

Traffic Signs Detection Program

Proposal

In the real world traffic system, to make sure safety and reliability of whole traffic network, all vehicles inside it must obey local traffic rules, and in most cases, a common driver could learn these rules by reading the traffic signs, unfortunately, there could be thousands of traffic signs in a single route, so it could distract the driver and lead to some tragedy, especially when there's a complex road condition.

And in the final project of last semester, which is CS584 *Machine Learning*, we've talked about how to build a traffic signs detection and recognition program, and as our opinion, we could train our Neural Network with different samples, then let it recognize the input data, like figure 1 displays.



Figure 1

However, in last final project, we only emphasize “*How to recognize*”, actually, in the real world, our camera could only catch a large size picture, which may include one or several traffic signs, like figure 2 indicates.



Figure 2

So, in order to get the effective information, which hide in the raw images, it's necessary to design a program to identify those information, and then separate them. If everything goes well, we could get our output, like figure 3, after that, take it as input of recognition program, as we mentioned above. This procedure is “*How to detect*”.

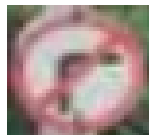


Figure 3

Till now, we know that the whole program is composed with detection and recognition programs, and instead of applying detection manually, like mostly in last final project, we'll design a program to achieve it.

As our consideration, we could use *shape match* algorithm, and surely, we may encounter several possible issues while deploy it, like

1. In the real world, mostly, the cameras that are mounted by vehicles could not take their pictures in front of signs, instead, they take pictures from left or right side of signs. So, it'll lead to shape change, for example, in figure 4, the speed limit signs are much more ellipses than regular circles. So here comes the issue: how to handle shape change? Due to keeping the program robust.



Figure 4

2. There's another issue in figure 4, sometimes, the effective information could be damaged in raw image, like the upper speed limit sign, only major parts of it has been captured by camera, we should consider how to detect such incomplete signs.

3. We've mentioned the 3rd issue in last final project report, in the section “*How to improve*”, we said that, in real world condition, multiple signs could exist in the same image or frame, and mostly, they are connected to each other, like two speed limit signs could show up in the same place to indicate different speed limit for trucks and other regular vehicles. Our program should be able to split them and identify them individually.

Relevant paper:

Real-time Traffic Sign Detection, Hassan Shojania, shojania@ieee.org