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Research Article

Human Ear Identification System Based On SIFT And SURF Feature Technique.

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ABSTRACT

Biometrics comprises the learning of automatic approaches for individual human beings based on physical or developmental characters. The difficulty of finding good biometric features and recognition systems has been studied broadly in current ages. This research reflects the use of ears as a biometric for human recognition. In this paper, feature extraction skills are applied such as Harris Feature, FAST Feature extraction and SURF Feature Extraction. All the images are taken from standard database and every image has different angles because of any criminal examination, accident, or ATM machine room camera taken different types of images. In this research paper used SIFT algorithm. SIFT is an image local feature description process built on scale-space. Its strong similar capability, SIFT has numerous applications in different areas, such as image recovery, image edging, and machine idea. After SIFT was proposed, researchers have never stopped tuning it.

Keywords: Ear Biometrics, Pre-Processing SIFT, SURF Algorithm

Introduction

In this paper introduce the result oriented discussion about the feature extraction and feature matching using simulated on Matlab SIFT and SURF algorithm is a gentle of image limited structures, find the extreme points in the measure space, regulate the position, scale and revolution invariant technique, these fundamentals will be joint into a feature descriptor is the feature of the image. The excellence of images is 2448 by 3264 for height and width, correspondingly. [6] In image samples of the database, used most effective.

Database Description

Input ear image is a data for the purpose of use as image and this data used for our research it perform all are the operations on image.in this stage we are taken a various images from the database. For this stage AMI database used and downloaded no of images from this database. Database have a huge amount of images but for this research we taken specific images because of some images was not clear for the next operation so specific images are taken from database there are multiple images not clear and images are blur images, noisy images so first of all we collect all images and then perform one by one operation on it. Not only all images are taken by database but also we will try to take images from the digital camera keep space of 30-35 cm from ear and camera.in our research there are no of databases use apart from that we are taken some databases. Pre-processing is a basic experimental work. Images are ready for the every operation which researcher wants to apply various techniques. Images are taken from every angle such as right, left, down, up, top, bottom, front, back every angle because of if in an accidental cases sometimes human faces can be damaged or no clear images so that time images taken from different angles side face.

Fig. 1. Sample of images used in our research

Pre-processing:

This section, ear preparation and ear acknowledgment is explored. Ear location or registration is done by Speeded-Up Robust Features (SURF) matching. Before feature extraction, pre-processing steps such as noise reduction, normalization (to handle variations in illumination and orientation), and segmentation (isolating the ear region from the background) are often performed to enhance the quality of the ear images. SURF is used for mechanically bringing into line two images that differ by a rotation and a scale change. After ear arrangement procedure, normalisation and ear recognition is executed. Here normalisation means that all the images must be equal in dimension. If the images are not equal, then they have to alter in a standard measurement through cropping and resizing. Ear region only detected from the original image using filtering and thresholding methods. Following are the operations performed in the existing system. After the taken input images the author performs the next stages.

Pre-processing method perform various basic operations on the input images following processes are apply to the images for a result. Each and every research pre-processing techniques are applied for good result. Here image is resized to fixed size. *Equitation*

1	1	1
1	1	1
1	1	1

Set of coordinate points =

{ (-1, -1), (0, -1), (1, -1),
(-1, 0), (0, 0), (1, 0),
(-1, 1), (0, 1), (1, 1) }

Selection of Features

The template to obtain a subset of features, there are two completely different methods: feature extraction and have selection. The options that will have discriminating power were retrieved during feature extraction, and a set of the first set of options is designated during feature selection. The most common strategy for choosing an options set is to choose a collection of input variables and exclude alternatives that have little or no predictive information while preserving or improving classification accuracy.

SURF Feature (Speeded Up Robust Features)

According to Bay et al. (2006), this system was called (SURF) detector. Unlike other popular methods at the time, SURF makes significant use of the hessian matrix to speed up matching. In order to save computing time, it relies on integral pictures, and its descriptor expresses a dispersal of Haar-wavelet replies surrounding the point of interest. SURF is guaranteed to operate more quickly with the Fast-Hessian detector and low dimensionality descriptor (64 dimensions) CFeatures from Faster Segment Test (FAST) Created by Trajkovic and Hedley (1998), FAST is the individual feature-based technique functional for this finding. However, the application used for the comparison was published by Edward Rosten Points = detect SURF Features (I), points = detectSURF Features (I,Name,Value) SURF recognizes picture keypoints and produces descriptors. In light of Hessian lattice, SURF gets the keypoints. Rationalize the task and diminishes expense by smearing proper channel to the fundamental picture. Haar wavelet responses in x and y course are processed to decide the overview. In light of vital image and Hessian network, robust keypoint descriptors are illustrious by exploiting SURF calculation. At long last keypoints of two face pictures are synchronized with the end goal of acknowledgment [1].

SIFT Feature (Scale Invariant Feature Transform Algorithm)

Step 1: Detective work in Scale Space Extrema; Step 2: Localization of Key Points; Step 3: Assignment for the Orientation Course; and Step 4: Description Creation. Samara point nominees are localized and refined in the cay point localization step by removing the tonality peak where they rejected the first gear dividing line points. The orientation of the key point is determined using the local image gradient in the orientation assignment step. Using a 4x4 array location grid and eight orientation bins per sample, the description multiplication stage

calculates the local image descriptor for each key point based on the image gradient order of magnitude and orientation at each image sample point in a region centered at the key point. That is the key point descriptor's 128-element dimension.

Methodology

Methodology plays a vital role in an investigation area because of methodology gives us to actual progressive report of the research. Each and every steps display the process of the data every step perform basic operations of the previous steps. There are no. of processes are in research so step by step representation of process displayed by the methodology. In research Input is the raw data for the research and process go through each and every stages are for the correct output.

