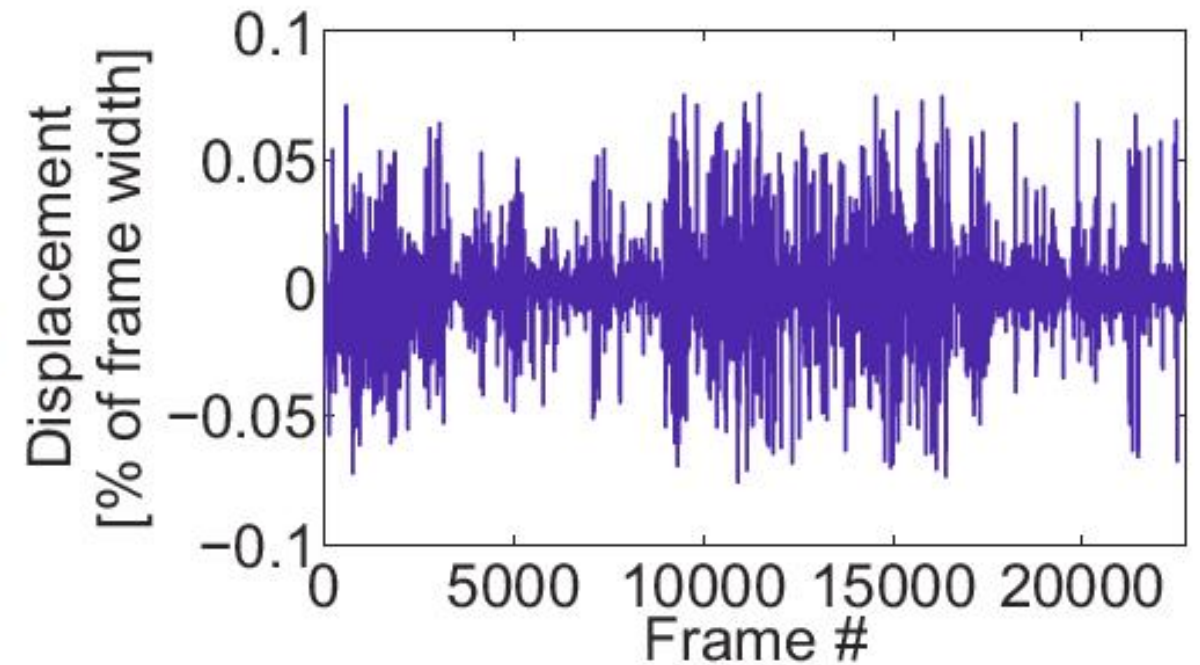
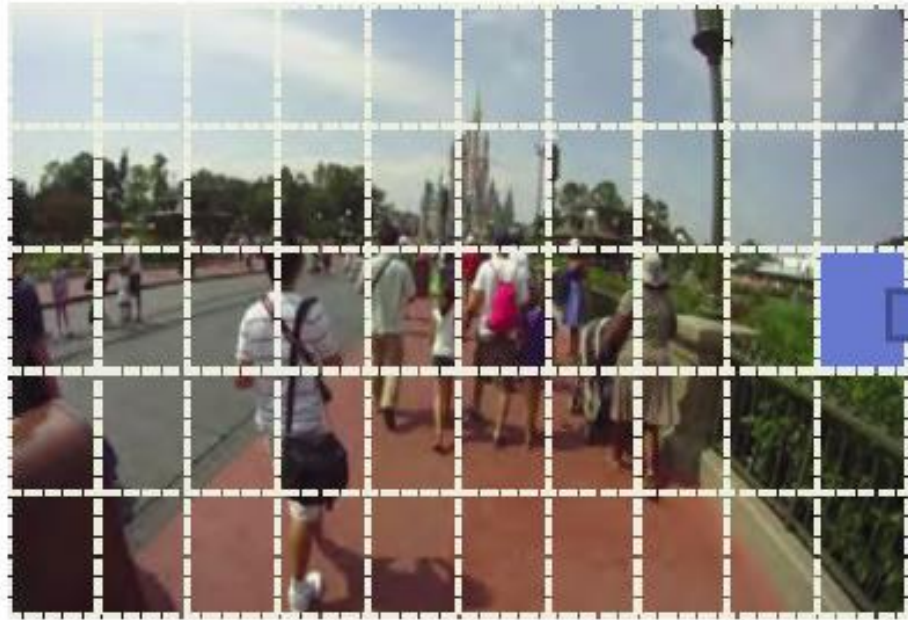
Problems with Short Term motion detectors



