Computer Vision
FALL 2020
Problem Set #2

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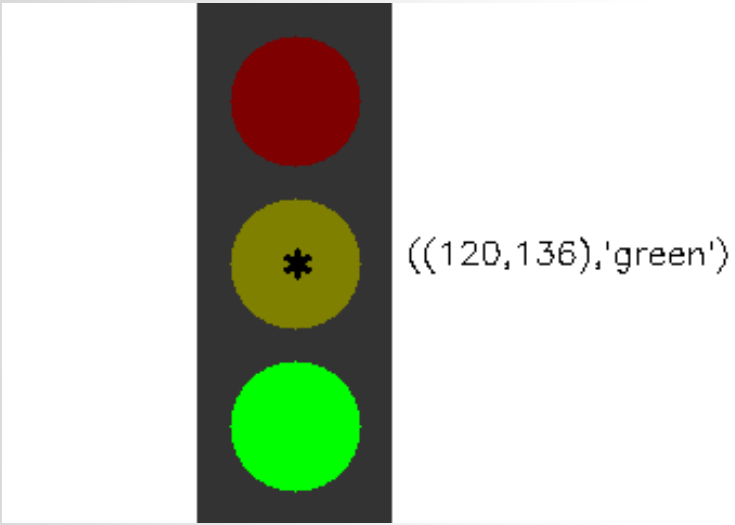
Traffic Light Detection

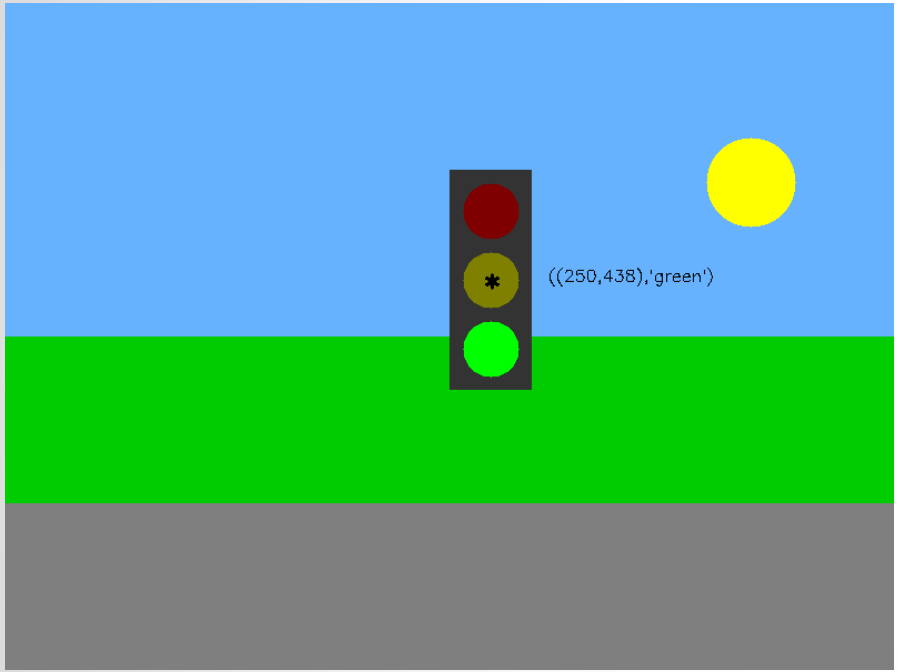


Coordinates and State:

