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A Survey Based On Cloth Pattern Recognition for Optically Defective Humanity.

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ABSTRACT

The recognition of Clothes pattern is a challenging task for optically impaired people .Due to the large intra class pattern variation this becomes a challenging task in computer vision. The clothing pattern is categorised into four that is plaid, striped, pattern less irregular and handling complex patterns and colour that cannot be identified by optically impaired people .This system integrates a camera, a microphone, a computer and a Bluetooth ear piece for audio description. There is a method to recognize clothing pattern efficiently by using Radon Signature descriptor and fuzzy Clustering to capture global features of clothing patterns and colour. The Advantage of this method is Efficiency is increased and we get crisp output using Defuzzification .It outperforms the texture analysis on clothing pattern recognition. Most thought of this system would support more independence in their daily life.

Keywords: clothing pattern recognition, texture analysis, and clustering, optically defective people.

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INTRODUCTION

Based on statistics from the World Health Organisation (WHO), there are more than 165 million visually impaired people around the world, and more than 37 million people are blind. Leading causes of blindness and low vision are diabetics, infection, traumatic injuries, cataracts, macular degeneration, diabetic retinopathy, cataract and glaucoma. Colour plays a major role in everybody's life. For the visually impaired people this became a task in their day –to-day life.

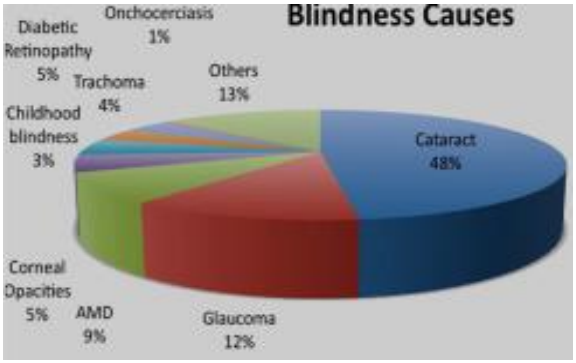

Fig 1: Blindness Chart

Levels of Visual Function include:

- Normal vision
- Moderate visual impairment
- Severe visual impairment
- Blindness

The prevalence of visual impairments increases with age i.e. about 15% of the people are in the 45-64, 17% of people in the range 65-74, 26% of the people of age 75 and older. In addition, visual function is comprised of many other components. These include visual field, colour perception, stereo acuity, dark adaptation, glare recovery, contrast sensitivity function. Based visual impairment prevalence studies, these qualities of vision are not commonly assessed in population. Here, introduced a camera-based system that helps optically defective humanity to recognize clothing patterns and colours. This system contains of three major components 1.For capturing clothing images an sensor including camera, for speech command input a microphone is involved and speakers for audio output that user can hear identically.2.Data capture and analysis of clothing pattern recognition, and colour identification by using a computer which can be a desktop or an smartphone.3.Audio outputs for the status of the colour and pattern which they have chosen.

In an extension our system can handle clothes with complex patterns and recognition of clothes in four categories such as plaid, striped, pattern less, irregular and identifying different colour.

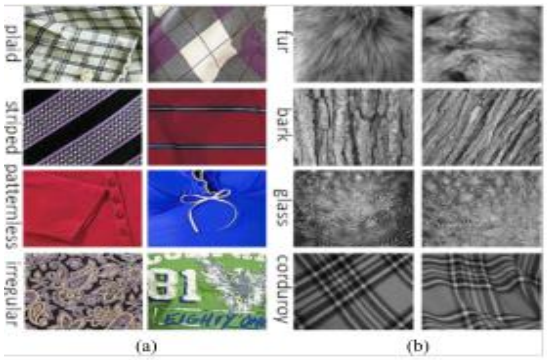

Fig. 2. Interclass variations in clothing pattern images and traditional texture images. (a) Clothing pattern samples with large interclass pattern and colour variations. (b) Traditional texture samples with less interclass pattern and intensity Variations. Clothing pattern recognition including four-pattern categories of plaid, striped, pattern less.

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METHODOLOGY

There are different methods to discriminate the cloth pattern for optically defective humanity. Some of the methods are like scale invariant feature, banknote recognition, electronic travel aids, navigation assistance, etc. These features are more usable for blind people detecting the difficulties of recognising.

Statistical descriptor and scale invariant feature transform:

In this method Xuedong Yang, Shuai Yuan, and Ying Li Tian in 2014 proposed a work to categorise the cloth pattern .Basically cloth pattern provides a large intra class variation which results in the major challenge task for cloth pattern recognition. In this method clothing pattern is categorised into plaid, striped, pattern less and irregular.

