PROTOTYPE OF VISION-BASED DRIVER ASSISTANT

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Developed prototype is able to **detect position of road lanes** from camera input to prevent accidents due to **microsleep** or **inattention**. It can run on **mobile device** in **real-time** and issues visual and audatory warning when the car approaches the **lane boundary**.

- **90%** of road accidents are caused by a **human mistake**

- Driver assistant watches the road constantly and **acts as a safe guard** for situations when driver is not 100% focused

- **Warning is shown** if the driver drifts out of the lane

- Phone is mounted **near the windscreen** for the best performance

- Similar safety features are included only in expensive cars. Assistant can be used by **anybody with a smartphone**

- Assitant understands the **geometry of the road** and provides solid framework for further functionality (e.g. front collision detection)
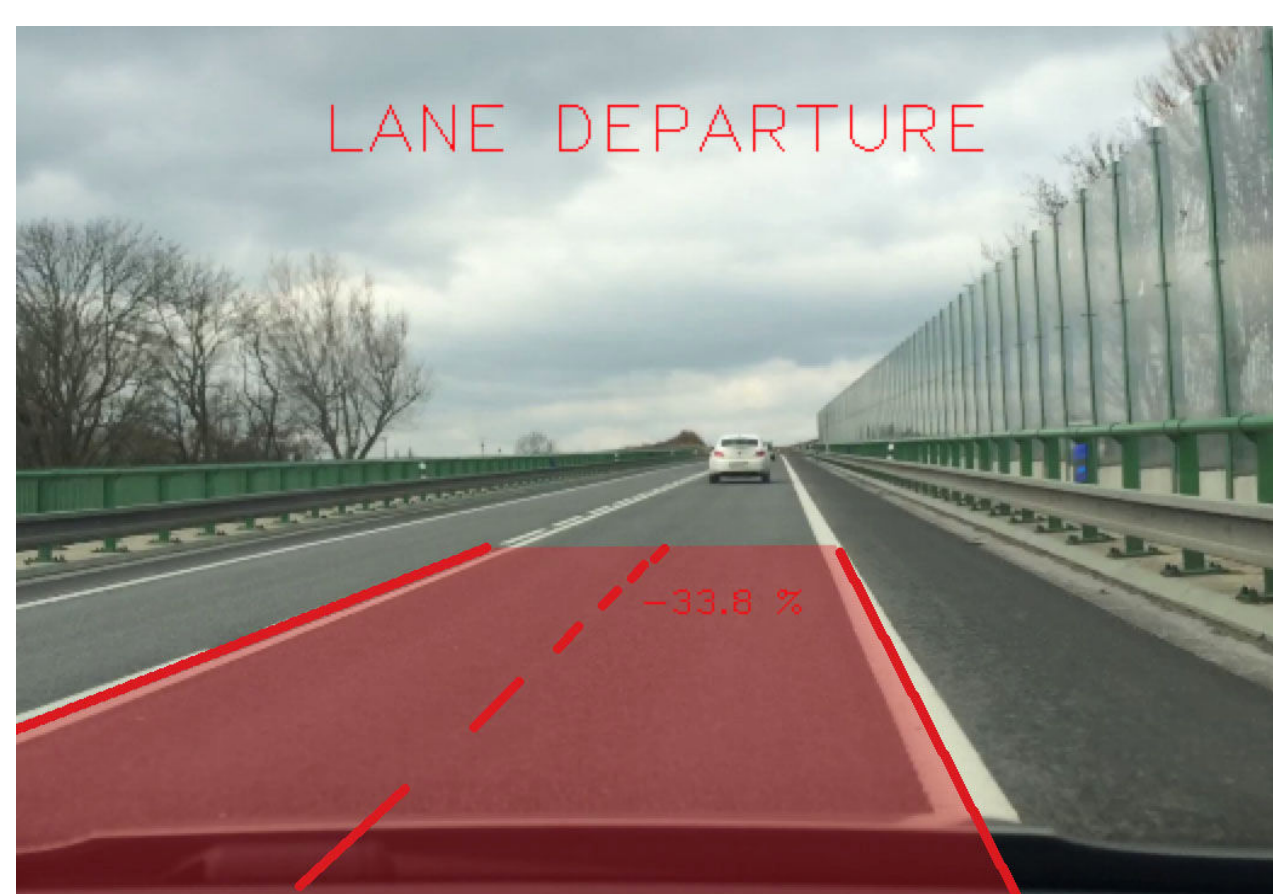
