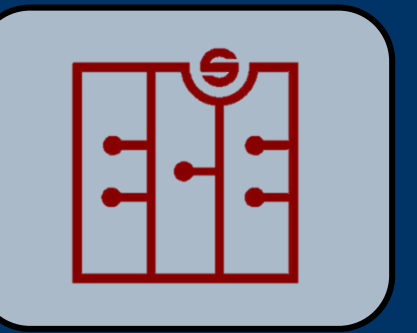




ROBUST LANE MARKING DETECTION USING BOUNDARY-BASED INVERSE PERSPECTIVE MAPPING



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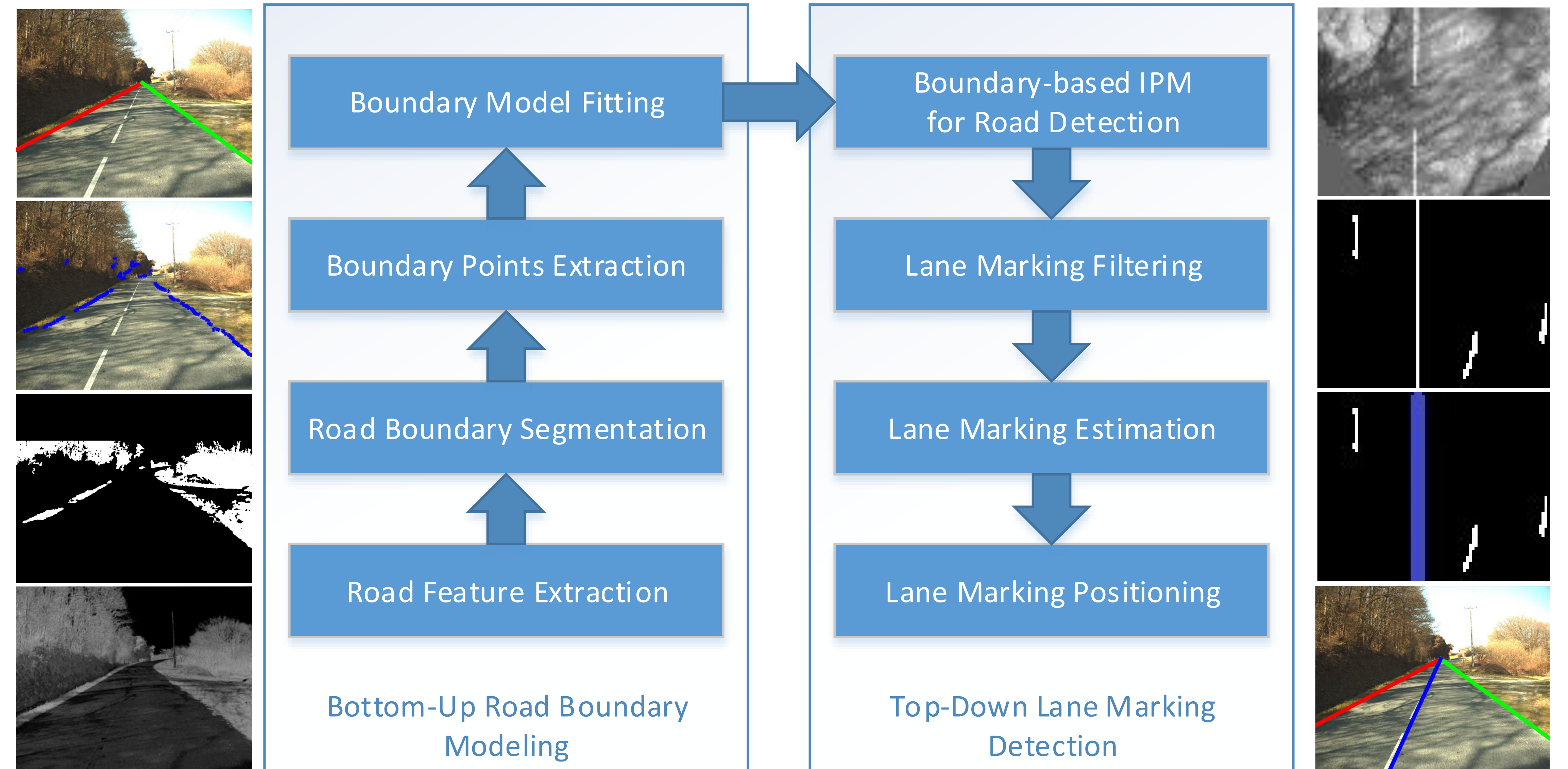
Abstract