- Coordinates: (120, 136)
- State: green

ps2-1-a-1.png

Traffic Light Detection

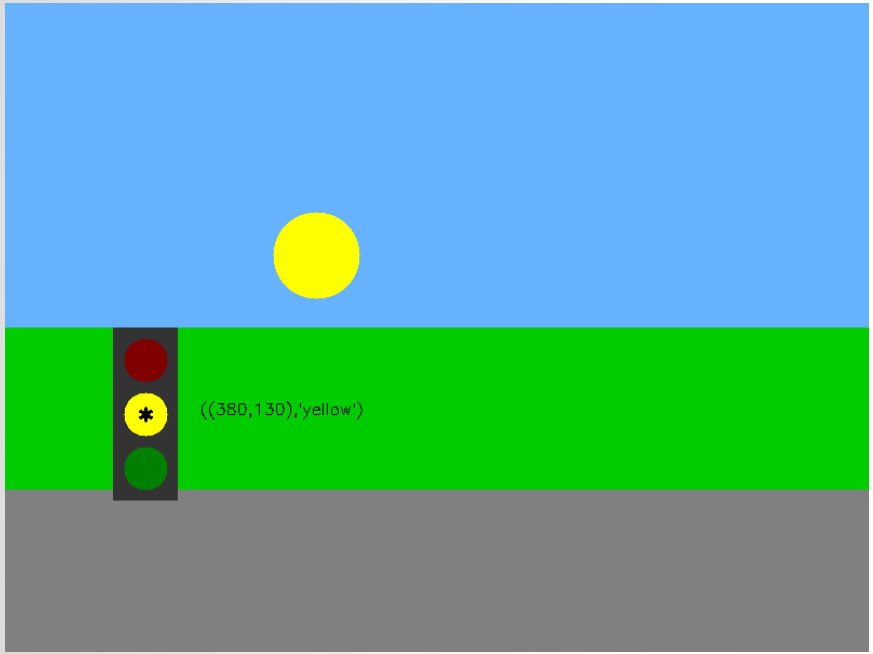


Coordinates and State:

- Coordinates: 250, 438
- State: green

ps2-1-a-2.png

Traffic Light Detection

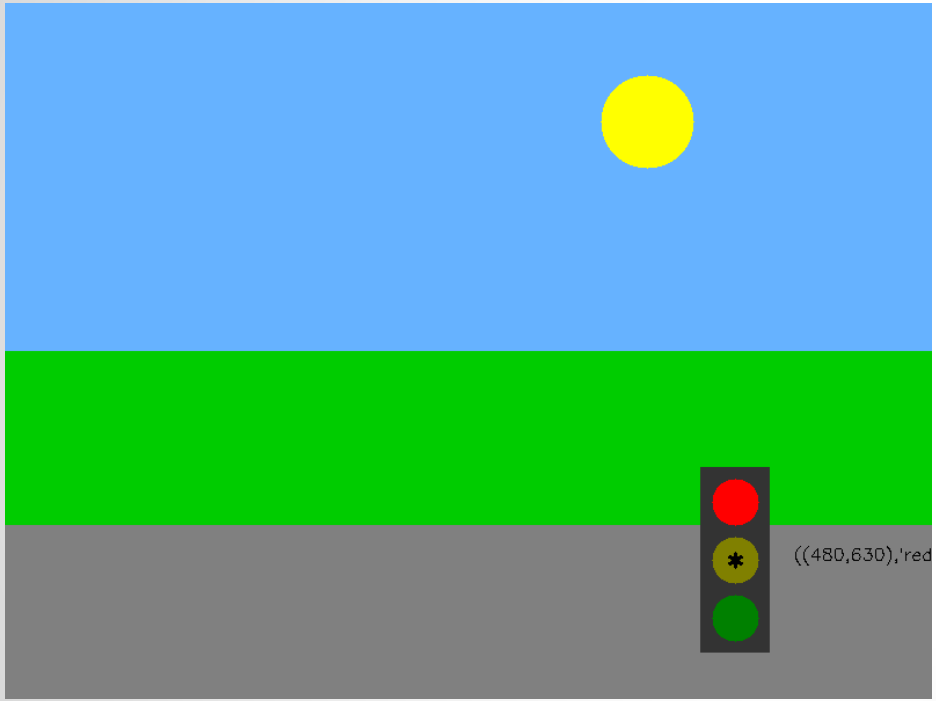


Coordinates and State:

