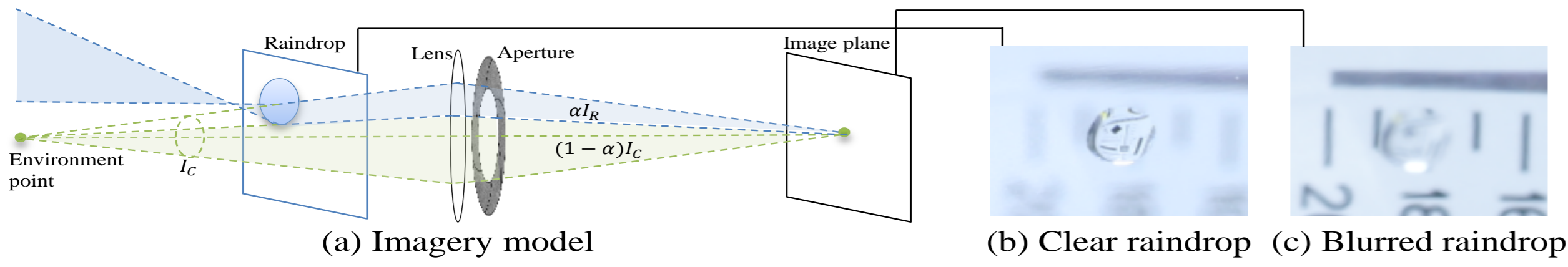


# Adherent Raindrops Detection and Removal from Long Range Trajectories

Shaodi You<sup>1</sup> Robby T. Tan<sup>2</sup> Rei Kawakami<sup>1</sup> Yasuhiro Mukaigawa<sup>3</sup> Katsushi Ikeuchi<sup>1</sup>

