detect stop sign inside road image

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ABSTRACT[3]:

High-definition and highly accurate road maps are necessary for the realization of automated driving, and road signs are among the most important element in the road map. Therefore, a technique is necessary which can acquire information about stop sign in the road to avoid building areas

INTRODUCTION:

In recent years, an extensive study has been going on regarding the practicability of automated driving. Among others, high-definition and highly accurate road maps are necessary for the realization of automated driving. Road signs are among the most important element, in the road map, which can be used as landmarks for the correction of the location of a self-driving-car and avoiding building areas.
Therefore, a technique is necessary which can acquire information about stop sign to avoid places of building.

Road sign recognition algorithms using images usually consist of two stages: road sign detection and road sign classification. In road sign detection, the aim is to extract the regions of interest (ROI) from an image. Then in the classification stage, the detected road sign candidates are assigned to the class that they belong. The algorithm that this report address it is about the first stage which is road sign detection and for a specific type which is stop sign.

Body:

for detection of road sign there are three ways:

1)deep learning algorithms like YOLO, R-CCN, and SSD which depends on existence on big training data which is not available in our case.

2)machine learning algorithm like HOG, DPMs, and PASCAL which depends also on existence data to learn from it and works will in small training sets, but small training set is not available also in our case.

3)image processing which depend on comparison between images, and due to not existence of training set, that is the only available option which we select from it, sliding-window paradigm[(1)] which depend on dividing image on multi slides and compare between the target sign(which is stop sign in our case) and each slide of image.

ENVIRONMENT CONFIGURATION:

1-OS: LINUX(UBUNTU)
2-Programming Language: PYTHON(version 3.6.8)
3-Libraries: CV2, NUMPY, ARGPARSE, TIME

code explanation:

--first to run the script to see picture you should write: “python3 road_sign -i (or –image) image_path”, for example(python3 road_sign -i image.png) then it will detect stop sign and make around it rectangle [figure 1]

----the script support three options:

---first-option:to display rectangle or to display the target sign in each slide [figure 2.1 , 2.2] you should write:
“python3 road_sign -i image_path -p [then specify ‘rect’ or ‘stop’]”
--for figure 2.1, write:
 “python -i image_path -p rect”
--for figure 2.2, write:
 “python -i image_path -p stop”

---secon-option: to display rectangle in different colors [figure 3.1, 3.2, 3.3] you should write:
“python3 road_sign -i image_path -p rect -c [then specify ‘red’, ‘greeen’, or ‘blue’ default is red]
-for figure 3.3, write:
“python3 -i image_path -p rect -c red”
-for figure 3.3, write:
“python3 -i image_path -p rect -c green”
-for figure 3.3, write:
“python3 -i image_path -p rect -c blue”

---third-option:to select time which frame (at option one) move through it, write the command:
python3 -i image_path -p rect -s .5

