

Automated Criminal Tracking and Apprehension Using Advanced Surveillance Technologies

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ABSTRACT

Real time & non real time criminal apprehend system using the concepts of Machine Learning & Digital Image Processing. In this project, I will analyze various facial aspects of a criminal in real time and non real time with the help of various algorithms. In non-real time, our database of images is processed by the program. Then the image selected is compared with all the different images present in the database to find out the where the suspect was or what were the images of a specific location during a specific period of time. In real time, the suspects image can be captured and run through the database to identify him. If the known suspect is a criminal then a red alert box will be displayed on the suspects face while the video surveillance is running and the geo-location (consisting of latitude and longitudes) of the suspect will be sent to the required authority via message instantly. This project will help people to apprehend criminals quickly and even backtrack all the places and people criminal has come in contact with.

Keywords: Machine Learning, Digital Image Processing, Content based image retrieval.

I. INTRODUCTION

Image processing technology concentrates on the development of data extraction techniques applied toward the statistical classification of visual imagery. In classical image processing systems, an image is preprocessed to remove noise, segmented to produce close object boundaries, analyzed to extract a representative feature vector, and compared to ideal object feature vectors by a classifier to determine the nearest object classification and its associated confidence level. This type of processing attempts to formulate a two-dimensional interpretation of three-dimensional scenes using local statistical analysis, an entirely numerical process. Symbolic information dealing with contextual relationships, object attributes, and physical constraints is ignored in such an approach. This paper describes a number of artificial intelligence and digital image processing techniques which allow symbolic information to be exploited in conjunction with numerical data to improve object classification performance.

II. DEFINITIONS

A. Concept Introduction

Real time & Non-Real time criminal apprehend system uses Content based image retrieval in non real time to backtrack into suspicious events and find suspicious individuals and solve crime scenarios. In real time, concepts of artificial intelligence, machine learning to detect criminals and suspicious people instantly. The program detects the person and creates a red mark on the image. A geo-location is also instantly sent to the closest concerned authority for immediate reaction towards the identified person.

Content-based picture recovery (CBIR), otherwise called inquiry by picture content (QBIC) and substance based visual data recovery (CBVIR) is the utilization of PC vision to the picture recovery issue, that is, the issue of looking for advanced pictures in expansive databases.

"Content-based" implies that the pursuit will investigate the genuine substance of the picture. The term 'content' in this setting may allude hues, shapes, surfaces, or whatever other data that can be determined frame the picture itself. Without the capacity to analyze picture content, seeks must depend on metadata, for example, inscriptions or catchphrases. Such metadata must be created by a human and put away close by each picture in the database.

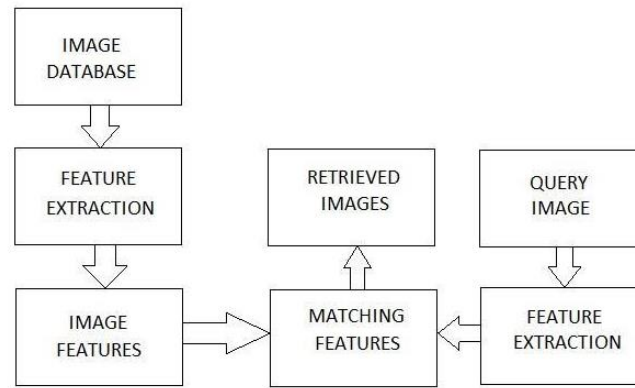


Fig:1 Block diagram of CBIR

B. Objective

We have actualized the CBIR framework which contemplates the low level highlights of picture which is more exhaustive when contrasted with abnormal state highlights and it additionally gives client a larger amount of recovery. We have isolated a Picture into two exceptionally essential classes of shading and grayscale and utilized diverse highlights vector for comparability examination and recovery. We have utilized columnar mean, corner to corner mean and histogram for grayscale and RGB esteems and Euclidean strategies for shading picture. a Realistic UI where client can really choose the strategy which they need to be utilized for the picture recovery and that will give them a choice of utilizing distinctive technique if the outcome isn't according to their prerequisite.