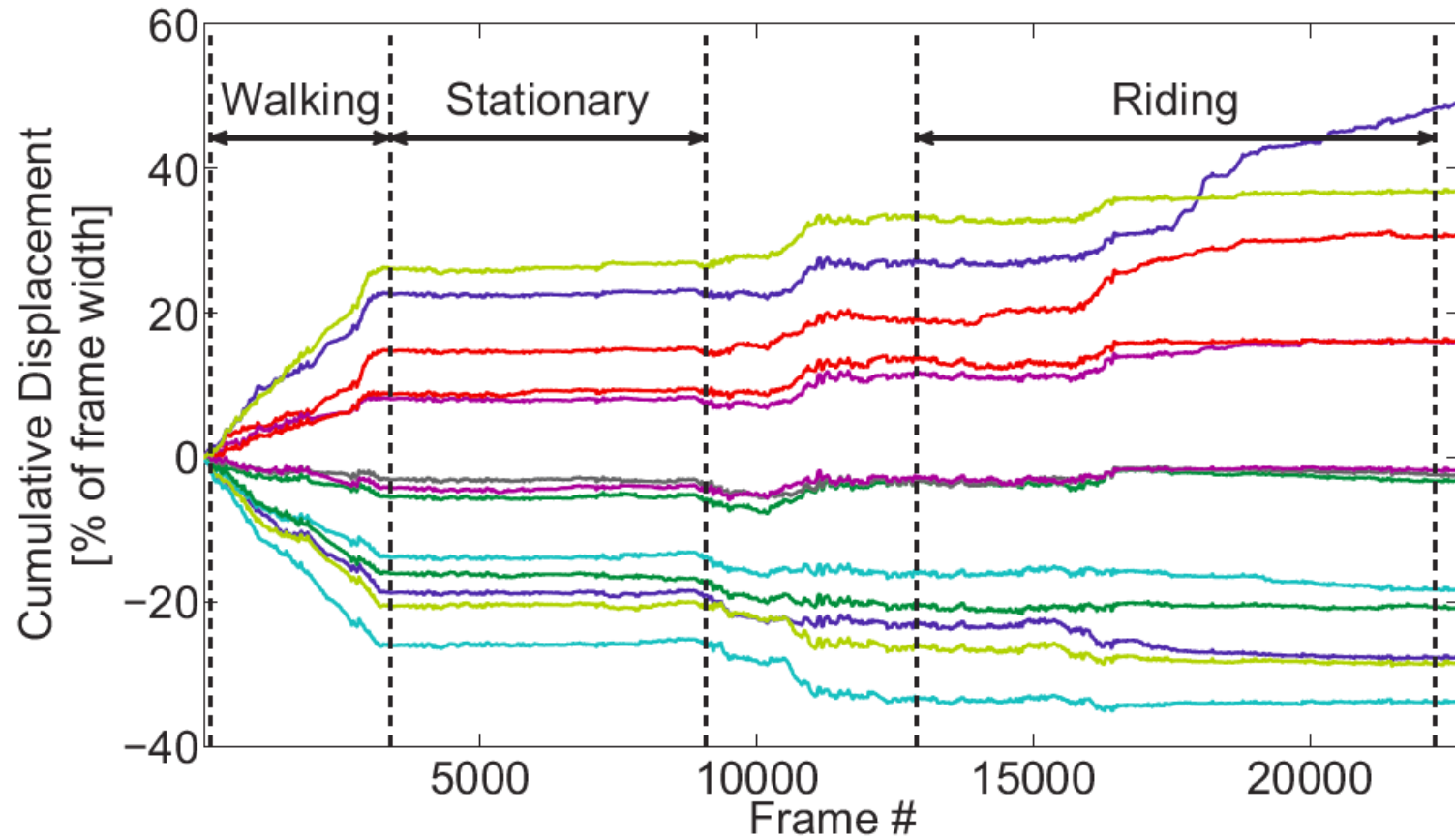
Cumulative displacement curves

- Divide Image into 10x5 cells and compute displacement of cells.
- Make it cumulative over time to cancel out head motions.

