Vehicle recognition using supervised classifiers

1 Description

One of the methods for 3D object recognition is the analysis of image features extracted from the silhouettes of the objects [1, 2, 3]. Supervised classification methods can be applied on these features with different results.

2 Objectives

The goal of the project is to predict the class of vehicle, among four different types (van, saab, bus, opel), from the silhouette. A database will be used for the analysis [1]. Three supervised classifiers should be created to recognize the vehicle class and the accuraccies produced by all these classifiers should be computed.

The student should: 1) Design any preprocessing of the dataset; 2) Define and learn the classifiers using the training data. 3) Design the validation method to evaluate the accuracy of the proposed classification approaches.

As in other projects, a report should describe the characteristics of the design, implementation, and results. A Jupyter notebook should include calls to the implemented function that illustrate the way it works.

3 Suggestions

- Implementations can use any other Python library.
- If classes are not well balanced you may use performance measures different to the accuracy.

References

[1] Aldo Laurentini. How many 2D silhouettes does it take to reconstruct a 3D object? *Computer Vision and Image Understanding*, 67(1):81–87, 1997.

[2] Farzin Mokhtarian. Silhouette-based isolated object recognition through curvature scale space. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 17(5):539–544, 1995.

[3] J. P. Siebert. Vehicle recognition using rule based methods. Research Memorandum TIRM-87-018, Turing Institute, March 1987.

[1] The "Vehicle Silhouettes" dataset can be downloaded from `http://archive.ics.uci.edu/ml/datasets/Statlog+%28Ve`