Clients expecting to recover pictures from an accumulation originate from an assortment of areas, including wrongdoing avoidance, prescription, engineering, form and distributing. Strikingly little has yet been distributed in transit such clients scan for and utilize pictures, however endeavors are being made to classify clients' conduct with the expectation that this will empower there should be better met later on. Endeavors are additionally continuing incorporating the look for all sort of pictures and consolidating all previously mentioned include vectors for correlation and recovery to accomplish the most ideal productivity.

Entire recovery is made in order to backtrack any suspicious events

III. CBIR INTRODUCTION

Content Based Picture Recovery is an application for recovering the pictures from a gigantic arrangement of picture databases in light of the picture highlights, for example, shading, surface and some different qualities. Here we take picture highlight as the list to that picture and recover that specific picture.

This task makes utilization of five techniques to recover both Shading and Dark scale pictures.

The strategies utilized are as per the following:

- For Dim scale pictures
- Columnar Mean.
- Corner to corner Mean.
- Histogram Examination.
- For Shading (RGB) pictures
- R G B parts.
- Recovering comparable pictures utilizing Euclidean Separation.

Here we settle the measurement of the picture to be 256X256 for the picture investigation and highlight extraction. On the off chance that the information picture is more than the predetermined measurement then we will resize it to 256X256. For Dim scale picture investigation we have taken Post Dark Guide (PGM) pictures and for shading (RGB) picture examination we have taken JPG pictures.

The previously mentioned techniques are actualized in Matlab 7 and have been effectively run. In back end we utilize MySql server.

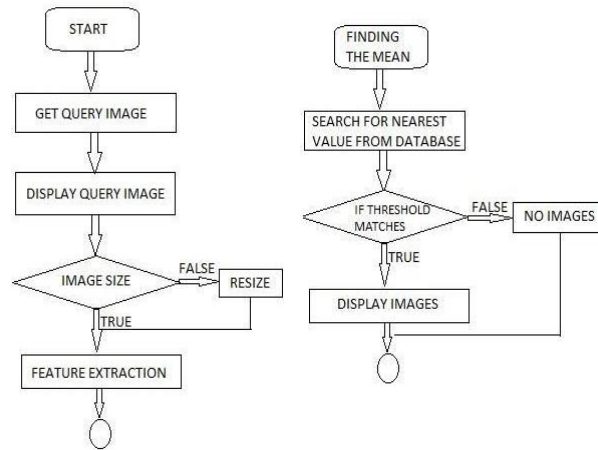


Fig:2 Flow Chart for Image Retrieval

A. Retrieving similar images using Euclidean Distance

Recovery utilizing worldwide normal RGB: We utilize normal RGB to figure shading closeness. Normal RGB is to process the normal incentive in R, G, and B divert of every pixel in a picture, and utilize this as a descriptor of a picture for examination reason.

The normal estimations of R, G, and B utilized for ascertaining the Euclidean separation is a similar esteem which is utilized as a part of the recovery of pictures utilizing RGB segments for shading pictures. Euclidean separation is a geometrical idea which thinks about the co-ordinate estimations of the pixel focuses between which the separation is to be found. This separation characterizes the position change of two focuses as far as pixel esteems which if there should arise an occurrence of picture preparing is the estimations of R, G, and B.

B. Database Design

Database can be characterized as an organized accumulation of records or information that is put away in a PC with the goal that a program can counsel it to answer inquiries. The records recovered in reply to questions move toward becoming data that can be utilized to decide. The PC program used to oversee and question a database is known as a database administration framework (DBMS).