- Coordinates: 380, 130
- State: yellow

ps2-1-a-3.png

Traffic Light Detection

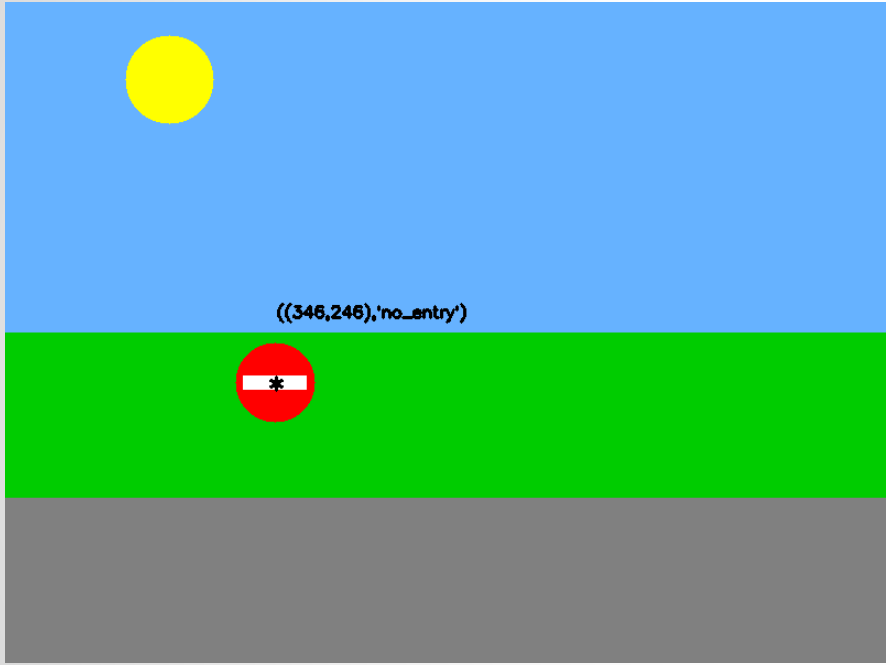


ps2-1-a-4.png

Coordinates and State:

