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Assistive Clothing Pattern Recognition for Visually Impaired People

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ABSTRACT: Picking garments with confused examples and hues is a testing assignment for outwardly disabled individuals. Programmed apparel design acknowledgment is additionally a yearning research issue because of pivot, scaling, enlightenment, and particularly extensive intraclass design varieties. This approach is to plan a model that will create an ongoing item advancement for outwardly disabled individuals. Such a system of recognizing clothing patterns automatically having different colors makes their life better and improve their life quality. Our approach achieves 92.55% recognition accuracy which significantly outperforms the state-of-the- art texture analysis methods on clothing pattern recognition. The prototype was also used by ten visually impaired participants. Most thought such a system would support more independence in their daily life but they also made suggestions for improvements.

KeyWords: Discrete wavelet transform, scale invariance feature transform, support Machine algorithm,CNNY

I. INTRODUCTION

WHO imparts that, there are more than 161 million ostensibly outwardly hindered individuals around the globe, and 37 million of them are visually impaired people.Choosing clothes with suitable colors and patterns is a challenging task for blind or visually impaired people. They manage this task with the help from family members, using plastic braille labels or different types of stitching pattern tags on the clothes, or by wearing clothes with a uniform color or without any patterns. Automatic camera-based clothing pattern recognition is a challenging task due to many clothing pattern and color designs as well as corresponding large intraclass variations. Here, we introduce a camera- based system to help visually impaired people to recognize clothing patterns and colors. The system contains three major components.The system contains three real segments: (1) Existing images having different clothing patterns, (2) Clothing pattern recognizes by using a computer which can be a desktop, (3) Audio yields or a content message to give acknowledgment consequences of garments designs.

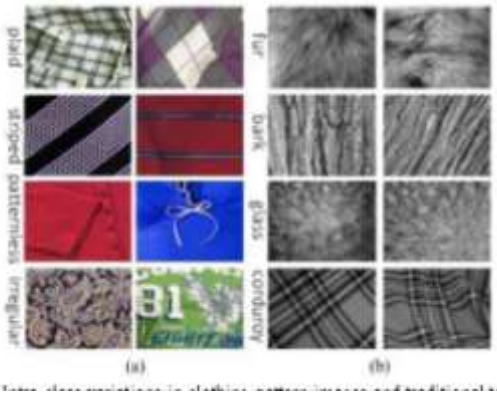

Figure1:Intraclass variations in clothing pattern devices and traditional structure images

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Our system can handle clothes with complex patterns and recognize clothing patterns into six categories (checkered, floral, solid, striped, zig zag,dotted) to meet the basic requirements based on our survey with ten blind participants.

Figure2: Overview and architecture design of the camera-based clothing pattern recognition system for blind and visually impaired persons.

II. RELATED WORK

Assistive frameworks are being produced to upgrade the life quality and wellbeing for those with unique including indoor route and way discovering, display reading, banknote recognition, recovery, and so forth. Liu et al. fabricated an attire suggestion framework for particular events.Liu et al. [1] built a clothing recommendation system for specific occasions (e.g., wedding or dating). Hidayati et al. [2] proposed a method for genre classification of upper-wear clothes. The two systems are both designed without considering key factors for blind

Users needs. Yuan et al. built up a framework to help blind individuals to coordinate garments from a couple of cloth pictures. This framework can furnish a client with the data about regardless of the garments examples. However this framework can't naturally perceive clothing designs. Because of the absence of invariance to general geometric changes, these methodologies cannot adequately speak to surface pictures with expansive 3- D changes, for example, perspective change and non inflexible surface misshapening. Multi fractal investigation [3] has accomplished great strength to 3-D distortions. Texture representation [4] is an advantage from the invariance of fractal measurements to geometric changes. For instance, multifractal range (MFS) proposed by Xu et al. [1] joined fractal measurements of pixel sets gathered by thickness capacities and introduction layouts. To make representation of texture more vigorous to 3- D picture changes (e.g., viewpoint change and non rigid surface deformation) and illumination variety, mostof the recent methods reply on extracting local image features [13], [14], [15].

