

A Hybrid Approach for Improving Content Based Image Retrieval Systems

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ABSTRACT

In recent years, as there has been an explosive increase in digital image storages, the necessity for effective techniques for providing quality image retrieval results within a search time that is acceptable to users is felt. Image retrieval being considered as a wide area of research, techniques like Text Based Image Retrieval(TBIR), Content Based Image Retrieval (CBIR), etc are undergoing developments and are being studied. The previous techniques have few limitations with respect to semantic gap between the machine description and human perception. We propose to develop a hybrid Image Retrieval System using Text Based Image Retrieval(TBIR) and Content Based Image Retrieval(CBIR) that would provide more accurate image retrieval results closer to human perception.[4]

Keywords: Text Based Image Retrieval(TBIR), Content Based Image Retrieval (CBIR), Hybrid Approach.

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I. INTRODUCTION

There has been advancement in technology and computer department in recent times. These advancements have lead to conveniences for usage of digital data and its storage. Interests of researchers are captured in this filed because of the want for accessing the digital data based on its content. There are miscellaneous areas wherein image databases are now employed. A few of them are advertising, art, entertainment, history, medicine and many more. Two different methods for retrieving images are Text-based and content-based retrieval methods. All the key features from an image are extracted in order to extract it in both approaches. The extraction of the indices of an image in first approach is done manually, while they are extracted automatically in the second approach. Text- based image retrieval faces two hitches when the image database is of large size. Huge amount of labour required in manual annotation is the first problem and different results of annotation for a particular image which is caused by the subjectivity of human perception is the other one. Indexing is applied to a particular image using its feature content instead of its keywords in content-based image retrieval. Hence the research being done in content-based image retrieval systems is paced up due the text based indexing. [4] [2].

Based on overall appearance, different applications require various techniques for comparison between different pairs of images. For instance if any user wants all identical images related to a particular image from the search engines storage. [3] A common solution to this above stated problem is the use of color histograms which are used in many systems. Color histogram is a representation of colors in an image which is used by the systems to compare color features of different images. In this paper we attempt to increase the efficiency by improving the relevance of the output images using the hybrid approach.

II. RELATED TOOLS

1. Language: Java J2SE and JDK

J2SE (Java 2 Standard Edition) Java would be the required as language for development of the project. JDK is the development kit used to compile java programs.

2. IDE: NetBeans

Just like visual studio provides development environment for VB and .Net, NetBeans provides an integrated development environment (IDE) for Java.

3. Database / Data Library

Serialized Objects / Serialization - Database in Java In case the project needs database this is how it is handled in java.

- A. First step is to use data structures like Vectors and Lists. These come under Java Collections API
- B. Secondly we declare our own classes using these data structures. E.g. a class Student to hold all the student information. Now these classes need to be pre-compiled and called within Java application as libraries. This is called as a Java Class Library
- C. Now class objects cannot be saved to hard drive directly. We need to convert these objects to bytes so that they can be saved to hard drive. To do this we must use a concept called as Serialization. Basically it is a concept where in objects are converted to byte streams so that they can be saved to hard drive or sent via internet and vice versa. The reverse process is called as deSerialization.
- D. Finally to save these bytes to hard drive or to send them via network we need Java I/O.

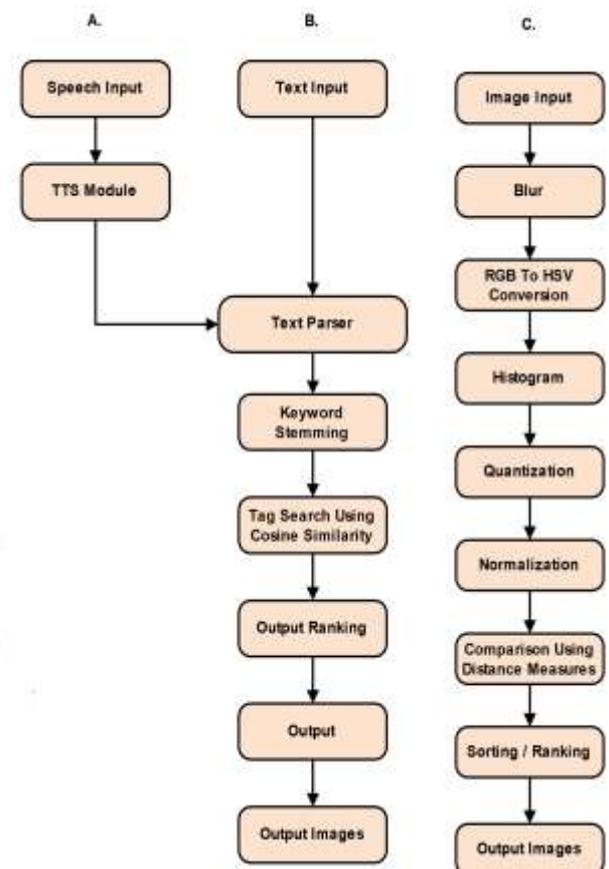
4. Client-Server Architecture using Serialized Objects / Serialization

In case the project needs client-server communication this is how it is handled in java.

- A. First step is to use data structures like Vectors and Lists. These come under Java Collections API.
 - B. Secondly we declare our own classes using these data structures. E.g. a class Student to hold all the student information. Now these classes need to be pre-compiled and called within Java application as libraries. This is called as a Java Class Library
 - C. Now class objects cannot be sent via network directly. We need to convert these objects to bytes so that they can be sent/received. To do this we must use a concept called as Serialization. Basically it is a concept where in objects are converted to byte streams so that they can be sent via network and vice versa. The reverse process is called as deSerialization.
 - D. Finally to send these bytes them via network we need Java Networking.
5. GUI - AWT & SWING are used for GUI design.



Fig 1. System architecture



III.ARCHITECTURE AND WORKING

Indexing and searching are the two operating phases of content-based image retrieval systems. For every image in the database, in the indexing phase, a feature vector is computed which captures all the suitable attributes and is stored into a visual feature database. A content vector for a particular query is calculated in the searching phase,

when a query is made by a user. The content vector is then matched up with the vectors in the content database using a similarity criterion. From that database, the images which are most identical to the input query are given back to the particular user. The image database contains all the images which are to be retrieved. The feature database contains all the features of images which are to be mined from them. A graphical query interface of the retrieval system is used for communicating to the user. The retrieval results are displayed once the necessary features are collected. Suitable features are extracted from the query image by the query processing module. The feature vector of query is compared with the vectors of the feature database by the similarity measurement module and the most identical images are identified. Almost all the image retrieval systems take a significant feedback from its users wherein the retrieval performance is improved due to the human and computer interaction. A powerful tool is created by the relevant feedback for introducing the user subjectivity and tuning of the similarity function parameters into the retrieval system.

IV. CONCLUSION AND FUTURE SCOPE

We can conclude that the integration of Text Based Image Retrieval(TBIR) and Content Based Image Retrieval(CBIR) helps in improving the precision and recall measures by producing more relevant images as the output.

As future work, we intend to incorporate Fourier descriptors to enhance the relevance furthermore.

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