- Coordinates: 480, 630
- State: red

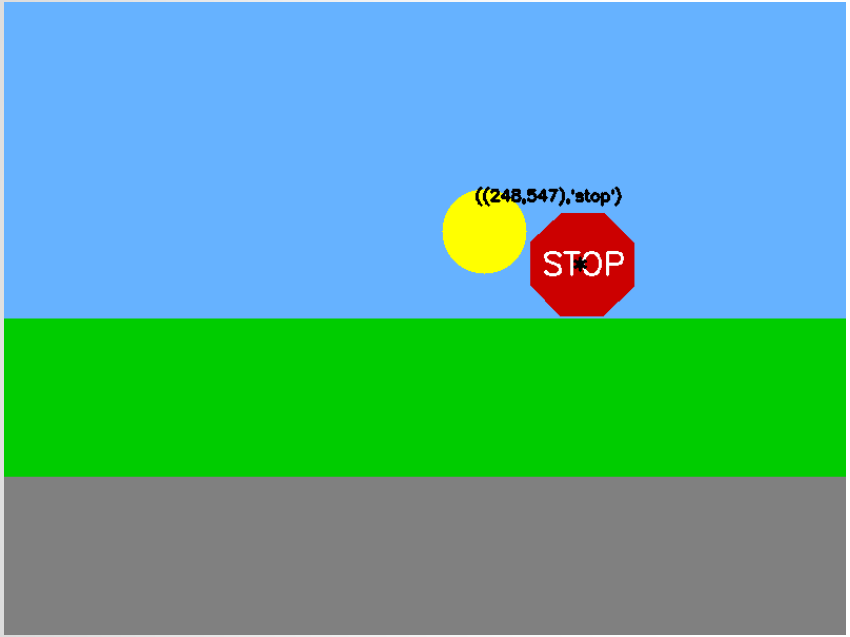
Traffic Sign Detection - Do Not Enter



Coordinates: 346, 246

ps2-2-a-1.png

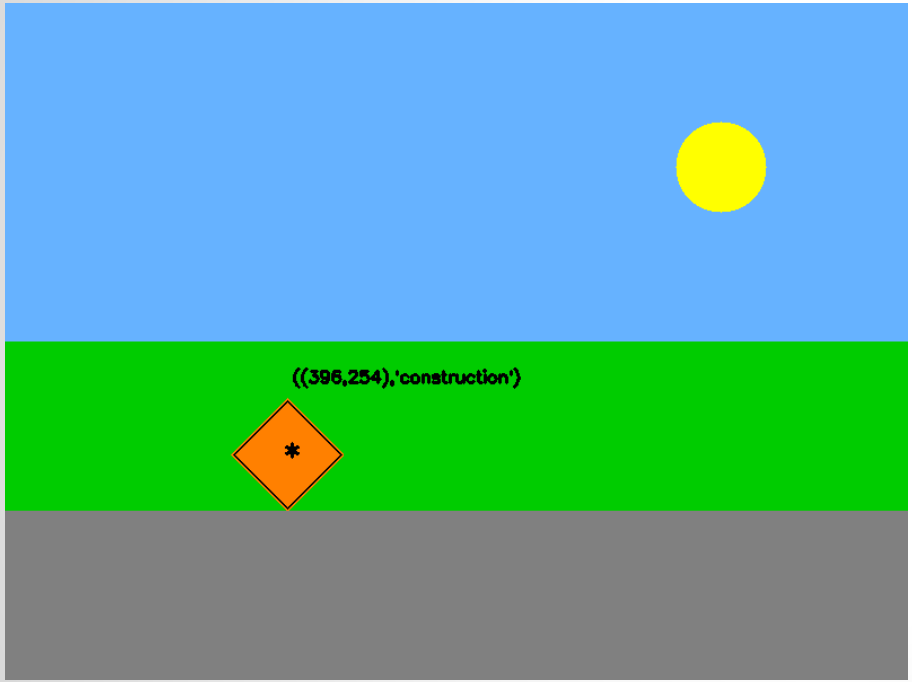
Traffic Sign Detection - Stop



Coordinates: 248, 547

ps2-2-a-2.png

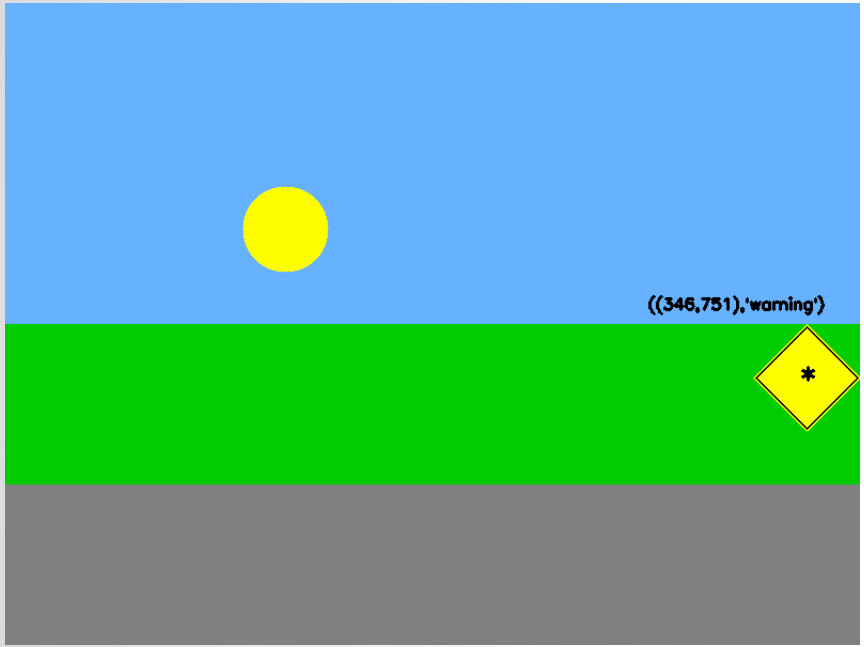
