

Project Plan

Structured Feature Representation for Scene and Object Representation

ANU COLLEGE OF ENGINEERING & COMPUTER SCIENCE

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Background

I have a strong personal interest in getting into the field of Computer Vision - in particular Visual Pattern Recognition.

Even though I will be primarily conducting research on a specific problem/solution within Pattern Recognition, I also hope to obtain an overview of the entire field during the project.

Please note that I am concurrently taking the course “Statistical Pattern Recognition”, which supplements the project.

Problem/Task description

Simply speaking, the project is about researching a proposed way of comparing two images with respect to how similar they are. A practical application of this, for example, is finding an image (or even part of one) within a set of other images.

The proposed idea is:

1. Preprocess image and extract dominant features such as shape, color and texture with the help of key points, histogram and filter bank
2. Build a (weighted) graph by combining the features to nodes
3. Compare the resulting graph with the graph of another image

The preprocessing and extraction of the features are already implemented and given in the form of Matlab source code.

The actual research part lies in building and comparing the graph with the emphasis on the latter. The proposed idea/algorithm for comparison is based on graph entropy – an information theoretic functional on the graph with a probability distribution over its nodes. The comparison can be broken down in two parts: entire graphs only and more complex sub-graph search.

The practical research part will be prototyped/implemented in Matlab. Once finished, the result will be evaluated in terms of its targeted capabilities (e. g. scale/position/rotation invariant) as well as its matching performance against a standard set of images widely used in the field. Furthermore, it is intended to compare the researched method with two currently used approaches, which eventually have to be implemented in Matlab as well.

Schedule



References

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