Zhang et al. likewise joined scale invariant component change (SIFT) and SPIN for surface order. Not at all like existing conventional surface pictures, garments designs contain significantly bigger intraclass varieties inside each example classification. Although numerous PC vision and picture handling strategies have been created for surface investigation and order, conventional surface examination techniques cannot viably perceive clothing patterns.

Here, we develop a camera-based system especially for apparently blocked people to empower them to see pieces of clothing cases. It is insignificant exertion system and moreover straightforward. Normally seeing articles of clothing cases may enhance their life quality

III. PROPOSED WORK

The camera catches the image of clothes which as different patterns. The captured image will be processed with imageprocessing technique. The image will be analyzed for various patterns like lines and shapes. The shapes include circle, square, triangle and few other shapes. The algorithm is developed to recognize these shapes. Since pattern detection relies upon camera determination and lighting conditions. Fig.1 shows system block diagram. System consist of input which having camera and also CCNY online data images.

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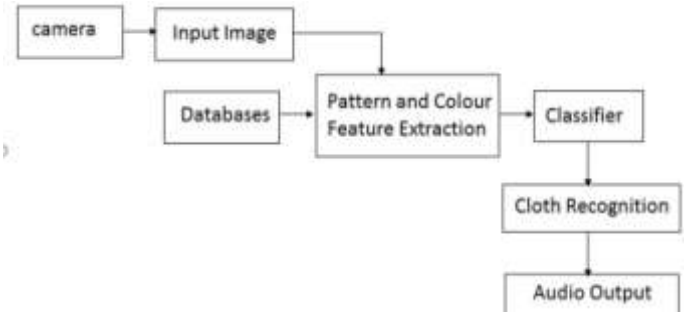

Figure 1: Architecture of proposed work

A. Training and Testing Images

The clothing patterns are as follows:
a. Irregular b .Pattern less c. Plaid d. Stripe Dataset integrates 100 images of six distinctive typical clothing pattern designs:checkered, striped,floral,solid,zig zag and dotted. The determination of each picture is downsampled to 140×140. Each one pattern has its own directionality, intensity and lighting variation. If the test image of stripe pattern the image patches are horizontal direction and but in the training set the image patches are invertical direction.

This change should be possible just by extricating the worldwide highlights like variance, entropy, energy, homogeneity. Once the superlative capacity has been assessed by the particular picture, every pixel in the photo is mapped comparatively, autonomous of the advantage of including pixels in the photo. These procedures are simple and quick, however they can cause lost differentiation. Cases of normal worldwide tone mapping strategies are differentiate diminishment. Local features are the points, small patches and lines. This two highlights joined together to get the situation of each picture pixels. These pixels can be in the matrix form. So they combined together using the classifier.

B. Pattern Classification

1. Statistics of wavelet subbands

Inorder to investigate the pictures which have not very many foundation commotions and uniform factual properties it is worthwhile to utilize measurable highlights. Discrete Wavelet Transform (DWT) is a decent ghostly investigation device for extricating the factual highlights. The DWT can be utilized to decay a picture I into low-recurrence channel Dj(I) under a coarser scale and numerous high-recurrence channels under various scales Wk,j(I); k = 1, 2, 3; j = 1, 2, . . . , J, where J is the quantity of scaling levels. Each scaling level produces four wavelet subbands. It incorporates one low recurrence channel Dj(I) and three high-recurrence channels Wk,j(I). The three high recurrence diverts separates data in level, vertical, and slanting headings. Here J=3 scaling level is utilized for decomposition. In this measurable descriptor four factual element esteems are extricated. It incorporates difference, vitality, homogeneity, andentropy of all wavelet subbands. These factual qualities ascertained are connected to frame the last descriptor.

2. SIFT(Scale Invariant Feature Transform) SIFT is utilized to remove the nearby highlights from the picture. It has detectorsand descriptor. The detectors will detect the interest points. The descriptors tocompute the representations of interest points based on their associated support regions [18]. Energy value is calculated forevery last pixel in a picture and each pixel value is compared. The pixel which hasdiverse properties is represented as interest points. It extract scale and rotation invariant interest points that is keypoints. It eliminates weak keypoints for processing.

