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Implementation of Machine Learning Based Pattern Recognition for Blind People

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Abstract- Based on statistics from the World Health Organization (WHO), there are more than 161 million visually impaired people around the world, and 37 million of them are blind. According to the World Health Organization (WHO), low vision is defined as visual acuity of 20/200 or less in the better eye with best correction possible (WHO. 2004). In this paper, the system of automatically recognizing clothes pattern and colors are proposed. The images are captured by the camera and get processed to identify the pattern of the clothes that is chosen. This can be classified using the support vector machine algorithm. For this the features of the image have to be obtained. These features can be extracted using three descriptors. The Radon Signature descriptor is to extract statistical properties, the wavelet sub bands are used to extract global features of clothing patterns. Matching clothes is a challenging task for many impaired people; The use of an efficient computer based system to match clothes with multiple colors and complex patterns helps visually impaired people and blind people to distinguish between pattern and their color information. There are three main components in our methodology for detecting clothes Color and their Pattern detection, we develop the computer based system that detect the cloth pattern and their color, in that the pattern and color is recognize on the based of RGB color scheme. To evaluate effectiveness of the given system we used different image comprising technique to analysis the cloth pattern and their color.

Keywords- *Machine Learning, Visually Impaired People, Radon and DWT Transforms, Pattern Recognisation.*

I .INTRODUCTION

For visually impaired people when they go to the textiles for selecting the dresses they could not be able to choose the clothes. So choosing clothes with suitable colors and patterns is very difficult for them. They can manage this difficulty with the help of other people. Some of them use plastic Braille labels or different types of electronic assistance but they cost high. Most of the blind people due to these difficulties they prefer to wear the clothes with a uniform color or without any pattern. The visually impaired people have difficulty for choosing the clothes. And also choosing clothes with complex patterns and colors is more challenging task for them. They use other methods [10] to finding the pattern with the help of rotation and illumination invariant analysis it is possible to find out the patterns and also standard algorithms [6] were developed for the blind people to find the pattern and color but due to the large intra class pattern variations those method gone failure. To overcome all these problem computer vision based system is developed to recognize clothing patterns in four categories of pattern and identifies colors**.**

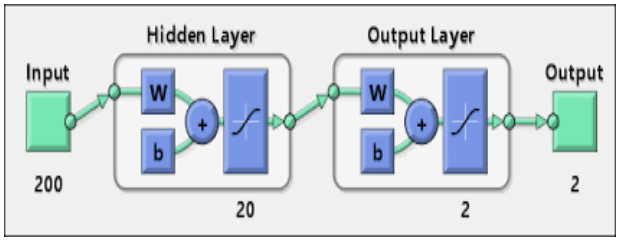

Figure 1: A Trained Machine with Matlab.

In [1] and [2] the texture was identified, but finding the texture with very less dataset is not useful because the intensity value and the directionality changes for all the images, so the local features is to be extracted to overcome this problem. Due to large variance and local points of the same clothing pattern categories, global features and directionality of clothing patterns are stable within the same category. Therefore, it is able to obtain best result with local feature extraction. The combination of global and local features extraction for clothing

pattern recognition that is radon Signature, Statistical descriptor (STA) and scale invariant feature transform (SIFT).

II. LITERATURE SURVEY

There are so many authors and researchers they can proposed the so many methodologies to pattern reorganization for visually impaired people. Some of the works are as follows Xiaodong Yang [11] developed a system for blind people to select clothes based on cloth pattern and colors in a cloth shop independently. This is a camera based system that can recognize clothing patterns into four categories (plaid, stripped, pattern-less, and irregular) and identify 11 colors: red, orange, yellow, green, cyan, blue, purple, pink, black, grey and white.

FAIZ .M. Hasanuzzaman proposed a system to automatically recognize banknote of any currency to assist visually impaired people in [12]. This is also a camera based computer vision technology. This system has features like high accuracy, robustness, high efficiency, ease of use. This system is robust to conditions like occlusion, rotation, scaling, cluttered background, illumination change, wrinkled bills, and also eliminating false recognition and can guide the user to properly and correctly focus at the bill to be recognized using Speed Up Robust Features (SURF). Dimitrios Dakopoulos and Nikolous developed a vision substitution system for travel aid for blind in [13]. Out of the three main categories of navigation systems (Electronic Travel Aids, Electronic Orientation systems, Position Locator Aids), they focus on Electronic Travel Aids. In all these works, the needs of blind people are considered. But, the main area where a color blind person faces a problem other than the traffic signals is in a cloth shop for selecting clothes of desired colors and patterns without the help of another person.