Figure 1

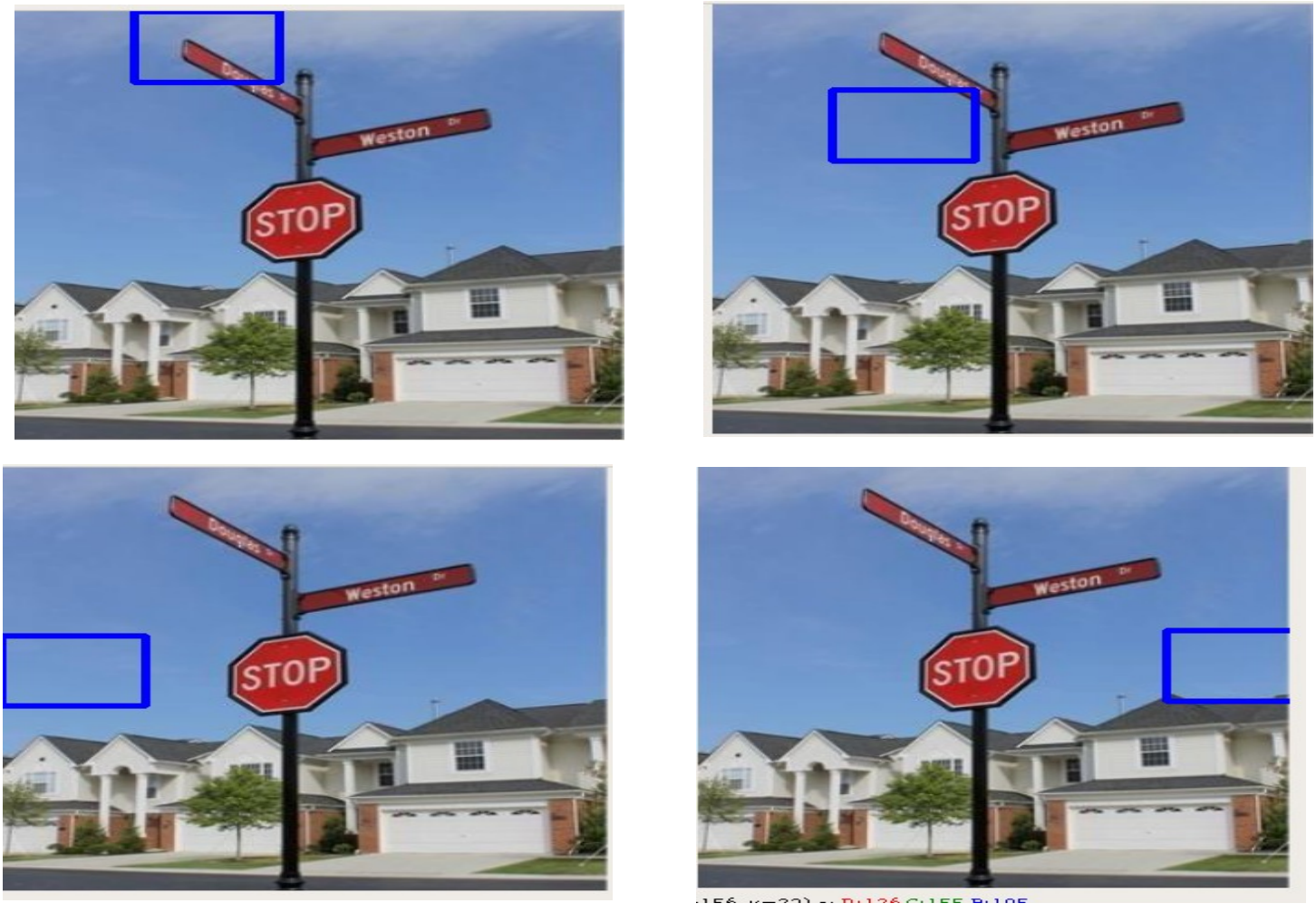

Figure 2.1

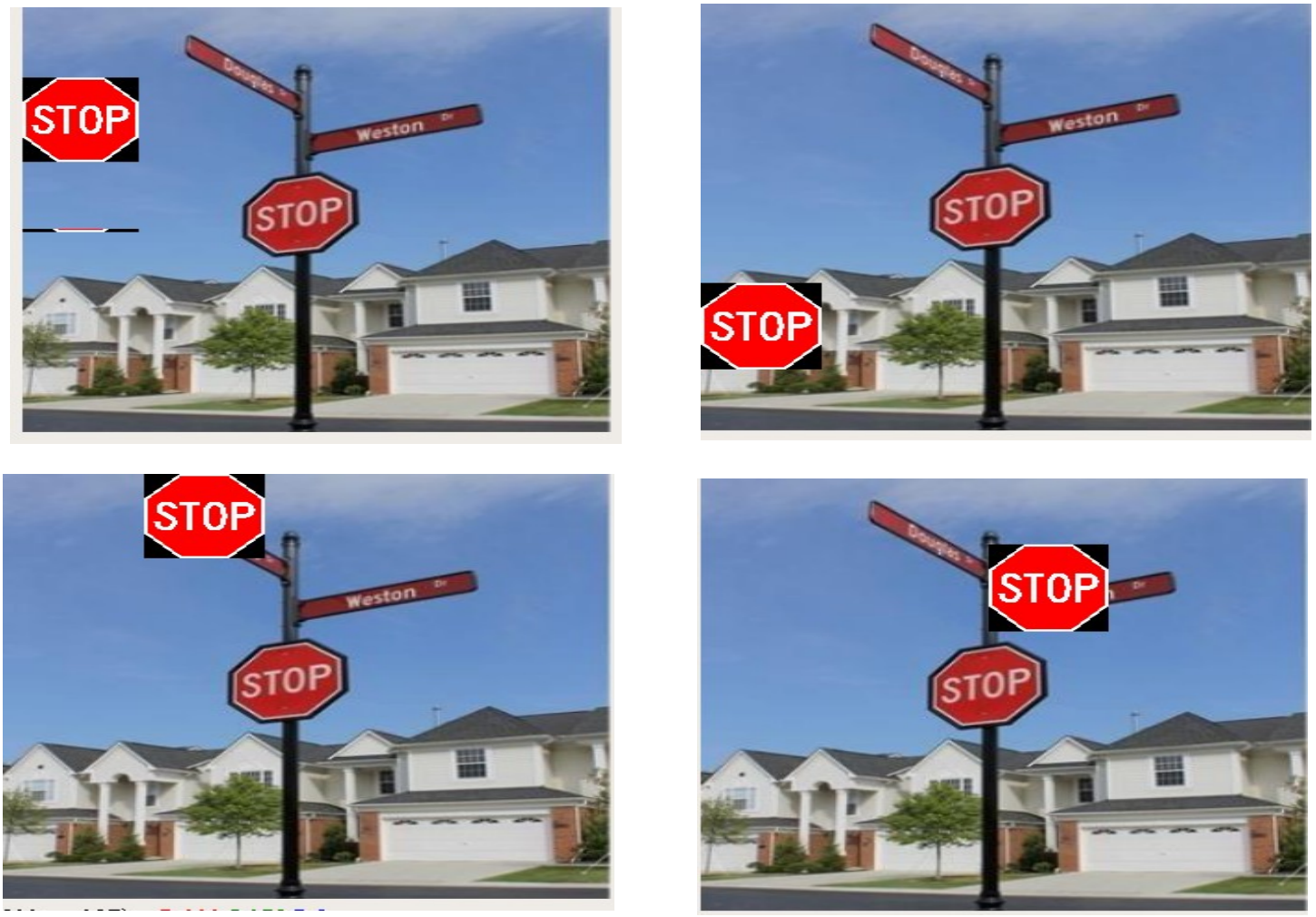

Figure 2.2

Figure 3.1

Figure 3.2

Figure 3.3

CONCLUSION:

-by using slide window we could get a non accurate rectangle around the desired image, adding some options to improve shape of output of algorithm.

FURTHER WORKING:

-we could using pyramid[(2)] method to improve accuracy of algorithm through changing the size of kernel to get a better performance.

1-https://www.pyimagesearch.com/2015/03/23/sliding-windows-for-object-detection-with-python-and-opencv/

2-Pyramid:https://en.wikipedia.orgwiki-Pyramid(image_processing)

3-ROAD SIGNS DETECTION AND RECOGNITION UTILIZING IMAGES AND 3D POINT CLOUD ACQUIRED BY MOBILE MAPPING SYSTEM