Practical Assignment Proposal Presentation

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Ana Maria Mendonça
Teresa Araújo
Guilherme Aresta

Major guidelines

- Students should form groups of 3-4 persons;
- Each group can select one of the two available proposals;
- The delivery deadline for the report, code, dataset and contributions is 8 December 2017.
- The delivery deadline for the material of the public presentation is 11 December 2017.

Deliverables

Each group is required to deliver:

- A four A4 page report in IEEE Transactions article format describing the methodology and obtained results, both qualitatively and quantitatively;
- The MATLAB code developed during the project (and dataset for assignment 2);
- The material prepared for the public presentation of the group assignment;
- A brief description of the contribution of each element of the group to the assignment.

Practical assignment proposal 1 – CARVANA

The main goal is the **identification of the type and brand of a vehicle** given a set of views of the vehicle.

- The practical assignment is composed of 3 tasks.
- Tasks 1) and 2) are mandatory, whereas task 3) is for valorization (3/20 points).
- The methods are to be developed using the approaches discussed during the classes.

Tasks

1) Development of an algorithm to perform **car segmentation**. The segmentation algorithm should be automatic, i.e., work without any user interaction. Four different views are provided for each vehicle. Finally, the performance of the segmentation method should be compared with the ground-truth via the Sørensen–Dice coefficient, which is also to be implemented by the group.

2) Development of an algorithm that, given the car segmentation ground-truth or task 1 result (and the original image, if needed), **classifies the vehicle in one of four classes**: compact, pick up, sedan or SUV. The performance of the classification method is to be evaluated via accuracy.

3) Development of an algorithm that, given the car segmentation and the original image, **predicts the brand of the vehicle.**

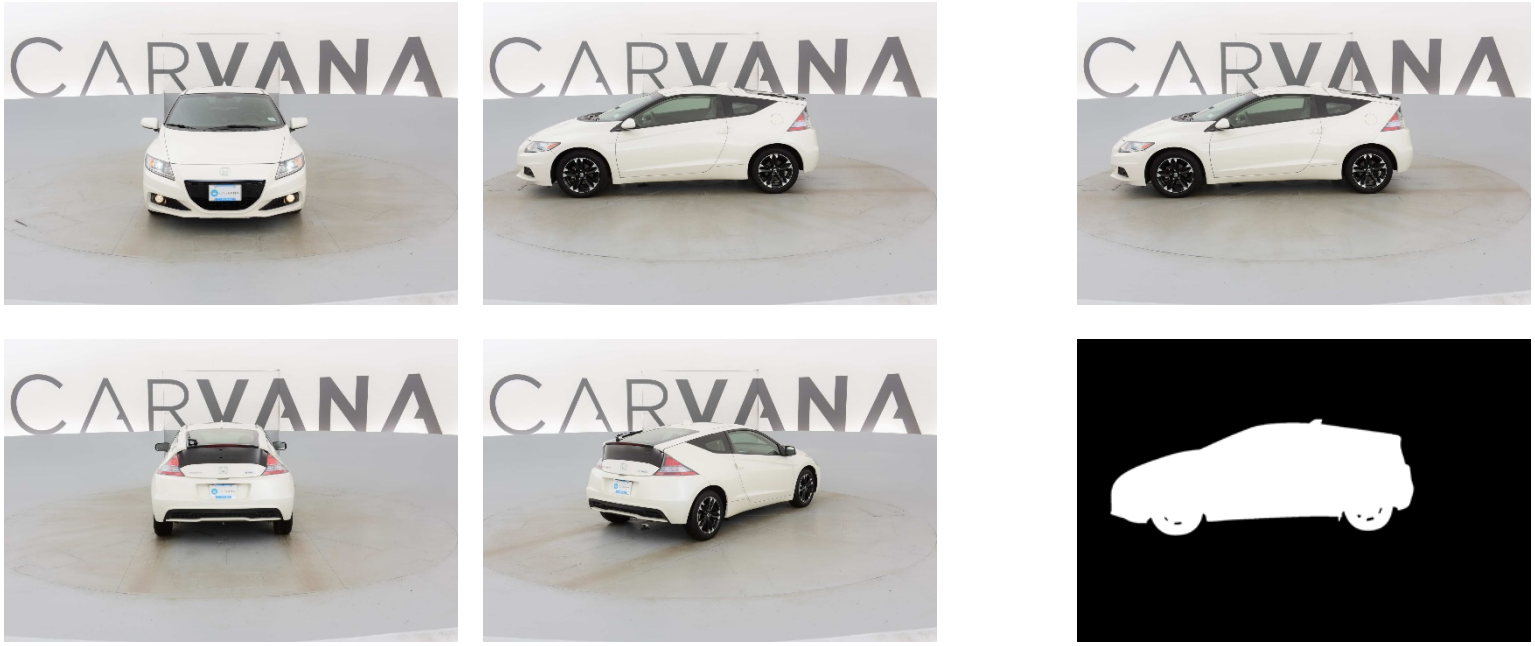
Note: tasks 2 and 3 can be performed using the segmentation ground truth.

Practical assignment proposal 1 – CARVANA

Dataset

The dataset is composed of 16 vehicles - 4 (compact) + 3 (pick up) + 5 (sedan) + 4 (SUV).

Each vehicle has 4 images corresponding to the front, back, side and another view, as well as the corresponding segmentation ground truth (binary mask).



Segmentation Ground Truth

Practical assignment proposal 2 – Resistors

The main goal is the **development of a system that predicts the value (resistance) of a resistor** based on an image of the resistor.

- The practical assignment is composed of 3 tasks.
- Tasks 1) and 2) are mandatory, whereas task 3) is for valorization (3/20 points).
- The methods are to be developed using the approaches discussed during the classes.

Tasks

1) Development of a **dataset** for the assignment, as well as the corresponding ground truth (list with the name of the image and the values of the resistors in the image);
2) Development of an algorithm that **predicts the resistor(s) value(s)**, supposing that the position and region of interest (ROI) of the resistors are known. The performance will be evaluated via the percentage of correct resistor values (for each type of image of the dataset and for all images in the dataset).
3) Development of an **algorithm that detects and segments the ROIs containing resistor(s)**. Calculate also the performance of the algorithm developed in task 2 using the results of task 3.

Note: task 2 can be performed using a ROI ground truth produced by the group.

Practical assignment proposal 2 – Resistors

Dataset

The dataset should consist of photographs of resistors in different contexts.

Specifically, photographs should have different background settings (in terms of color, texture, etc.), and all resistor colors should be represented at least once. Furthermore, images should have a variable number of resistors with different orientations.

At least 50 images, with the respective ground truth, should be obtained by the group with the following distribution:

- At least 30 images containing just one resistor, with different orientations and different background settings;
- At least 10 images containing more than one resistor;
- At least 10 images with resistors integrated in a complex setting (for instance, on a circuit board with other electronic components).