III. PROPOSED WORK

The proposed work is for developing an assistive system to provide an aid for the color blind people in selecting clothes in a cloth shop of different colors, where the assistive system that is proposed here would help the color blind customer in the cloth shop to select clothes of different colors independently. The system of automatic pattern and color recognition system capable of real time recognizing the patterns and colors. Choosing the appropriate pattern and color of the clothes is important to assist the blind people to make decisions. The recognizing process depends basically on two factors they are preprocessing and feature extraction they are required to implement a system to recognize the different patterns. For that the training algorithm called support vector machine are used.

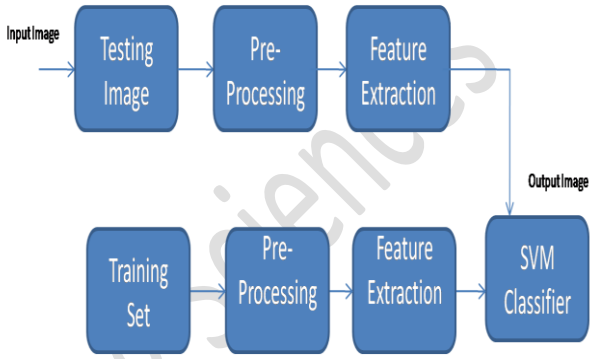

Figure 2.Functional Block Diagram of Proposed Methodology.

Extracting the feature is the important method of classifying the patterns. Each image has its own characteristics. To analysis this characteristics the features are used. These features can be extracted using the following algorithms.

- Statistical (STA) feature extraction
- Scale Invariance feature transform (SIFT)
- Recurrence Quantification Analysis (RQA)

A. Statistical (STA) feature extraction

Statistical feature extraction is done using the wavelet transform. The STA is used to decompose the image pixel into low pixels. STA have 4 features like variance, energy, uniformity and entropy. Using these features the images can be classified.

B. Scale Invariance feature transform (SIFT)

SIFT is the local feature extraction. To perform easier recognition, it is important that the global and local features extracted from the training image

be identified even under changes in image scale, noise and illumination, as the name mentioned it is invariant to the scale. The feature extracted is points, patches in the image.

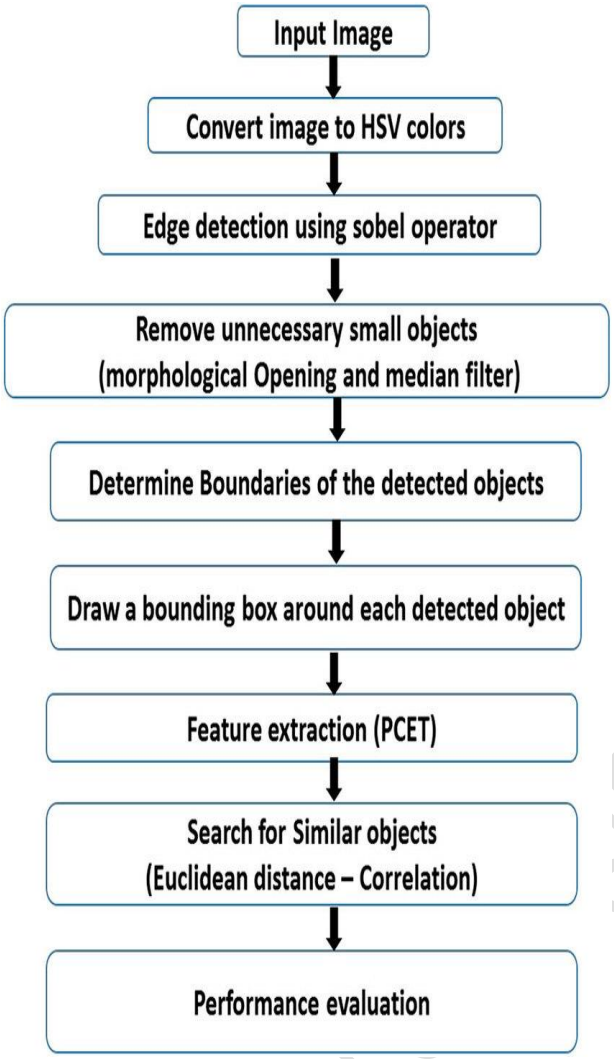

Figure 3. Pattern Reorganization detection flow chart.