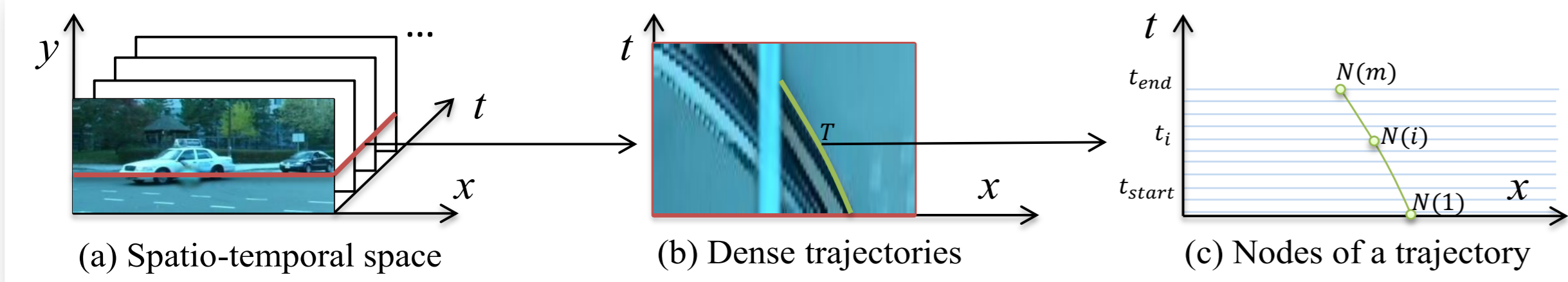


## Modeling of Blurred Raindrop

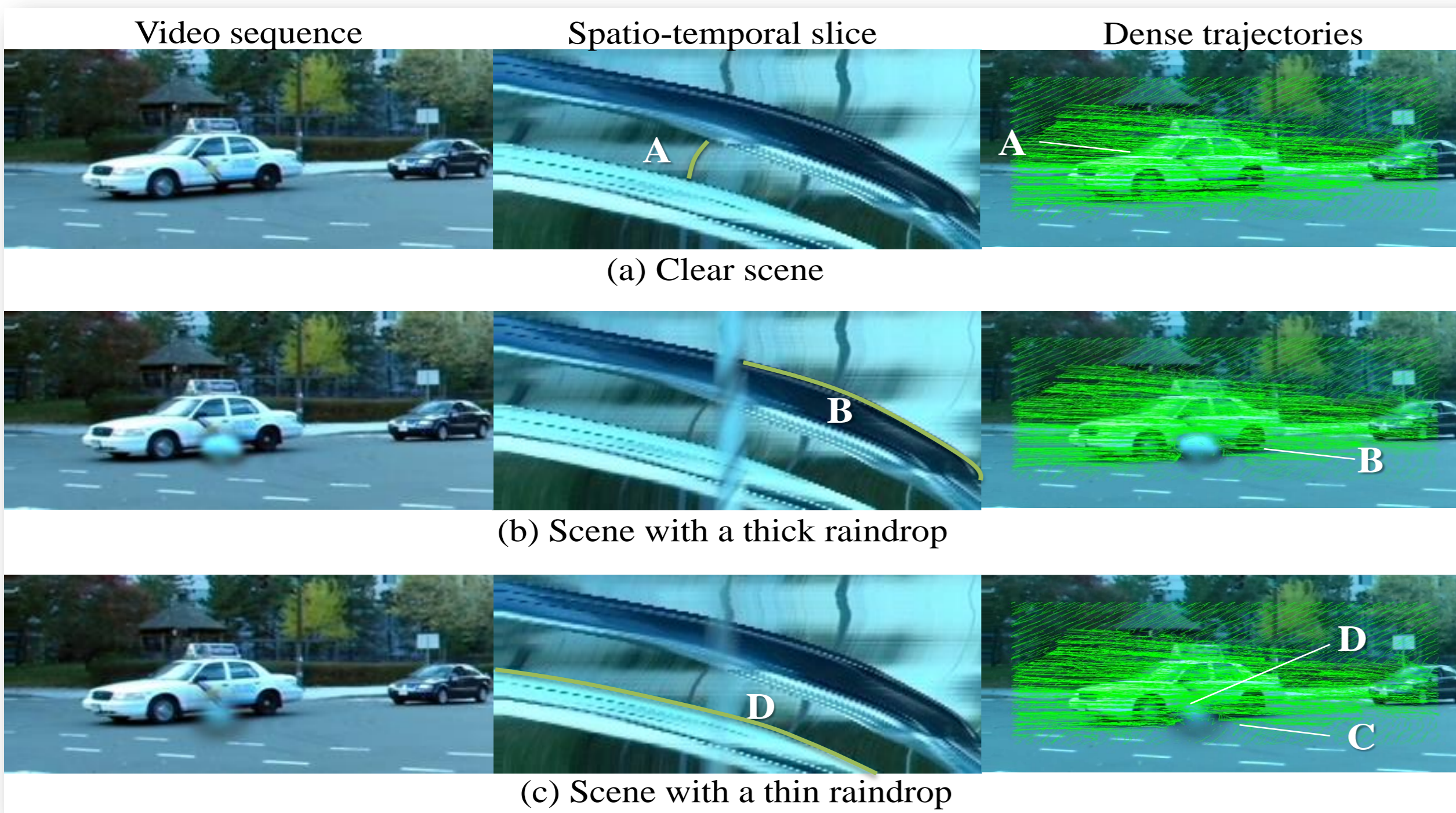


(a) Raindrop model. (b) Appearance of a clear raindrop. (c) Appearance of blurred raindrop observed on the image plane.

