FELIX STÜRMER

SKETCH-BASED IMAGE RETRIEVAL USING CURVELETS

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An Evaluation of Curvlet-Based Cross-Domain Descriptors for Sketch-Based Image
Retrieval

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ABSTRACT

Short summary of the contents...

ACKNOWLEDGMENTS

acknowledgments go here...

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LIST OF FIGURES

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LISTINGS

ACRONYMS

INTRODUCTION

1.1 MOTIVATION

Paragraph about increase in visual data, mobile cameras, medicine, etc...

At the core of the research into content-based image retrieval lies the need to be able to access the growing repositories of visual data in a convenient and efficient manner. In this context "convenient" describes the ability for the user to express the query without a complex reformulation of the intent to make it accessible to the query processor. At the same time the computational efficiency becomes more important as the amount of data to search grows. This issue becomes even more critical as the use of mobile, power-limited devices increases across many areas of application, such as autonomous vehicles or handheld augmented reality devices.

Research into text-based information retrieval has brought into existence many statistical methods to query a potentially large body of text using text as the query input. This preserves the close mapping of the intent of the user to the expression of the query and thereby makes the process accessible to users without knowledge about the internal workings of the retrieval system. Providing the means to access a large amount of visual data using a system with similar properties has turned out not to be an easy problem. Using text-based querying for that purpose depends on the ability to reliably label visual data, which would require solving the general object recognition problem first [1]. The avoid that obstacle and to free the retrieval system from the requirement of translating between textual and visual information, many methods to search an image database using visual similarity have been developed.

Sematic Gap

1.2 DEFINING CONTENT-BASED IMAGE RETRIEVAL

- Definition CBIR

- historical intro [CBIR at the end of the early years]

- Visual Similarity => Semantic Similarity? Sematic Gap! [1]

1.3 OUTLINE

Thesis outline goes here

BACKGROUND & RELATED WORK

Complete vs incomplete sketches

Most approaches can be characterized by looking at three stages in their processing pipeline:

INPUT FORMAT The structure of the input data determines the amount of information available to the subsequent processing steps. Possible preprocessing steps include color space conversion, scaling and edge extraction.

EXTRACTED FEATURES The large number of coefficients produced by the curvelet transform are reduced to a set of feature coefficients.

DISTANCE METRIC In order to rank the images according to similarity a metric is used to calculate the distance in feature space between two sets of feature coefficients. The selection of a metric is often closely coupled with the feature extraction algorithm.

2.1 INPUT FORMAT

2.2 FEATURES

- bag of features from k-means clustered visual words [video google]

- great comparison of sampling for k-means clustered vws [nowak06]

2.3 METRIC

- after ranking using euclidean distance, rank by spatial similarity [video google]

- Earth Mover's distance? [rubnerljcv00]

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PROPOSED SOLUTION

Proposed solution goes here. . .

3.1 INPUT FORMAT

- Luma component (Y') of Y'UV representation

- Gradient magnitude of Sobel operator of luma component

- Canny edge map of luma component

- gPb

3.2 FEATURE EXTRACTION

- Global features: mean and standard deviation

- Local features: visual words via k-means clustering

3.3 DISTANCE METRIC

- Euclidean Distance

Read Image	Apply Curvelet Transform	Calculate Means / Standard Deviations	Rank by Euclidean Distance

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EXPERIMENTAL RESULTS

Experimental results go here. . .

[April 23, 2012 at 12:00 – `classicthesis` version 0.1]

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ANALYSIS

Analysis goes here. . .

CONCLUSION 6

Conclusion goes here...

BIBLIOGRAPHY

[1] A. W.M Smeulders et al. "Content-based image retrieval at the end of the early years." In: *Pattern Analysis and Machine Intelligence, IEEE Transactions on* 22.12 (2000), 1349–1380.

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DECLARATION

Put your declaration here.

Berlin, January 2012

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Felix Stürmer