C. Recurrence Quantification Analysis (RQA

Recurrence Quantification Analysis (RQA) is also a local feature extractor. Mainly it is used to increase accuracy in the SVM classifier. RQA has three feature they are Recurrence Plot – It is a graph that shows all the time at which a state of the dynamical system recurs. Recurrence rate- It is the percentage of points in the threshold plot. This obviously depends on the radius but not for the fixed radius. Fig 3 shows the flowchart of the operation performed. In Color recognition, after capturing the image from camera, image is divided into RGB pattern and then with the help of RGB values the color of the cloth is displayed. Color is the most vital visual feature for humans. By representation, we mean the overall of image content when used as a "global" feature. A space is defined as a model representing in terms of intensity values.

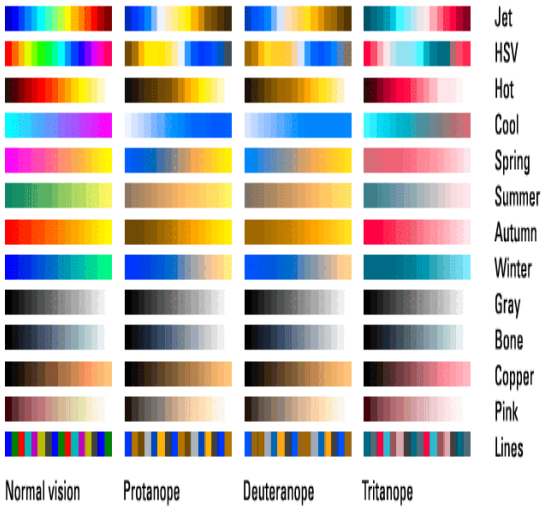

Figure 4.Matlab color maps as seen by color-blind users.

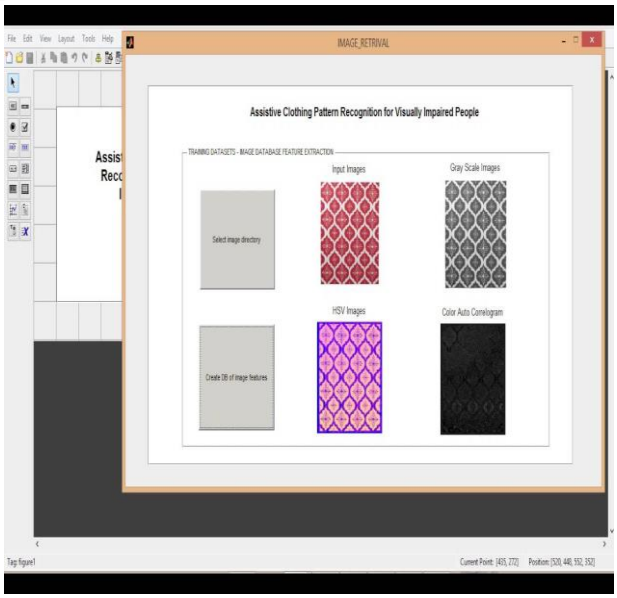

Figure 5.Simulation Results of Assistive Pattern Reorganization method on Mat lab.

There are different s models: RGB, Lab, HSV, HSI, YCbCr, etc. Each of these has got specific applications and also has got advantages and drawbacks. In this system, RGB color model is used.

IV. CONCLUSION

Here, we have developed a system to recognize clothing features and colors in particular to help color blind people in their daily life to lead an independent and quality life, using global, local feature identification and multilevel clustering to increase the accuracy of the assistive system. Also the performance evaluation of the assistive can validate the resulting performance of the system.

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