## Modeling in Spatio-temporal Space

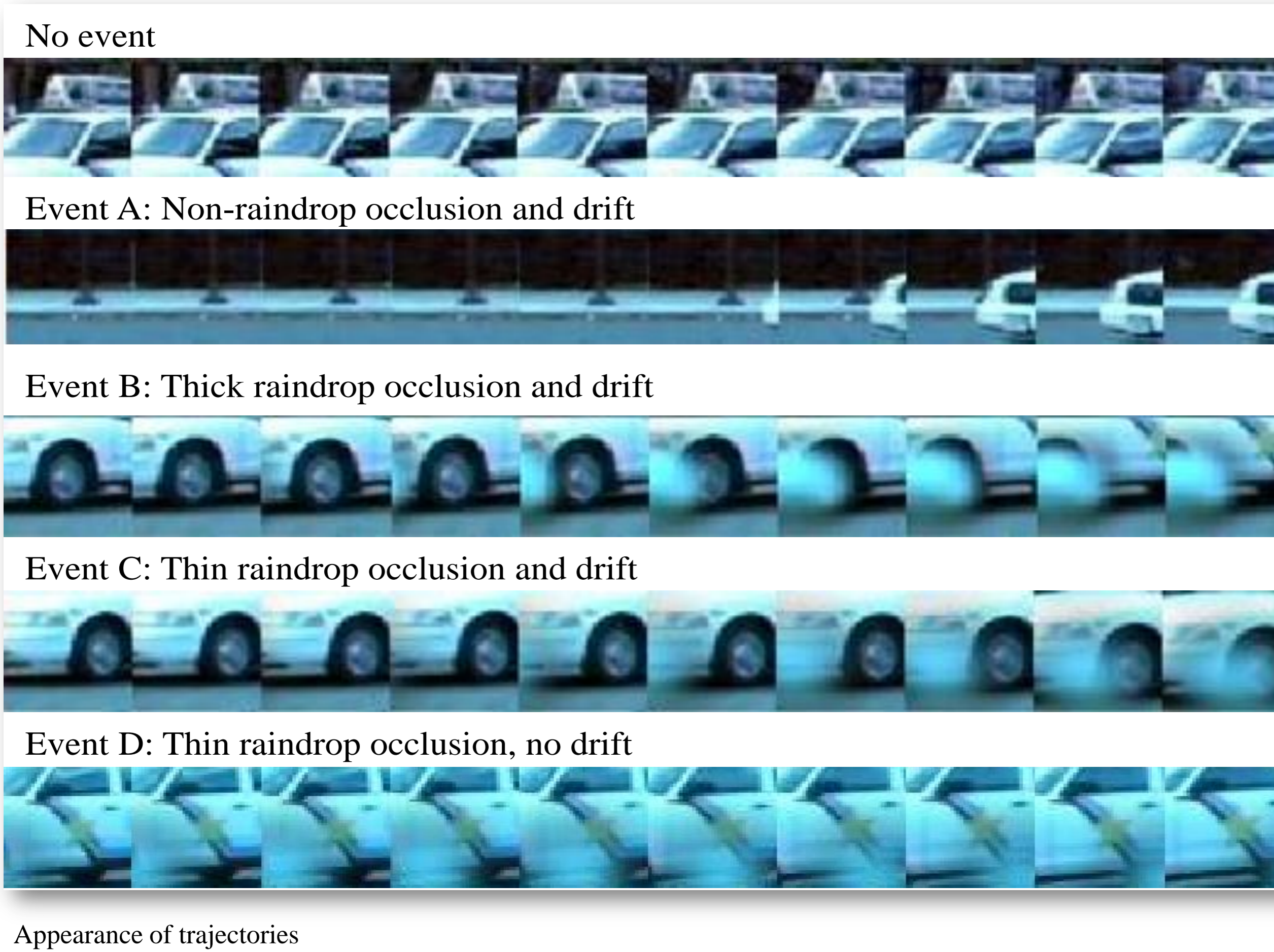


Spatio-temporal space and dense trajectories. (a) 3D Spatio-temporal space; (b) A 2D slice visualizes the dense trajectories. (c) A trajectory consists of a number of concatenated nodes.

