CS3246: PROGRAMMING ASSIGNMENT 2

An Image Retrieval System based on Visual Content

Due date: 25 October 2013 (1700 Hrs)

Presentation Date: 28-29 October 2013 (Mon-Tue), 20 mins per group

Objectives:

This assignment aims to implement a program to index, match and retrieve images based on color and texture features. You would be given a program to do color-based matching and an image test set. You are required to modify the program to incorporate CCV and edge histogram features. A thorough evaluation of results is expected.
(The program can be used for video retrieval too, by considering only keyframes in videos which are then handled in the same way as images.)

What You Need to Do:

The submission must include the first three key components:

1. **Feature Extraction**: You should incorporate the color and texture features.
   - For color, you need extend color histogram to CCV.
   - For texture, you should incorporate at least the edge direction histogram.
   - For better effects you will need to handle perceptually similar colors.
2. **Image Similarity Matching**:
   - Design and test several similarity measures to compute the similarity between two images based on color and edge direction features.
   - A simple UI should be developed to present the ranked list of results, and allow users to perform relevance feedback.
3. **Analysis and Aggregation of Results**:
   - You are to systematically test the features and analyze your results to draw conclusions on the effectiveness of the use of various features and techniques. For this, I expect to see charts of retrieval results based on F1@20 averaged over all queries (i.e F1 computed from top 20 returned results).
4. **Extra Grades:**
   - You may want to incorporate relevance feedback based on content of relevant images.

Presentation and Online Testing:

- You will need to present your work within a 20-min session, including question answering, during which you will present your work using ppt and demonstrate your software live on your Notebook.
- Several new queries will be used to test your system during online evaluation.

What You are Given:

- You are given: (a) a JAVA program that that performs simile color-histogram-based image retrieval; and (b) a set of 400 images, 20 test image queries, and the relevance judgment (ground truth).
- The Java codes and test image sets are available from IVLE Assignment folder.

Report:

You need to submit before the deadline: (a) not more than 8-page report covering the design, program structure, testing and analysis of results; (b) a short ppt presentation file (not more than 5 mins of presentation); you ppt should include sufficient technical details for people to know what you have implemented; and (c) source codes of your implementation and the evaluation results for all queries.

Remarks: (a) Techniques, flexibility and effectiveness of system is most important; UI is less important and hence do not spend too much effort on refining your UI. (b) All members are required to present some aspects of the system when asked during the project presentation and demo. (c) Extra marks will be given for excellent assignments.

Consultation:

Any questions regarding this assignment, please consult:

- Dr Gao Yue
- Ms Geng Xue

** **Late Submission Policy**: We impose the following penalties for late submissions. (a) Late but within 24 hours: 25% reduction in grades. (b) Later but within 3 days: 50% reduction in grades. (c) After 3 days: zero marks.

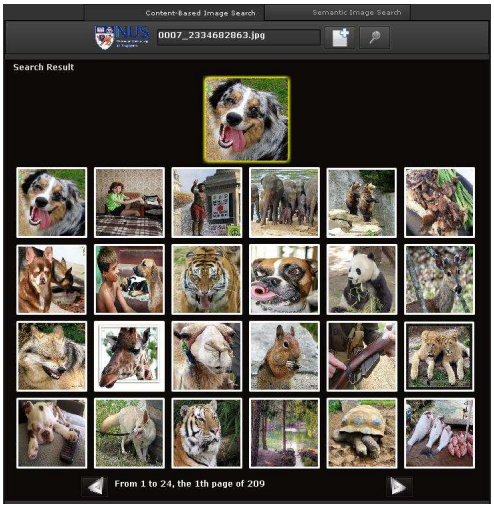

Figure 1: An example interface of an image search system