See the video on
http://bit.do/tkohout
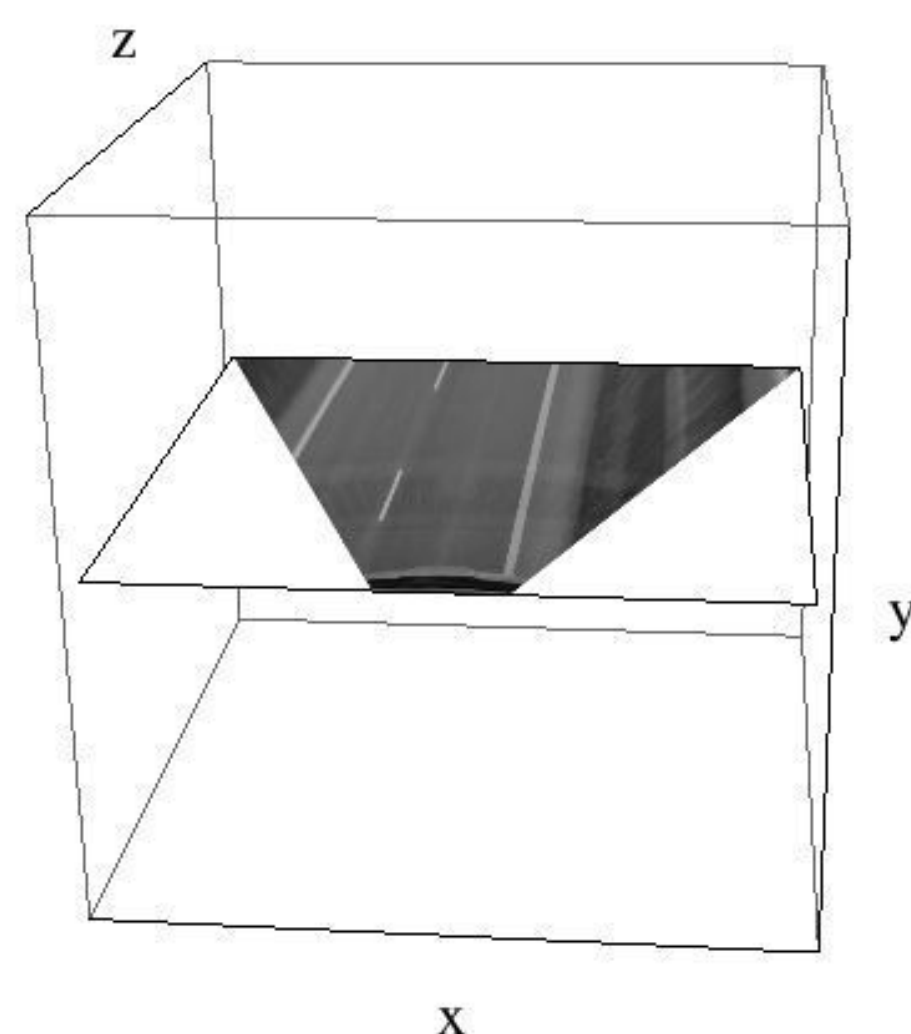
ROAD LANE RECOGNITION ALGORITHM

FEATURE EXTRACTION

Input is converted to a gray scale image and **lane markings** are highlighted using the **Marking filter**. **Hough Transform** is then used to recognize straight lines in the image.

MODEL FITTING

Cross-correlation matching is used to find a **marking center** for every detected line. Left and right markings are then combined to determine position of the **current lane.**

TIME INTEGRATION

To correctly detect **dashed markings**, lane position have to be tracked over time. **Kalman filter** is used to smoothen the result and even **predict** the future lane position.

IMAGE TO WORLD

Position of the lane in the image is converted from **2D to 3D** space using **pinhole camera model** and **inverse perspective projection**. This allows to counter the effect of the perspective distortion.

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