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Introduction to Straight Lane Finding

A Gentle CV Introduction for Self-Driving Car

Co-Instructor , Guest Lecture Tonight

Vivek Yadav

Technical co-founder of vector.ai, assistant professor in Mechanical Engineering and Neurology, with research interest in control, machine learning/AI. Lifelong learner with glassblowing problem.

https://medium.com/@vivek.yadav

What We Have Learned So Far ?

1. Color Selection
2. Edge Detection
3. Filter and Transformation
4. Camera Calibration
5. Distort and undistort

The Goal of Lane Finding Project

Original image

Lanes and road identified

Objective is to compute and draw lanes back on the original image

Perspective Transform

6 Cameras to do
Perspective Transform

Perspective Transform== Bird's Eye View

The bird sees the object smaller than the real world. For an example lane can be zoomed into parallel perspective

Application of Perspective Transform

Raw Camera Pictures

Full Bird's Eye View

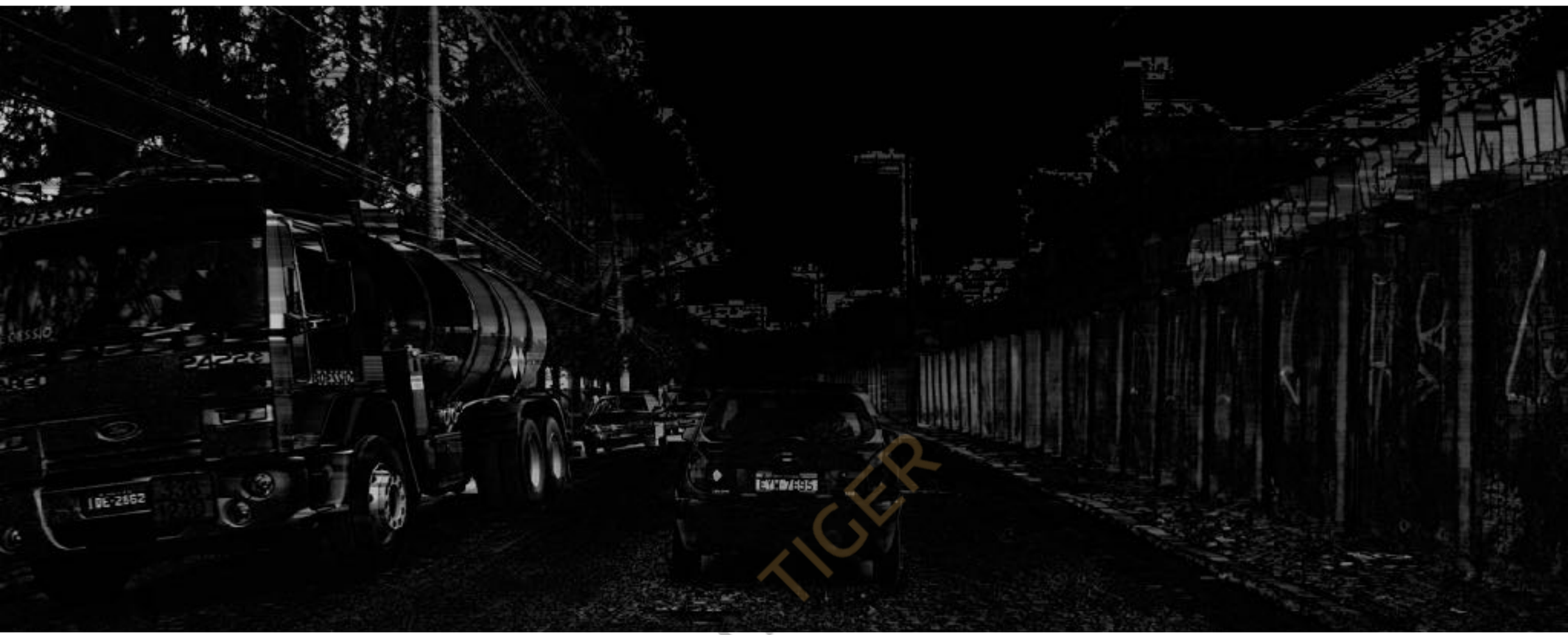
Quick Quiz: So if you combine this with ImageNet, what kind of problem can be solved using this method ?