Traffic Sign Detection - Construction



ps2-2-a-3.png

Coordinates: 396, 254

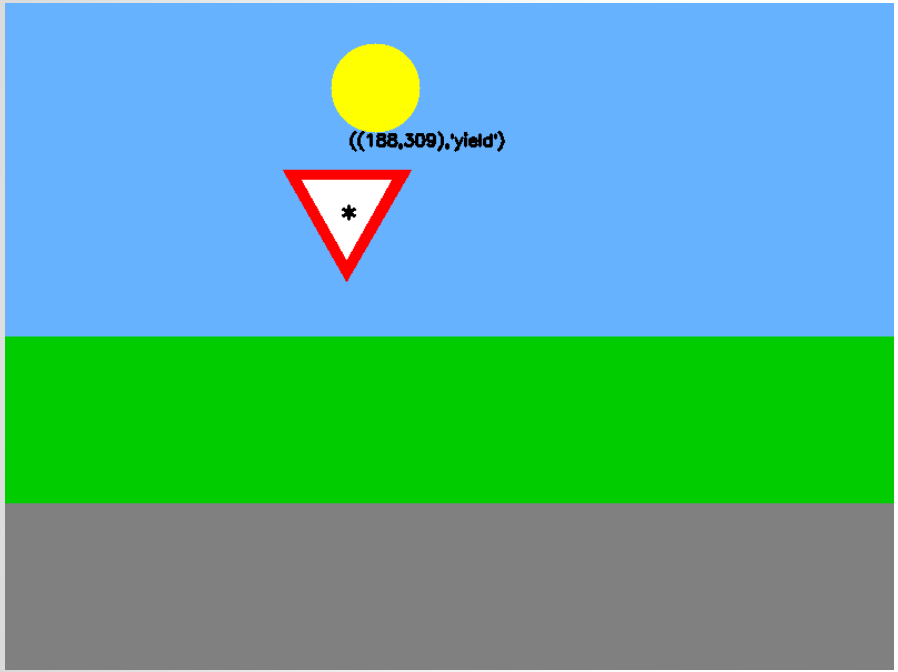
Traffic Sign Detection - Warning



Coordinates: 346, 751

ps2-2-a-4.png

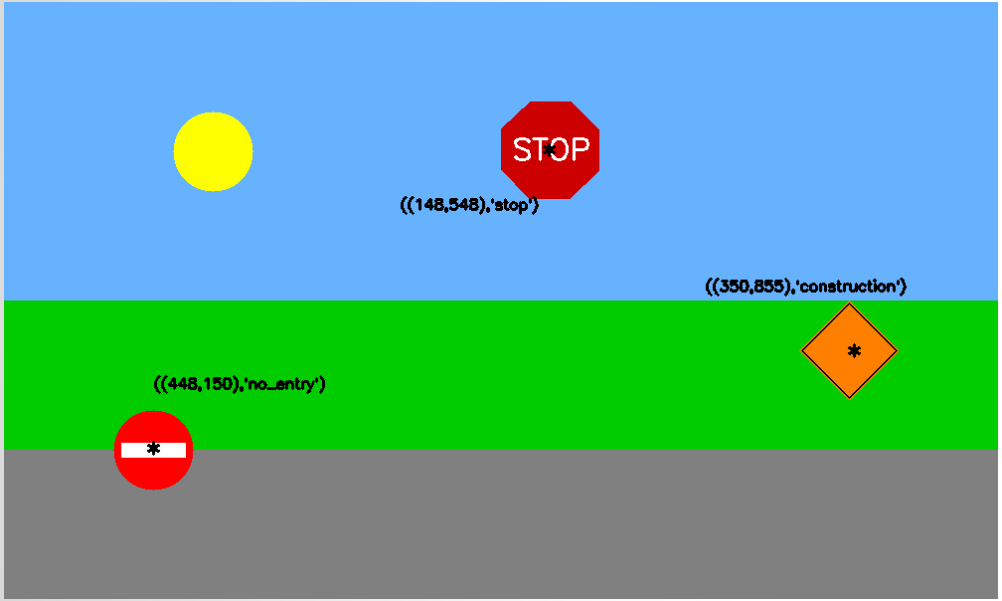
Traffic Sign Detection - Yield



Coordinates: 188, 309

ps2-2-a-5.png

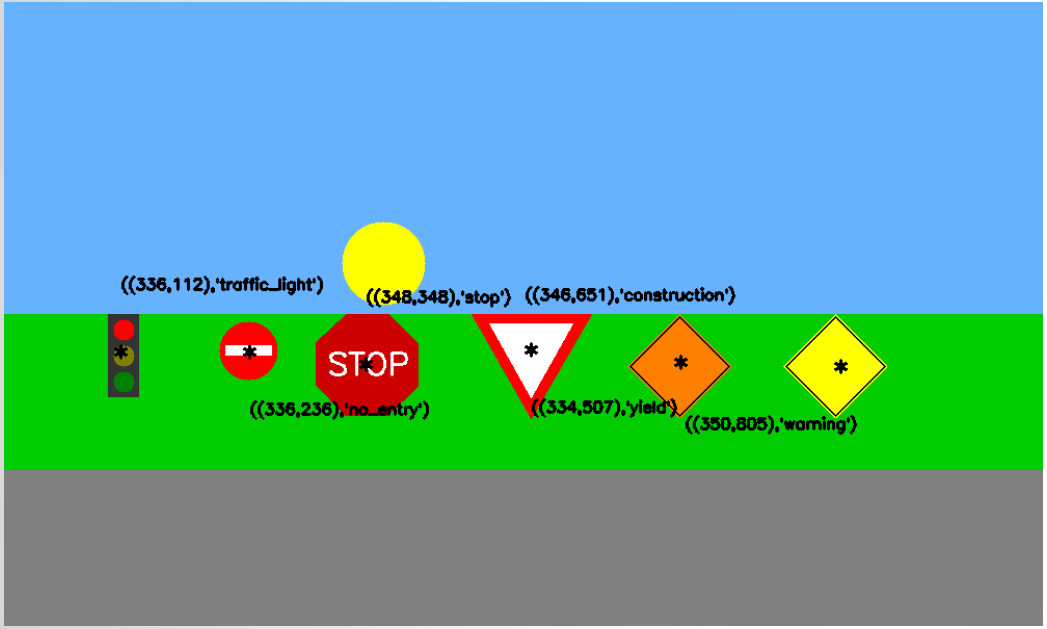