Road detection, which brings a visual perceptible ability to vehicles, is essential to build driver assistance systems. To help detect lane markings in challenging scenarios, one-time calibration of inverse perspective mapping (IPM) parameters is employed to build a bird's eye view of the road image. We propose an automatic IPM method based on road boundaries called **BIRD** (Boundary-based IPM for Road Detection), avoiding common problems of fixed IPM. Furthermore, integrating top-down and bottom-up attention, an illumination-robust lane marking detection approach using BIRD is proposed.

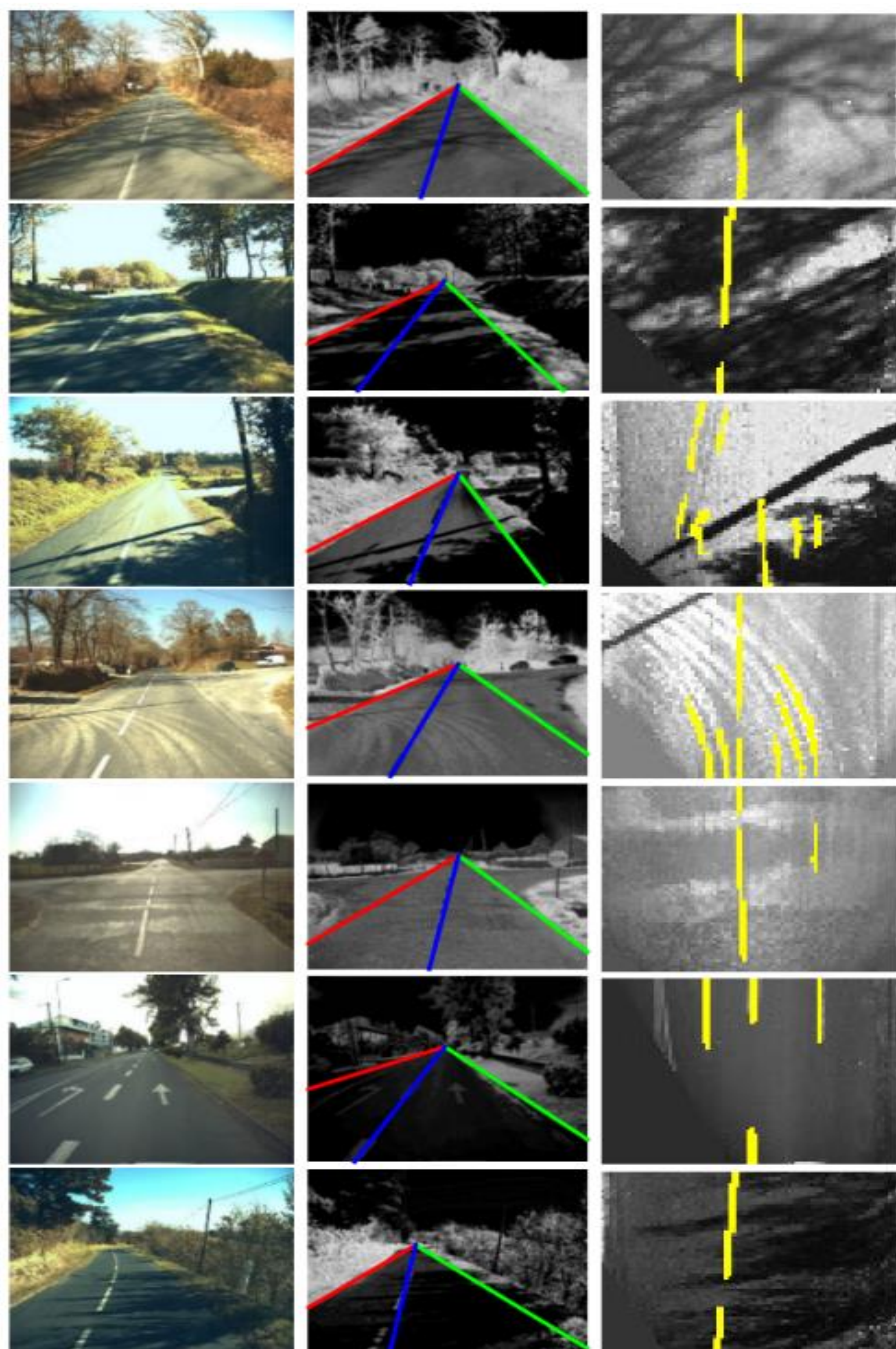
Problem

Lane markings are main clues for structured road following. Structured road detection task is generally defined as **locating lane markings from road images captured by an on-board camera**.
Main challenge: lane marking detection in shadow cases

Our Approach



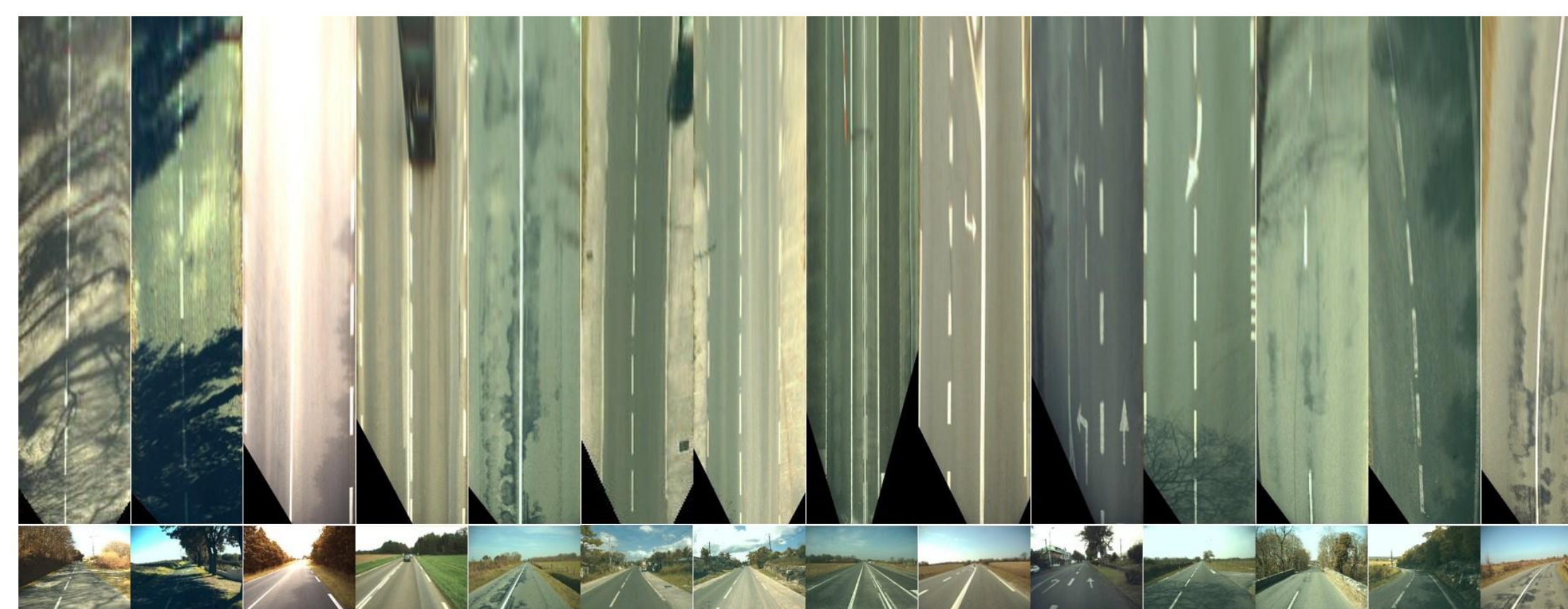
Experimental Results



Contributions

BIRD (Boundary-based IPM for Road Detection)

