Shape classification

1 Description

Shape classification consists of determining the class of a figure using information about its contour in an image. This is a real-world problem that allow the use of different representations and a variety of classification approaches to solve it [**?**]. For implementing the project, any of the shape datasets available from `http://visionlab.uta.edu/shape_data.htm` could be used.

2 Objectives

The goal of the project is to compare different classification algorithms on the solution of one or more shape datasets. This means, to apply the supervised learning methods to predict the shapes from the contour information available. It is also possible to use a single classification algorithm if at least three different feature representations of the data are used.

The student should: 1) Design any preprocessing or feature selection step to deal with the selected dataset(s) 2) Define and apply at least three different classification algorithms to the data 3) Design a validation method to evaluate the accuracty of the methods.

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

- Use the `scipy.io.loadmat` Python library to read the .mat files to python. .
- Implementations can use any other Python library.

References

[1] Ninad Thakoor, Jean Gao, and Sungyong Jung. Hidden Markov model-based weighted likelihood discriminant for 2-D shape classification. *IEEE Transactions on Image Processing*, 16(11):2707–2719, 2007.