Properties of CD curves

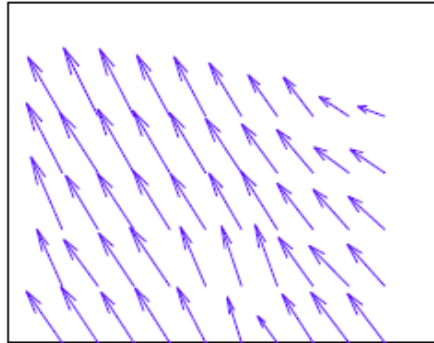


Properties of CD curves

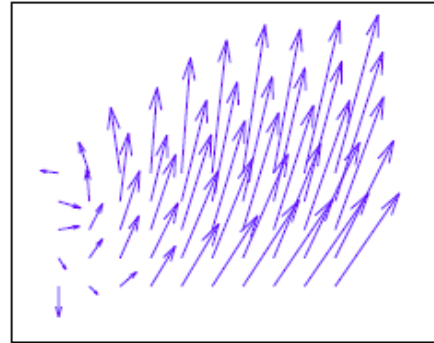


Properties of CD curves

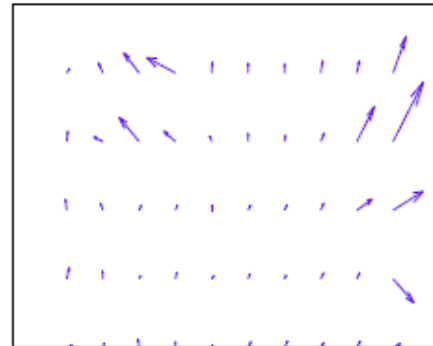
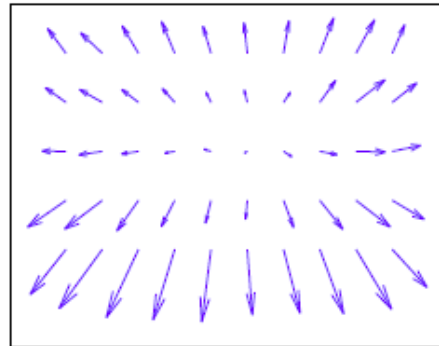
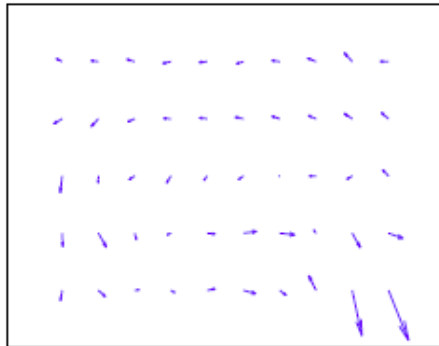
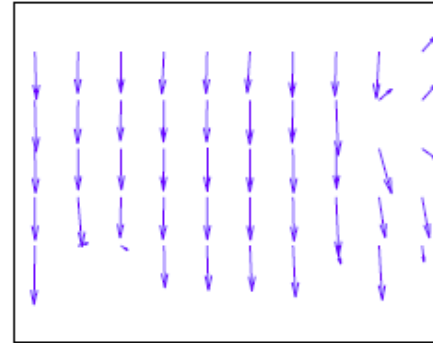
Sitting



Walking



Riding Bus



SVM features from CD curves.

- Radial Projection Response
- Motion Clusters
- FOE estimation

Gaze Fixation through CD curves

- Causes head motion to stop.
- This can be exploited to find the gaze fixation.

Experiments and Results

	<i>Walking</i>	<i>Car</i>	<i>Standing</i>	<i>Bus</i>	<i>Wheels</i>	<i>Sitting</i>	<i>Static</i>
Walking	83%	0%	6%	6%	4%	1%	0%
Car	1%	74%	3%	15%	0%	3%	4%
Standing	14%	2%	47%	4%	0%	31%	2%
Bus	3%	19%	27%	43%	0%	7%	1%
Wheels	9%	0%	0%	6%	86%	0%	0%
Sitting	3%	1%	22%	1%	0%	62%	10%
Static	0%	1%	1%	0%	0%	1%	97%

Table 2: Confusion matrix for the cascaded classifier tree. Rows are ground truth. Diagonal elements represents class accuracy, off diagonal elements give pairwise confusion.

Experiments and Results

Classifier	Accuracy			# Samples	
	Avg.	Class 1	Class 2	Class 1	Class 1
Box vs. Open	93%	94%	92%	176K	853K
Car vs. Bus	74%	73%	75%	121K	58K
Sitting vs. Standing	70%	72%	67%	499K	453K
Static vs. Moving	96%	98%	94%	25K	999K
Stationary vs. Transit	90%	86%	93%	992K	1053K
Walking vs. Wheels	93%	96%	91%	778K	126K

CD curves for other classes and tasks

- Might have very different results for chest mounted cameras.
- Authors have performed the same experiment with 3D CNNs.
- Activity recognition.