Multiple sign detection



Coordinates	Name
(148, 548)	stop
(350, 855)	construction
(448, 150)	no_entry

ps2-3-a-1.png

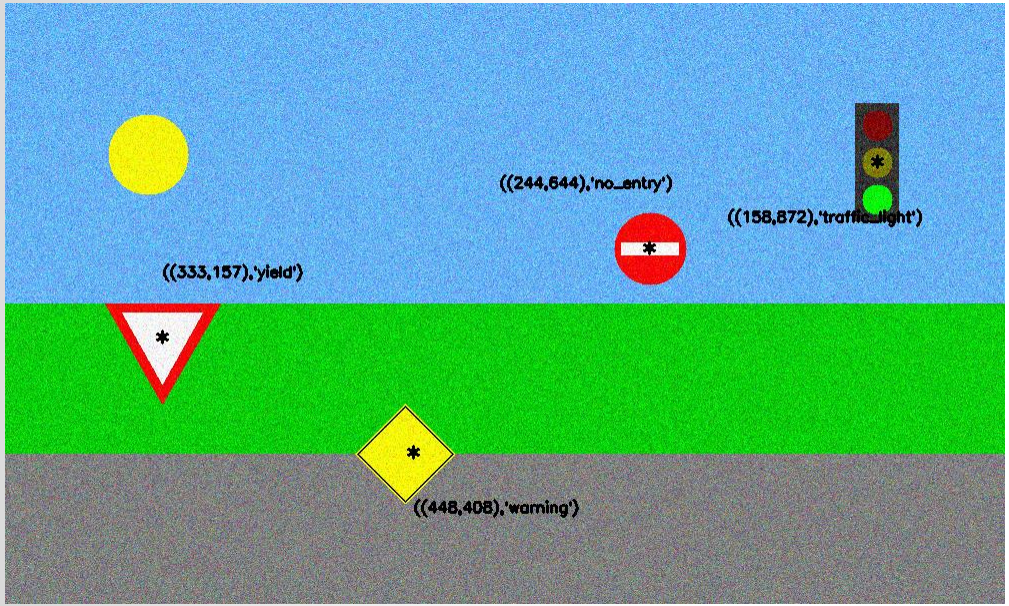
Multiple sign detection



Coordinates	Name
(336, 112)	traffic_light
(336, 236)	no_entry
(348,348)	stop
(334,507)	yield
(346, 651)	construction
(350, 805)	warning

