Data Challenge

Course name: Artificial Intelligence in Data Science
Neptun ID: BMETE15MF75

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Introduction

Computer vision is one of the most promising fields of data science since it has a wide range of applications including self-driving cars, medical image analysis and facial recognition. The aim of the Data Challenge is to provide hands-on experience in digital image processing.

Task

Your task is to build an algorithm for prohibitory traffic sign recognition. We have created a training data set (20 images) that can be used for building and fine-tuning a model. However, you are encouraged to collect more images, since it will allow you to improve your model's performance. Two possible ways of getting additional images are listed below.

- It is possible to simply take screenshots of the desired images (e.g. Google Street View or other online sources).

- You can use the google-streetview Python module (https://pypi.org/project/google-streetview/) for downloading Google Street View images with a Python script. Details about the usage of Google Street View API can be found in the official documentation (https://developers.google.com/maps/documentation/streetview/intro).

There are 6 traffic sign categories your model should be able to recognize:

Figure 1: Category A - no right, left, or U-turn

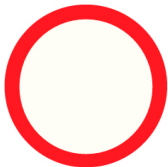Figure 2: Category B - speed limit (regardless of the indicated value)

Figure 3: Category C - road closed
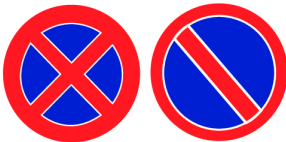
Figure 4: Category D - no entry

Figure 5: Category E - no stopping, no parking

Figure 6: Category F - other types of prohibitory traffic signs

Training set

The 1. table contains the image IDs and the categories of the traffic signs that can be seen in the images.

# of image	Categories of traffic signs
1	B, C
2	D, D
3	B, F
4	F, F (+ optionally B)
5	F, F
6	C, E, F
7	B, F
8	E, F
9	E, F
10	C, E (+ optionally B)
11	D, E
12	B, E
13	B, E, F
14	F, F
15	B, F, F
16	B, B, E, E, F, F
17	D, E, F
18	A
19	A
20	A

Table 1: Categories of the traffic signs that can be seen in the training images

Detailed rules

- In order to find red color HSV encoding can be much better than RGB

- In last years I have recieved vary nice solutions with or without neural networks. You may choose either route.

- You are allowed to use pretrained networks, but not available solutinos. Do not upload the weigths.

- The performance is not the most decisive factor in the evaluation process, though of course high accuracy is rewarded. In previous years scores between 10-60% were achieved, and were found acceptable!

- Building an algorithm that can perform more complex analysis of traffic signs (e.g. can recognize the speed limit values or can tell whether a Category E sign is no stopping or no parking) is honoured with extra points.

- We ask you to submit a short documentation (max. 2 A/4 pages, but this can be included in the notebook), in which you tell

- Leave all the images in the submitted notebook!

  - why have you chosen the given methods
  - what kind of difficulties and problems have you encountered and how you solved them, this can be used to describe why you were not successful
  - how have you reached your final result

- When copying code from a website, you need to cite the source (at least as a comment in the code and in the documentation).