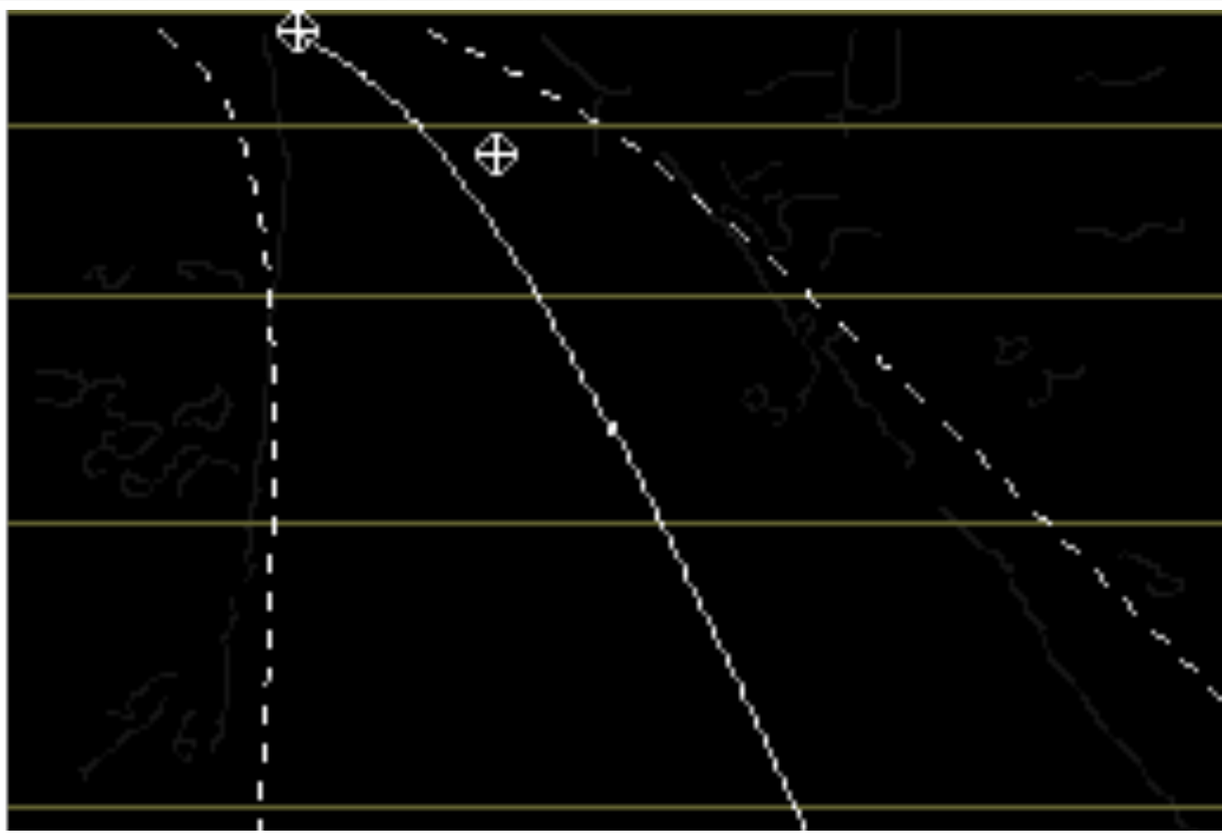
A. Mapping B. Localization C. Lane Detection

