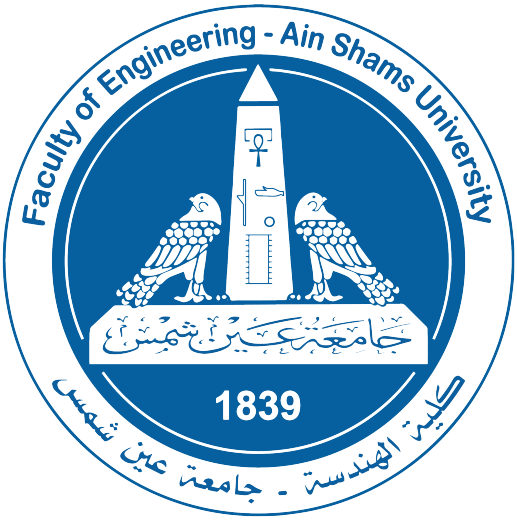

Image And Video Retreival System

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Contents

List of Figures

List of Tables

Chapter 1

Introduction

Chapter 2

Project Description

2.1 Detailed project description

2.2 Beneficiaries of the project

2.3 Detailed analysis

2.4 Techniques description

2.4.1 Images techniques

Mean color

This technique depends on computing the distance between images based on the color similarity between them. For RGB images the mean color of pixels is computed by finding the average color of the pixels in each channel separately then finding the average between the three values that result from each channel. To get the most similar images to the input image ,the difference between the mean color the input image and each image in the database is computed then we apply a reasonable threshold to execlude the images with large distance.

Mean color is one of the most techniques used in image retreival systems because it can be completed without regard to image size or orientation and it needs less computational power than other techniques.

Histogram

Histogram search algorithms , characterize an image by its color distribution or histogram. A histogram is nothing but a graph that represents all the colors and the level of their occurrence in an image irrespective of the type of the image.

Few basic properties about an image can be obtained from using a Histogram. It can be used to set a threshold for screening the images. The shape and the concentration of the colors in the histogram will be the same for similar objects even though they are of different colors.

Identifying objects in a grey scale image is the easiest one as the histogram is almost similar as the objects have the same colors for same objects. In order for identifying the objects in the images or generating the histogram the system has to obtain the array values of the frequency of occurrence of each color value -from 0 to 255- in the image.

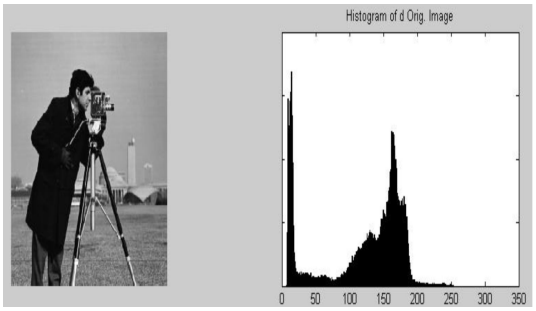

Figure 2.1: example for image histogram

To calculate the distance between two image histogram we calculate the sum of the smallest bin for each corresponding bins in the two histograms for input image I and the model image M normalized to the number of pixels in the model image.

$$\sum_{J=1}^{n} \frac{min(_{Ij},_{Mj})}{\sum_{J=1}^{n} Mj}$$

Figure 2.2: histogram distance equation

Color Layout

This technique is similar to histogram based technique except it solves the problem of getting results of images with a low histogram distance value but with a different contents.

In this algorithm we divide each image into 5x5 array of blocks so we get 25 sub-image then we calculate the histogram form each block. To find the distance between to images we get the distance between the histograms of each two corresponding block, then we calculate the total distance by finding the summation of all blocks distance.

$$d_{gridded\_square}(I,Q) = \Sigma\, d_{color}(C^I(g), C^Q(g))$$

-

Figure 2.3: color layout distance equation

2.4.2 Videos techniques

Chapter 3

Project planning

3.1 Task breakdown structure

3.2 Time plan and Gant chart

Chapter 4

System Design And Architecture

4.1 System architecture

4.2 Multimedia database design

4.2.1 The purpose of our data base

The puspose of our data base is to work as images and videos search engine server.This is achieved by storing images and videos with their pre computed extracted features then takes a an image or video as input form the user and query the data base storge based on the extracted features of the input material and outputs the most relevant matrial to the input model.

The project database supports three filter techniques for images retreival operation which are mean color, histogram, and color layout and one technique for video retreival operation base on histogram of the key frames.

4.2.2 Required information

To achieve the required techniques, we need our database to hold some information about each stored element.

1. Images features
    - We store the mean color value for each image. Mean color is calculated by finding the average of the pixels values for each channle separatley, then finding the averge between the three values resulting from each channel.
    - Histogram information is needed to be stored,but if we store the whole 255 values of each histogram ,we will consume huge amount of

storage. The solution we have used is to divide the histogram into five regions and get the averge of each region so we convert the 255 values into 5 values only and store them in the database. we need these five values for only first step in filtering and then we compare using the complete histogram -255 values- for the filtered images.

2. Video features

   - Instead of storing the whole video frames we only store the information about the key frames of the video. Each key frame is related to its video through "ID", then we deal with key frames in the same manner of the images so we store five values for the histogram of each key frame.

4.2.3 Database Schema

The data base consists of three main tables :

- The first tables is "Image" which holds the information for each image.
- The second is "Video" which holds only the ID and Path of each video.
- The third table is "Key Frame". this table holds all the key frames of all stored videos and relate each key fram to its video using the video ID.

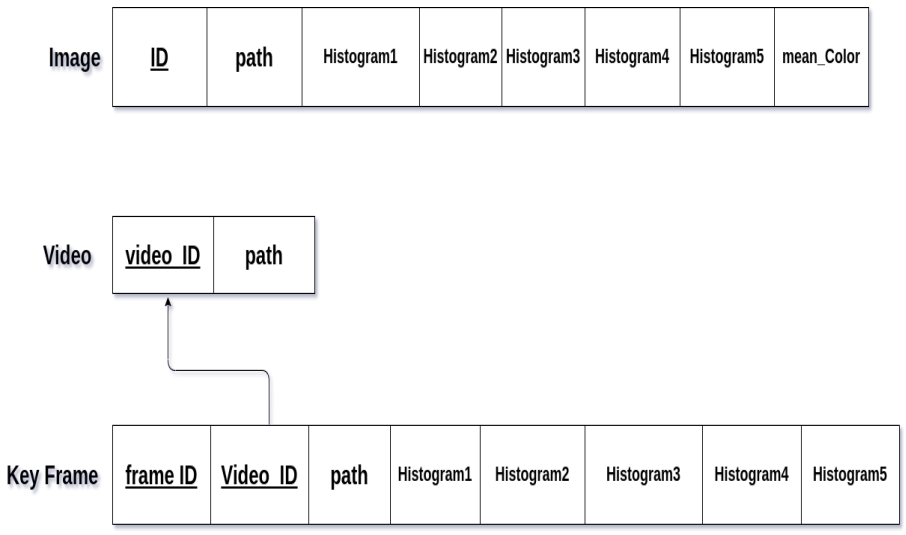

Figure 4.1: Data base schema

4.2.4 Primary keys and foriegn keys

- Primary keys of each table are:
  1. Image table Primary key is the Id of each image.
  2. Video table Primary key is the Id of each video.
  3. Key frame table Primary key is a composite key from the id of each key frame and the id of the refered video.
- Foriegn keys used are:
  - Key frame table has the referenced video id as a foriegn key which relates each key frame to its original video.

4.3 System design

4.4 Testing scenarios and results