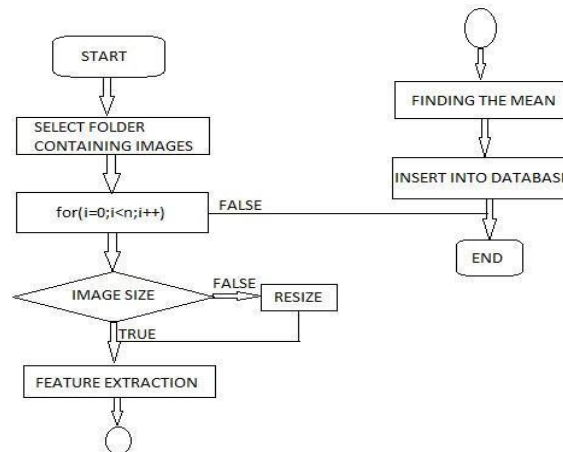


Fig:3 Flowchart for inserting values into a Database.

While utilizing framework which is composed to such an extent that correlation is to be performed with an officially existing database then database ought to be a standard database, so a portion of the standard databases utilized for CBIR in various field are as per the following:

Database of Galactic test pictures gave by IAPR specialized panel 13.

- Glaseby and G. W. Horgan: Picture Examination for the Natural Sciences (John Wiley, 1995) this database is given from books
- National Plan Archive more than 55,000 3D computer aided design and strong models of (generally) mechanical/machined building outlines. (Geometric and Keen Registering Research facility/Drexel College)

- UNC's 3D picture database many pictures (Configuration: GIF)
- AT&T: The Database of Appearances (previously 'The ORL Database of Faces') (Arrangement: PGM)
- Caltech Picture Database 450 frontal face pictures of 27 or so one of a kind people. (Arrangement: GIF)
- CMU PIE Database A database of 41,368 face pictures of 68 individuals caught under 13 postures, 43 enlightenments conditions, and with 4 distinct appearances.
- CMU VASC Picture Database Pictures, successions, stereo sets (a huge number of pictures) (Arrangement: Sun Raster picture)
- CEDAR CDROM database of written by hand words, Postal divisions, Digits and Alphabetic characters (Organization: obscure)
- NIST Unique mark and penmanship datasets - a large number of pictures (Organization: obscure)
- El Salvador Map book of Gastrointestinal Video Endoscopy Pictures and Recordings of his-res of concentrates taken from Gastrointestinal Video endoscopy. (Arrangement: jpg, mpg, gif)
- The Mammographic Picture Investigation Society (MIAS) small scale database.
- Mammography Picture Databases at least 100 pictures of mammograms with ground truth. Extra pictures accessible according to popular demand, and connections to a few other mammography databases are given. (Organization: homebrew)
- Optic stream: the Barron and Armada examine.
- Optical stream test picture arrangements 6 engineered and 4 genuine picture successions (Configuration: Sun Raster picture)
- Molecule picture successions genuine and manufactured picture groupings utilized for testing a Molecule Picture Velocimetry application. These pictures might be utilized for the trial of optical stream and picture coordinating calculations. (Configuration: pgm (crude)) (LIMS-CNRS/CHM/IMM/vision/LIMS-CNRS)
- Groningen Regular Picture Database 4000+ 1536x1024 (16 bit) aligned outside pictures (Configuration: homebrew)
- IEN Picture Library 1000+ pictures, for the most part open air groupings (Organization: crude, ppm)
- College of Oulu wood and bunches database: 1000+ shading pictures, including characterization. (Arrangement: PPM)
- In our undertaking we have made a database by name "retsys", in that database we have made tables for every technique.
- Linguistic structure to make database:
- make database retsys;

IV. RESULTS & DISCUSSIONS

This CBIR framework is executed in Matlab and SQL is utilized as a backend apparatus for database creation and administration. At the point when client begins utilizing this framework to start with, they are coordinated to GUI window where they get an alternative to choose whether they need to pursuit or they need to embed into database.

When client chooses their choice they will be coordinated to another window as per their choice. On the off chance that they select pursuit choice they will go to look window and in the event that they select embed choice they will be coordinated to embed window.