Gradient Threshold

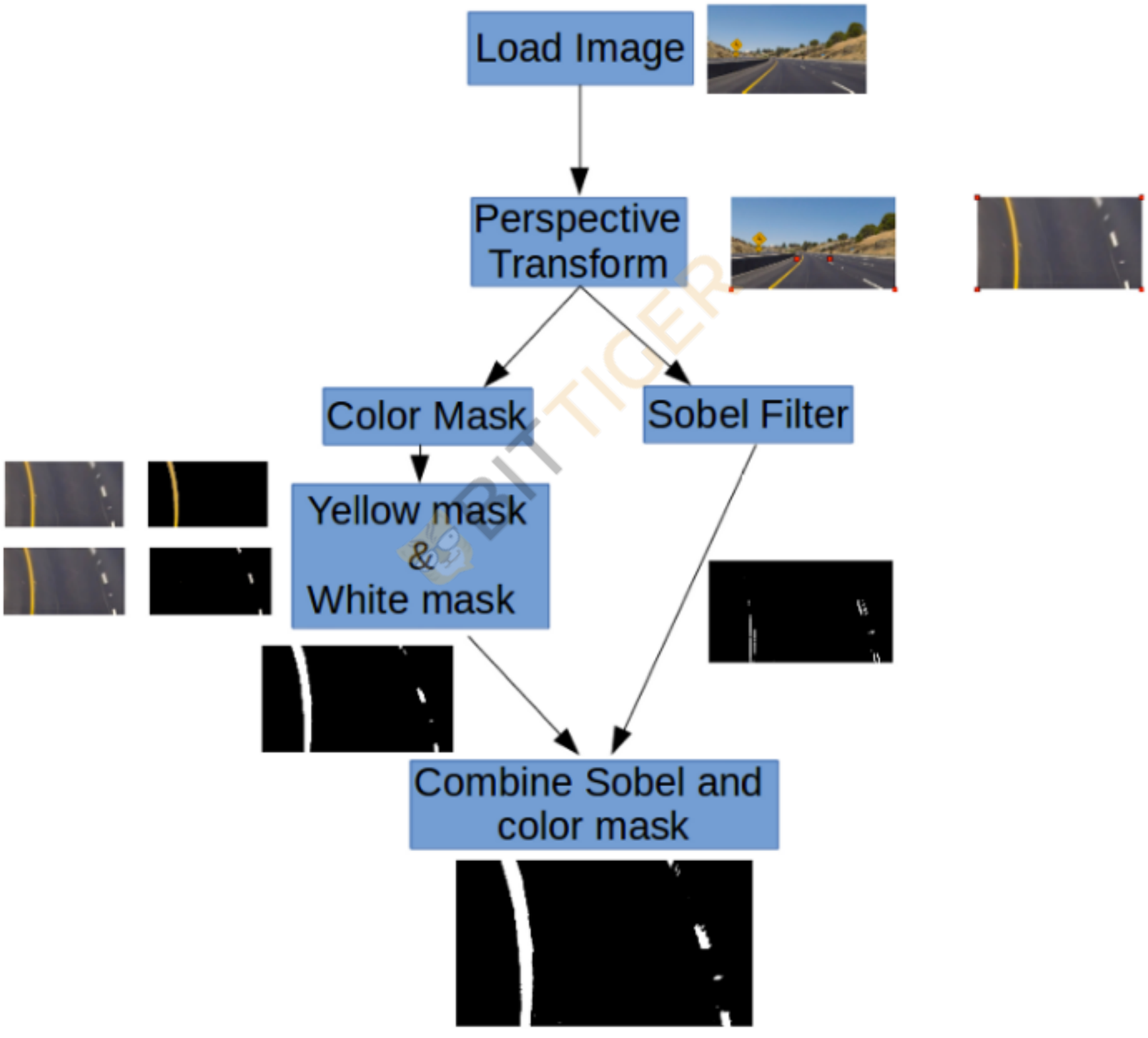
Still deal with Edges which we end up with **color masking** and **transformation**

So the best way to do this, like we discussed last week. Utilize the **Sobel Operator**