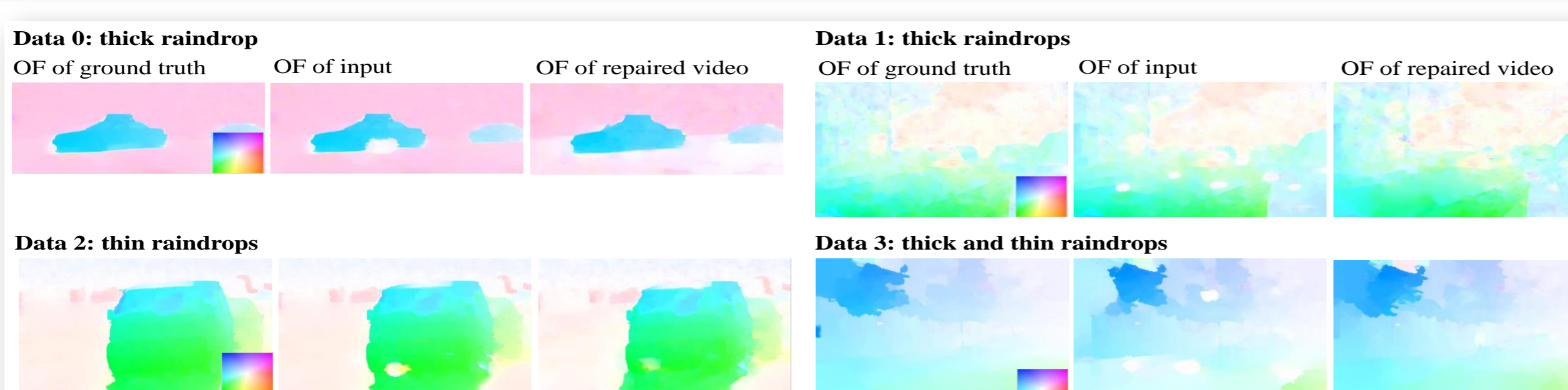


Video in rainy scenes and events on the trajectories. (a) A clear day scene. (b) A scene with a thick raindrop. (c) A scene with a thin raindrop. The clear scene data is from [9] Four trajectory events are labeled as, A: Occluded by a solid non-raindrop object and drifted. B: Occluded by a thick raindrop and drifted. C: Occluded by a thin raindrop and drifted. D: Occluded by a thin raindrop but not drifted.

## Appearance Analysis

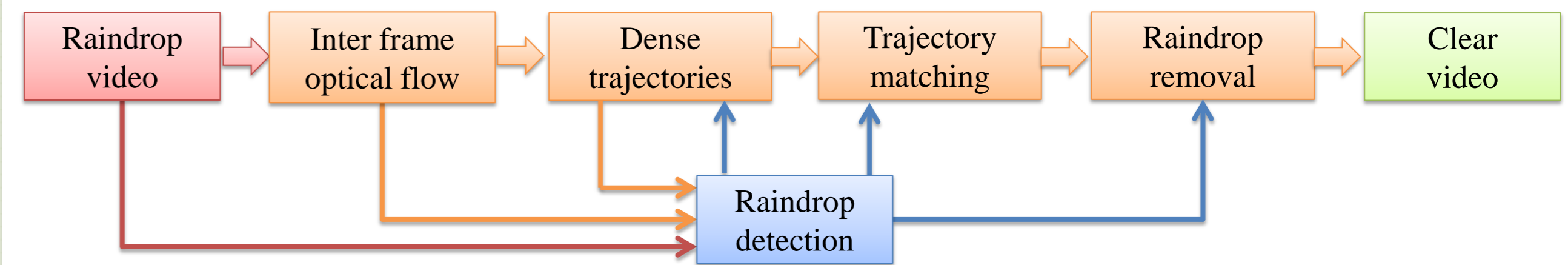


## Motion Filed Completion

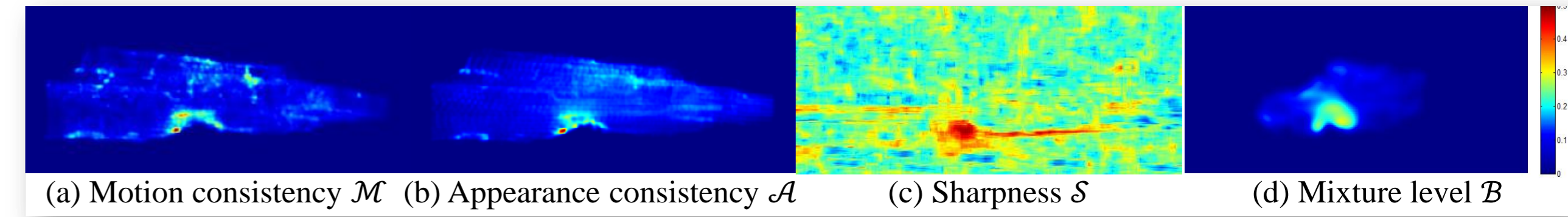


Comparison on motion field estimation before and after raindrop removal.

