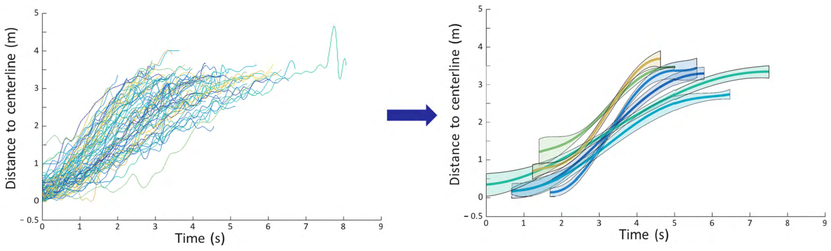
FUNCTION DEVELOPMENT

Ko-HAF
KOOPERATIVES HOCHAUTOMATISIERTES FAHREN

Motion Pattern Recognition for Lane Change Prediction

OBJECTIVE

- Forward-looking maneuver planning for safe & comfortable HAD driving
- HAD vehicle must be able to detect & anticipate human driving behavior
- Early lane change detection to recognize cut-in maneuvers

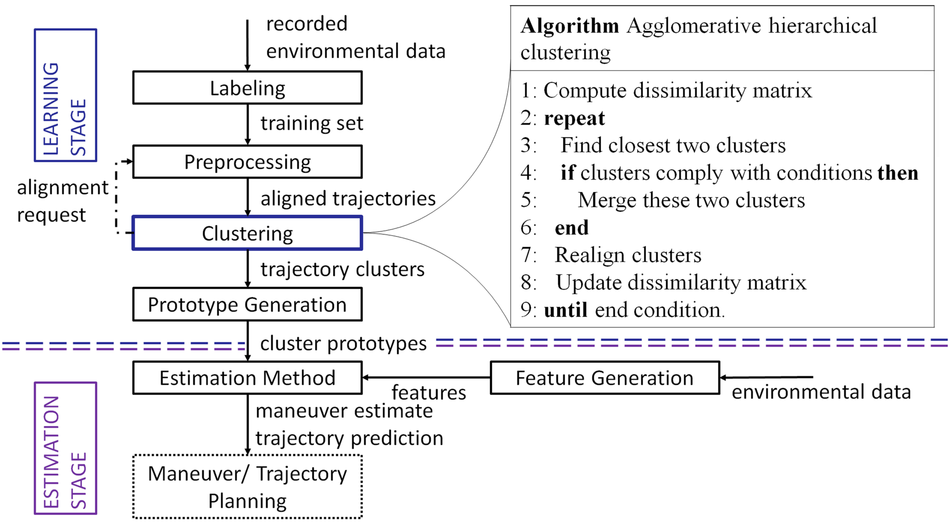


Recorded trajectories of highway lane changes to the left (LCL).

Prototype trajectories of LCL-maneuvers.

APPROACH

- Create a memory: Learn typical lane change courses from real highway data
- Prediction: Compare driving behavior of traffic participants with learned prototypes and utilize best match for maneuver classification and motion prediction



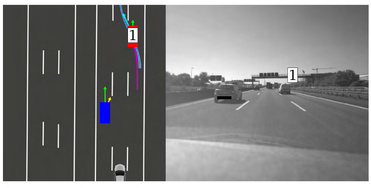
Algorithm Agglomerative hierarchical clustering

1: Compute dissimilarity matrix
2: **repeat**
3: Find closest two clusters
4: **if** clusters comply with conditions **then**
5: Merge these two clusters
6: **end**
7: Realign clusters
8: Update dissimilarity matrix
9: **until** end condition.

RESULTS

- Average prediction time ΔT of a lane change maneuver is 1.65 s before lane crossing

Approach		TPR	prc	F_1	ΔT (s)	Misclassification		
						LCL	LK	LCR
A	LCL	0.95	1.0	0.976	1.65	0.16	0.09	0.23
	LCR	0.87	0.97	0.916				



Example of an online-detected lane change maneuver of traffic object 1.

[1] Augustin, D., Hofmann, M. and Konigorski, U. (2018), Motion Pattern Recognition for Maneuver Detection and Trajectory Prediction on Highways

www.ko-haf.de

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