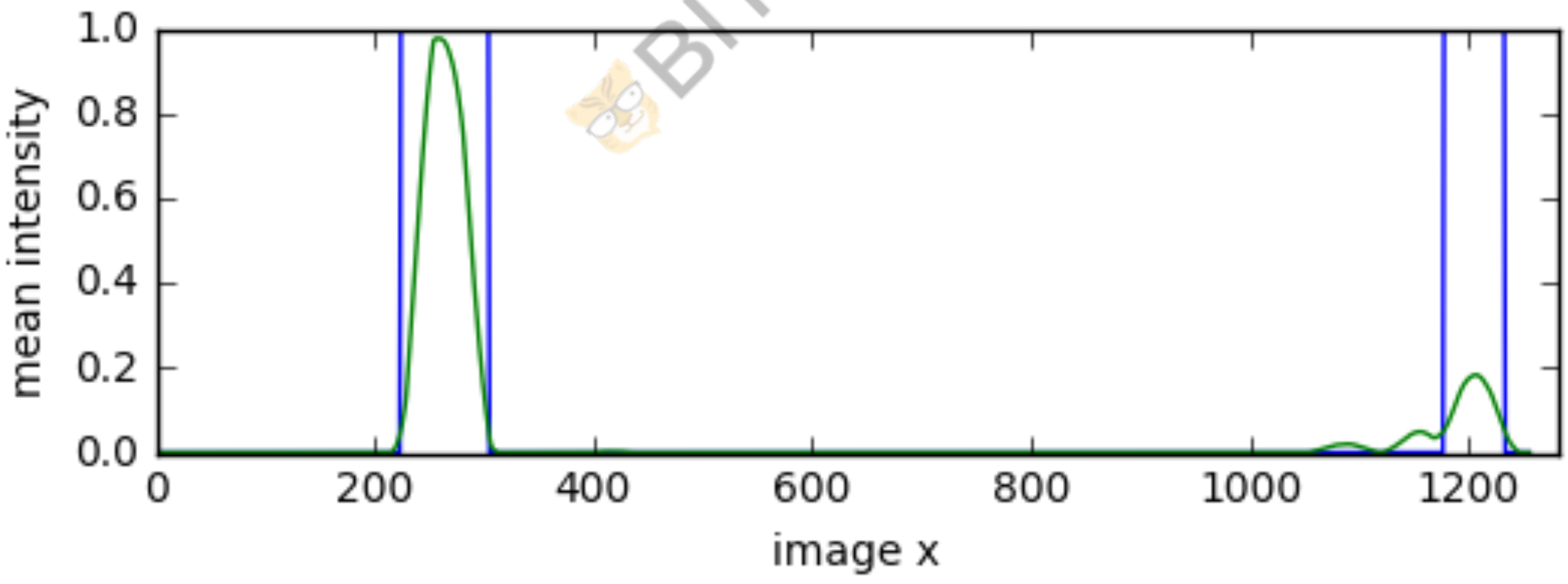




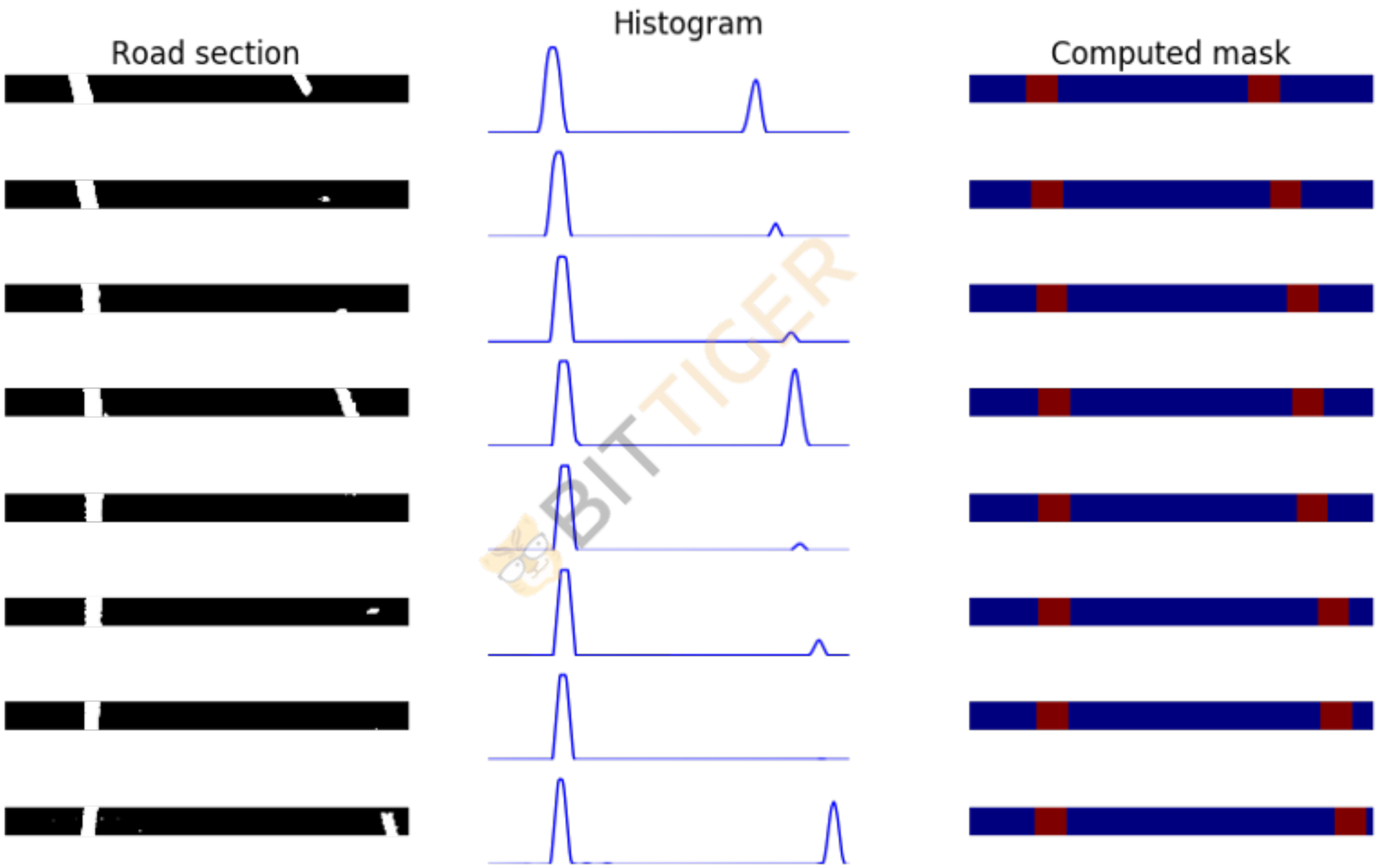
Let’s take closer look



Compute lanes for the first frame



Histogram of intensity computed along the road



Sliding Window and Polynomial Fit

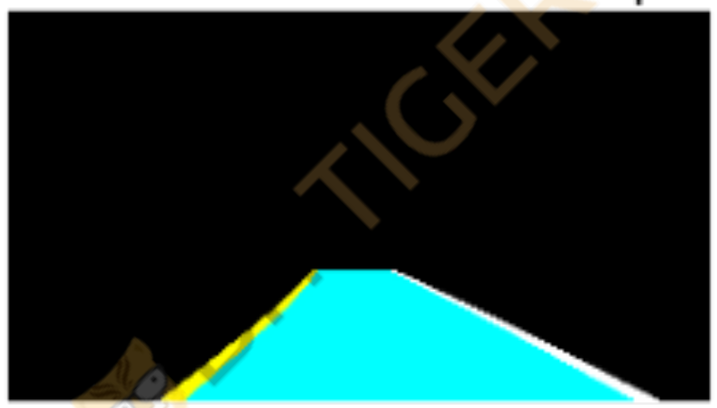
Sliding window for computing location of lanes in the next frame

Polynomial fit to left and right lanes

Draw back the undistorted image

Color warp

Transformed color warp



Color warp on original image

Draw back the undistorted image

Color warp

Transformed color warp

Color warp on original image

Let’s Prototype !