## Methodology

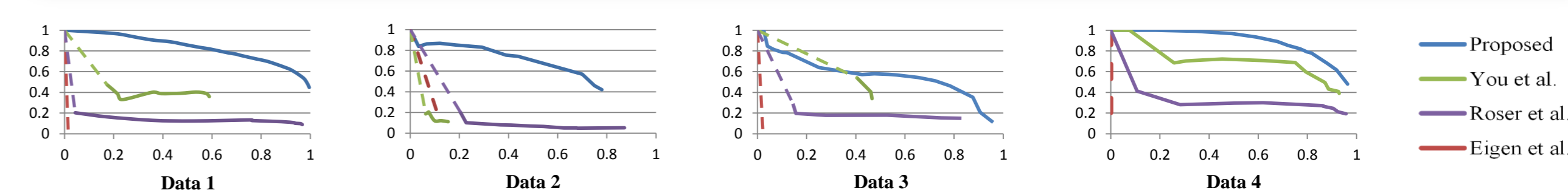
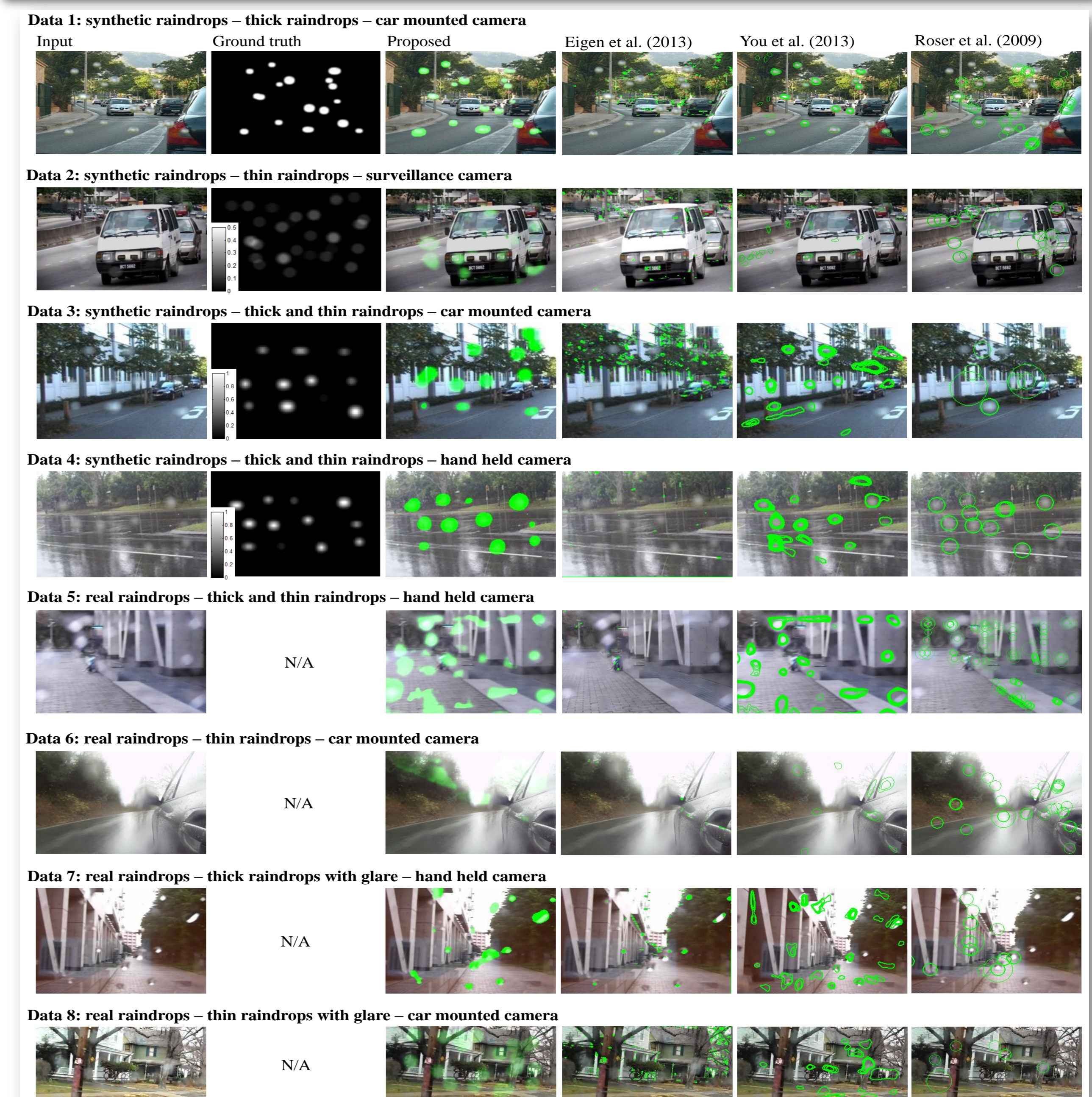


The pipeline of our method.