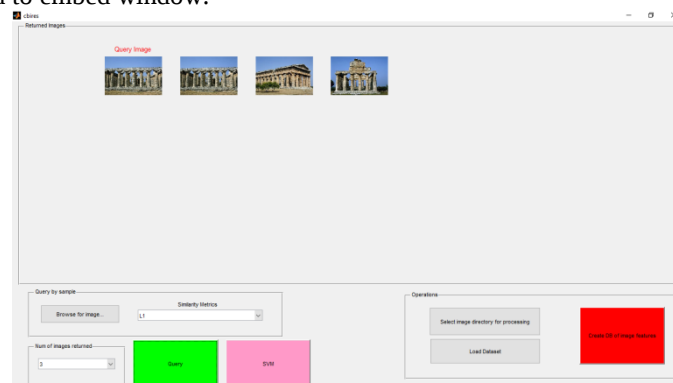


Fig:4 Non-Real time image processing

The image (location/suspect) selected can be processed to be compared to the database and the similar images will be returned. The images can then be backtracked to identify suspects and other personnel to solve an illicit activities that might have taken place.

In both the windows they will have the choice of choosing the one of the actualized strategies. In the hunt window they will have a choice of perusing the picture they need to look and that very picture will be shown on the screen.

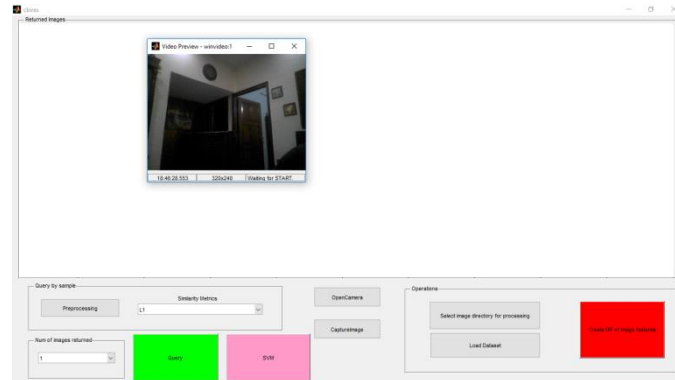


Fig:5 Real time UI

In real time, the cameras can instantly capture images upon selection.

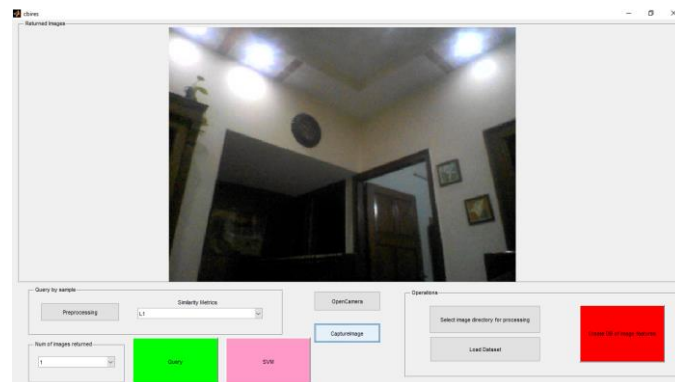


Fig:6 Captured image UI

The captured image can then be compared with the required databases to identify the suspect or location

V. CONCLUSION

Real time and non real time Criminal apprehend system at display is still especially an examination point. The innovation is energizing however youthful, and couple of operational picture files have yet demonstrated any genuine enthusiasm for reception. It isn't as viable as some of its more impassioned fans guarantee – yet it is a considerable measure superior to anything a large number of its faultfinders permit, and its capacities are enhancing constantly. Most present watchword based picture recovery frameworks leave an incredible arrangement to be wanted. In hardcore business terms, just a single utilization of program shows up our view is and is setting down deep roots. It isn't as successful as some of its more vigorous aficionados guarantee – yet it is a considerable measure superior to anything a significant number of its faultfinders permit, and its abilities are enhancing constantly. Also, as we contend in area Blunder! Reference source not found. above, most current watchword based picture recovery frameworks leave an extraordinary arrangement to be wanted.

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