

# Traffic Light Recognition With Image Processing

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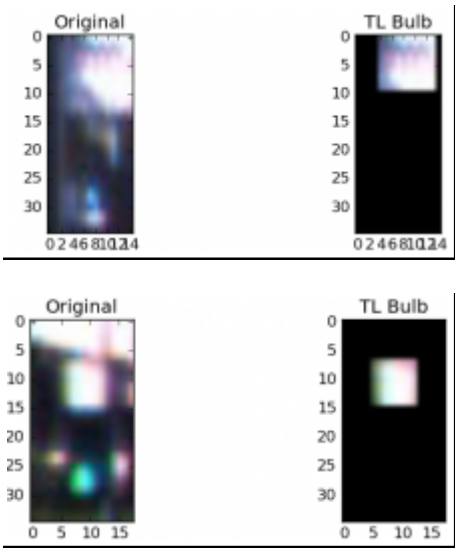
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In the last week, I try to recognize traffic light by traffitional image processing method. Only the basic Green, Red, Yellow lights are considered here.

## Bulb Localization

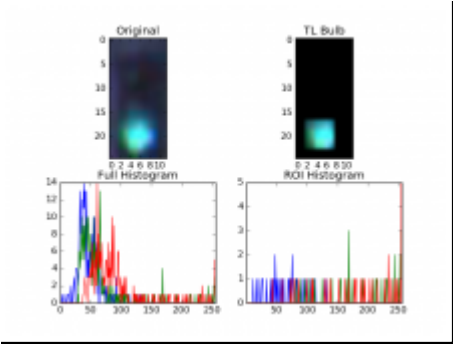
It is easy for human to recognize the where the bulb is. For computer, a localization method is required. The bulb would located by [Hough Circles detection method](#).

Most bulbs are located successfully (see section [ROI Analysis](#) ), while there are some failure cases as shown below.



## ROI Analysis

We study the RGB histogram in the whole TL box and inside the bulb area. There is a big difference between the whole area and the ROI (region of interest), so some color space method would be used here.



We also compute the means on three color channels as the main features, and try the visualization of TLs clustering based these features. It seems that we would try simple linear classification tools to classfy traffic lights by these features.



## Classification

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A simple Softmax classification model is tried first. Input is three RGB mean values of the bulb area, then flow through a 3x10 FC layer, a Relu layer, a 10x3 FC layer and a softmax layer.

With this simple, the recognition accuracy on basic TLs is about 90%.



## Future Work

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### improve Accuracy

TL bulb localization is not perfect right now.

### Complicate TLs detection

Left turn light, flashing yellow light and so on.