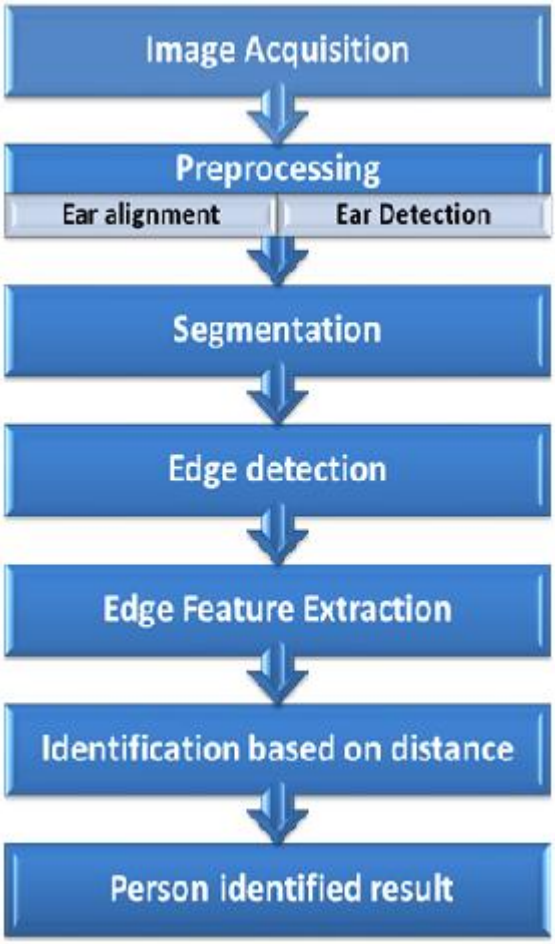

Fig. 2. Methodology for Human Ear Identification System

Result and Discussion

In previous section already discussed about the methodology and research work and its flow using various processes and perform the step by step execution here were used 28 peoples different samples all are images are taken from database in different views such as front, back, zoom, down, left, right .each people have .because every people and every angle we found the different features. We had gone through the techniques noise remove, edge detection, feature extraction, keypoint matching. Edge detection help us to find out exactly points, features where we want to match with our captured database or a taken images from the present area. Our research used the MATLAB2013 version as a software requirement.

MATLAB has been used to apply the previously described approach. Preparation and implication are the two components of the execution. The SIFT method is used to recover neighboring invariant features (scales, and descriptors, orientation, keypoints) from every workout image during the training phase. These features are then saved in a file called "trainingdata.m." The "train.m" script surrounds the training Matlab function. The impartial's job during inference is to identify a test image.

Throughout the implication stage, a set of resident invariant features is gained for the test picture and compared to the exercise feature-set expending the metric defined in segment 5. The ultimate product is the cup of the match that is closest. The writing contains the association Matlab function. The SIFT

procedure's ability to generate a high amount of features across a wide variety of scales and positions is a noteworthy characteristic. Human ear picture size, content, and procedure parameters are the core elements of the numeral of features created. To cut down on the amount of created key points, we down-sampled the development's training human ear images, which have a resolution of 2048 × 1536, by a factor of 16.

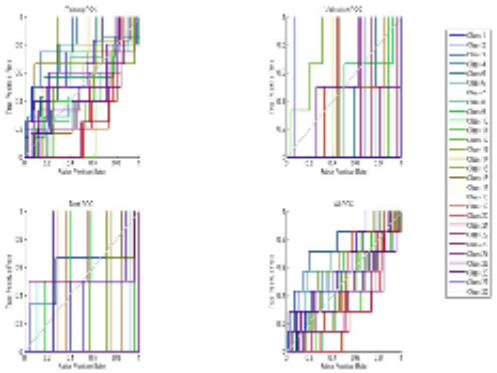

Fig. 3.SURF Feature ROC Curve

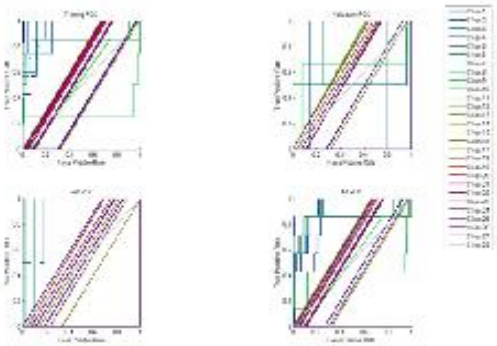

Fig. 3.SIFT Feature ROC Curve

For the purpose of feature matching here used SIFT algorithm which is based on found keypoints. in this table shows that the how many keypoints match with comparative two different features.

Table 4.4: Matching Features

Human Ear data Input Images	Corresponding Structures of SIFT	Counted features detected (Keypoint)		
		FAST	SURF	HARRIS
Image 1	15	50	45	70
Image 2	30	73	34	69
Image 3	10	39	29	54
Image 4	15	81	74	30
Image 5	9	45	58	62
Image 6	16	35	67	24
Image 7	13	25	55	29
Image 8	17	43	32	57
Image 9	20	47	40	45
Image 10	14	20	38	58

Conclusion

In this study, a fully automated technique for person identification was established. Because the ear has characteristics that make it distinctive and the ideal candidate, the author uses the ear photographs as a biometric applicant. The author of this study extracted ear-related items using the geometric technique and feature extraction. Cascade classifiers are used to extract features. Following detection, the ear's image is saved in a database in blob format. A person's image is evaluated for verification. The author created the photographs for comparison and worked on using the histogram.

Author's Contributions

In this paper each author contribute the equal task for the research and. Partial part of collection of databases and all over implementation of model up to result comparison.

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