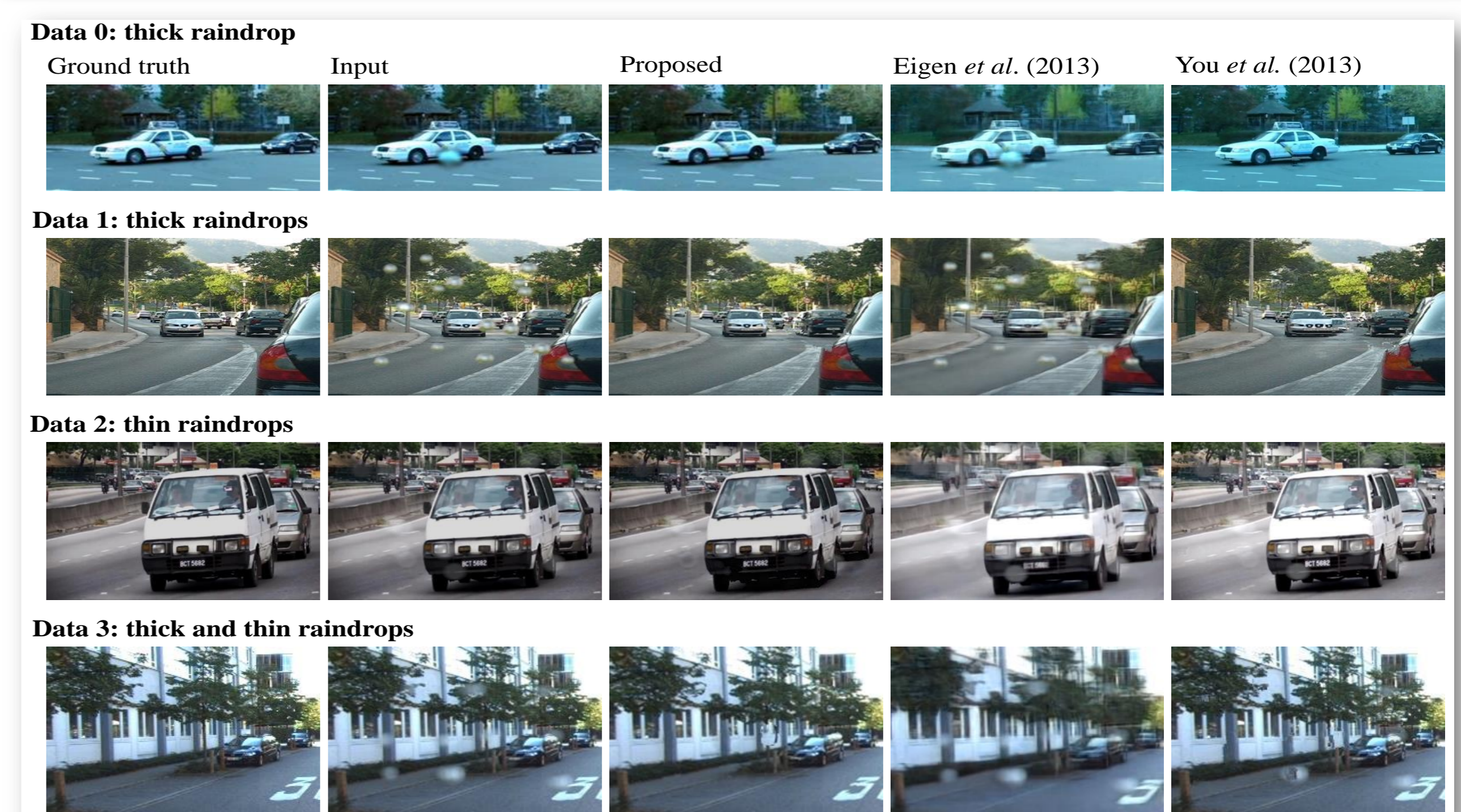
Raindrop features and labeling using the features. (a) Accumulated motion consistency MC. (b) Accumulated appearance consistency AC. (c) Accumulated sharpness SH. (d) Mixture level estimation A. (e) Binary labeling of the raindrop area. (f) Multiple labeling of the mixture level.

## Detection



Precision-recall curve on detection for the methods. The detection accuracy is evaluated at a pixel level. Dash lines indicates the range where no data is available.

## Removal



The raindrop removal results.

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