IV. CNN CLASSIFIER

A Convolutional Neural Network (CNN) is a multilayered neural network with a special architecture to detect complex features in data. CNNs have been used in image recognition, powering vision in robots, and for self-driving vehicles.

Once a CNN is built, it can be used to classify the contents of different images. All we have to do is feed those images intothe model. Just like ANNs, CNNs are inspired by the workings of the human brain. CNNs are able to classify images by detecting features, similar to how the human brain detects features to identify objects. CNNs are regularised versions of multilayer perceptrons. Multilayer perceptrons usually mean fully connected networks, that is, each neuron in one layer is connected to all neurons in the next layer. The "full connectivity" of these networks make them prone to overfitting data. Typical ways of regularization, or preventing

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overfitting, include: penalizing parameters during training (such as weight decay) or trimming connectivity (skipped connections, dropout, etc.) CNNs take a different approach towards regularization: they take advantage of the hierarchical pattern in data and assemble patterns of increasing complexity using smaller andsimpler patterns embossed in their filters. Therefore, on a scale of connectivity and complexity, CNNs are on the lower extreme.

V. RESULTS AND DISCUSSIONS

A. Greyscale Image

In photography, handling, and colorimetry, a grayscale or then again greyscale picture is one in which the estimation of each pixel is a singular case addressing only a measure of light, that is, it passes on just force data. Formula for conversion of RGB image to gray scale image is given by:

Gray img=0.3R+0.59G+0.11B

B. Radon Transform

In this paper, Radon Transform only used for preprocessing. It shows particular pixels for particular image pattern. It demonstrates specific pixels for specific picture design. Striped garments have one guideline introduction and plaid garments have two guideline introductions. Thesporadic and patternless garments don't have any prevailing rule introduction toward any path. They can be separated from each other by estimation of difference. Unpredictable examples haveextremely huge varieties than design less pictures.

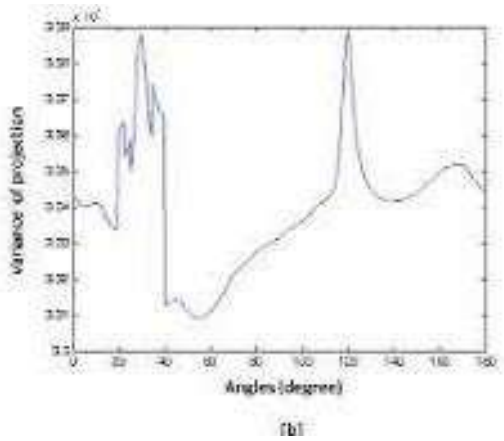

Fig1.Radon Transform

C. Output of System

The system shows output visually. Itshows output of solid, zig zag,floral,striped,dotted,checkered pattern It also gives output in audio form.

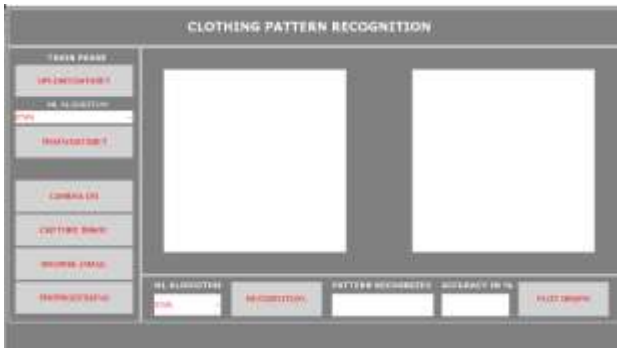

Fig1:Proposed System

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Fig2:Captured image

VI. CONCLUSION

In this paper, we have proposed a system to perceive attire examples to help outwardly debilitated individuals in their day to day life. We utilized Radon Transform to get the overall directionality features; STA to extract the global statistical features on wavelet subbands; and SIFT to represent the local structural features. The combination of multiple feature channels provides integral data to enhance acknowledgment exactness. We have gathered a dataset on dress example acknowledgment including six-pattern classification of solid,checkered,floral,dotted,striped and zig zag. This research leads to improvements over existing methods in taking care of complex clothing patterns with large intraclass variations. The method is very much useful to improve the life quality of blind, low vision and visually impaired people.

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