ps2-3-a-2.png

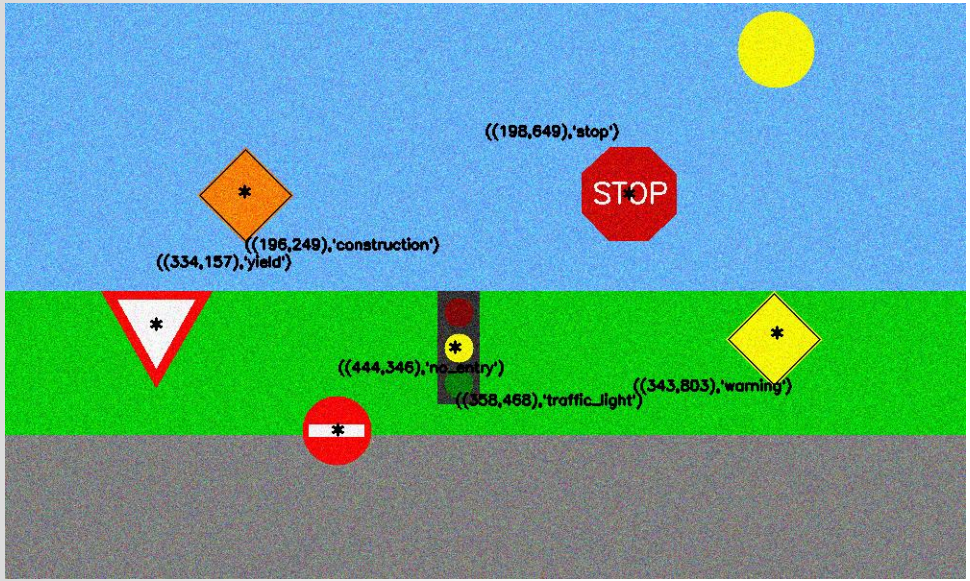
Multiple sign detection with noise



Coordinates	Name
(333,157)	yield
(448,408)	warning
(244, 644)	no_entry
(158, 872)	traffic_light

ps2-4-a-1.png

Multiple sign detection with noise



Coordinates	Name
(358, 468)	traffic_light
(444,346)	no_entry
(198, 649)	stop
(334, 157)	yield
(196, 249)	construction
(343, 803)	warning

ps2-4-a-2.png

Challenge problem - A

Coordinates: (184, 462)
Name: no_entry

Credit :
https://www.epicamera.com/templates/layout/img/app6.jpg

ps2-5-a-1

Challenge problem - A

Coordinates: (94, 342)
Name: yield

Credit :
https://upload.wikimedia.org/wikipedia/commons/7/73/PA_420_yield_sign.JPG

ps2-5-a-2

Challenge problem - A

Coordinates: (237, 653)
Name: Construction

Credit :
https://ak8.picdn.net/shutterstock/videos/3757958/thumb/12.jpg?ip=x480

ps2-5-a-3

Challenge problem - B

Coordinates	Names
(137,111)	yield
(184, 462)	no_entry

ps2-5-b-1

https://celsians.com/wp-content/uploads/2019/09/20190918-1024x576.jpg

Challenge problem - B

Coordinates	Names
(238,202)	yield
(237,653)	construction

ps2-5-b-2

Challenge problem - B

Coordinates	Name
(116, 161)	yield
(292, 162)	no_entry
(195, 460)	construction

ps2-5-b-3

Challenge problem - Text

Describe what you had to do to adapt your code for this task. How does the difference between simulated and real-world images affect your method? If you used other functions/methods, explain why that was better (or why your previous implementation did not work)

- As for simulated vs real world images difference go, I had to increase threshold for some of the distances due to the distortions even after I blurred and denoised the images.
- Some images in real world, looks like they have proper lines and edges defined, but when passed through edge detection, it started giving broken edges, which affected polygon detection a lot.
- A lot of extra lines were coming up in some of the real world images and that is why I had to add extra masks to get just the signs from their colors and then detect the centers. Whereas in simulated images, I was first detecting centers and then checking the colors.
- Major changes I had to make and thus different functions:
  - Change threshold for proximal points of yield signs
  - HoughLinesP was detecting very small lines and thus I used HoughLines for construction and warning signs
  - As I was already checking for the colors in the beginning, it was easier to detect no_entry through checking for circles after applying the mask.