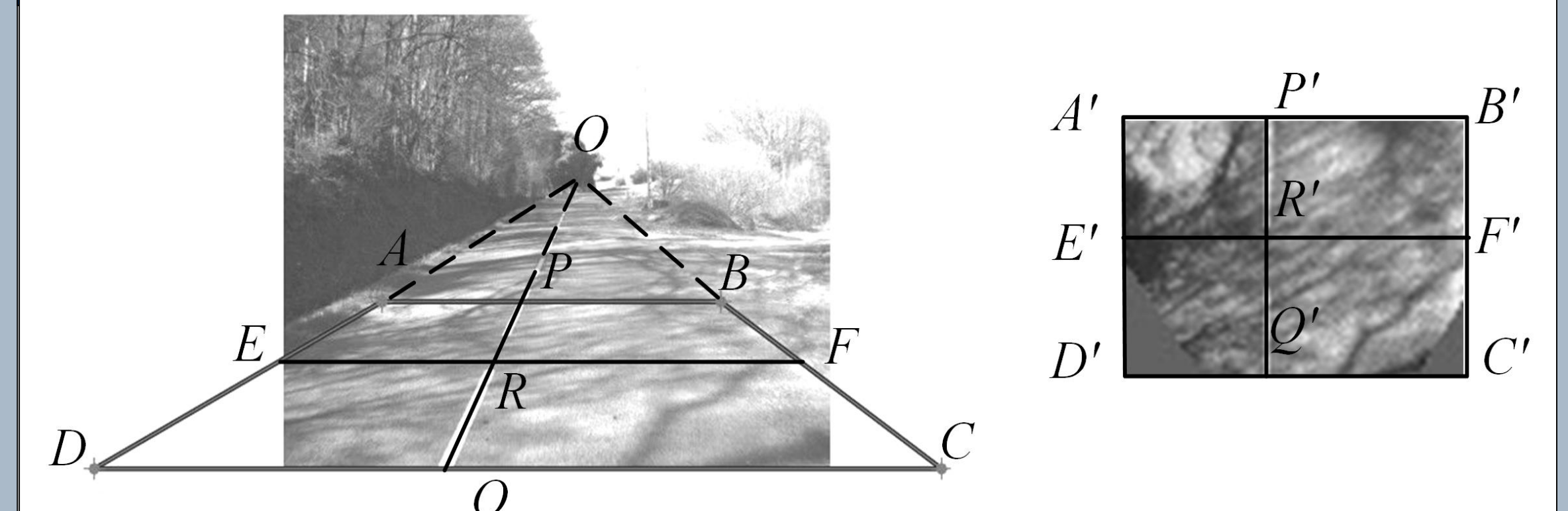
- ◆ **Automatic** - does not need camera calibration
- ◆ **Adaptive** - free from problems caused by fixed parameters.
- ◆ **Applied** - provides a convenience for feature extraction since the lane marking pixels are aligned to column in the obtained top view image.



A novel lane marking detection approach

- ◆ Provides a BIRD-based framework for challenging scenarios.
- ◆ Introduced road boundary detection techniques from unstructured road detection researches to help detect lane markings of structured road.

Main Idea



General methods do lane marking feature extraction for each row independently, so they do not work well in the road scene with shadow interference. Our approach maps road image to the bird's-eye view image, where we can use multi-row information to provide a more robust lane marking detection.

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Open Source

- ◆ Available at Github → github.com/baidut/OpenVehicleVision
- ◆ Released under MIT License