This cloth exhibits the property of anisotropic and isotropic in nature. To differentiate the clothing pattern radon signature is used to characterize directionality feature of cloth pattern. Radon signature performs based on radon transform that used to detect the principle orientation of image. Signature plots on r and ϑ this presents large colour or intensity variation and it becomes complicated to avoid or to reduce the intensity sobel operator is introduced and discrete wavelet sub bands are involved this decomposes the image into low frequency channel. Thus cloth pattern is recognised by this method.

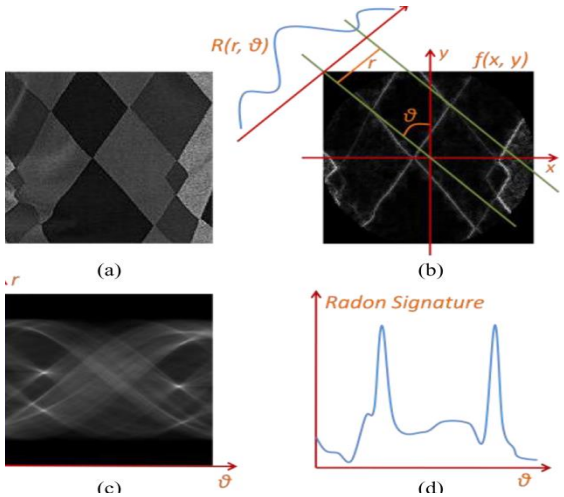

Fig.3. (a) an intensity image of clothing pattern.
(b) Radon transform performed on a maximum disk area within the gradient map
(c) Result of Radon Transform. (d) Feature vector of Radon Signature.

Banknote recognition for blind:

Faiz M. Hasanuzzaman, and Ying Li Tian ,Xiaodong Yang has proposed the method of recognising the banknote by surf features .this helps in detecting the bank note and currency .mainly applicable for the visually impaired people. This is also a camera based computer vision technology for the recognition of bank note.

Surf features are used to achieve high accuracy and to handle various conditions in different environments. The query image are extracted by surf feature and then compared with reference regions of each class. This system is robust to conditions like rotation, scaling, cluttered background, illumination change, wrinkled bills. SURF is becoming one of the most popular feature detectors in computer vision field. The descriptors is able to generate scale-invariant and rotation-invariant interest points in banknote.

Several techniques have been employed to identify banknotes. Lee and Jeon utilized a distinctive point extraction that used a coordinate data extraction method from specific parts of a Euro banknote representing the same colour. Banknotes direction and its face value are the two main parameters used in recognising of banknotes.

Most banknote recognition methods employed neural network techniques for classification .Takeda *et al.* First extracted features from the image and then input them to neural network for training and testing.

Wearable obstacle avoidance electronic travel aids for the blind:

Dimitrios Dakopoulos and Nikolaos G. Bourbakis proposed a method which is aided for defective people. Electronic travel aid is used to locate and detect objects and it provides information to the user about its range, direction and height of the object. In which two ultrasonic sensors are attached on the eye glass. This sensor senses the data from the environment and it us given to the microcontroller, A/D converter is used to get audible output and it is given to the user through earphones.

NAVBELT:

The navbelt is a technology developed for the people physically challenged and it is proposed by Borenstein in the University of Michigan .this consists of an ear phone, ultrasonic sensor and a computer.in which eight sensors are used to get the information and it is received by the computer. This sensor creates a map of angles for each sensor and the distance of an object is determined at its angle.

This navbelt can be operated in two modes .during the guidance mode the computer knows his or her destination and it is guided accordingly.in the image mode the different amplitudes are taken from eight directions and these amplitudes are converted to sound by computer and it is given to the user through the ear phone for their easy navigation.

Fig.4. "Seeing with sound" system (glasses With attached camera, ear speakers, and portable computer).

Navigation Assistance for Visually Impaired:

This has developed by Sainarayanan *et al.* from University Malaysia Sabah. This is an sound based system to assist for blind people.to identify objects in front of them during navigation .it holds of an digital video camera, stereo head phones single board processing system and a rechargeable batteries.

The video camera captures the grey scale video and it is resampled into 32× 32 resolution. Then by learning vector quantization the objects are enhanced and the background image is suppressed. The image which is driven is divided into two left and right and it is converted into stereo sound and it is given to the user. Since the blind user are well trained with stimulated experiments.

Only the object which is near can be identified by this method that becomes the drawback of this system. Many people have developed an electronic aid to assist the blind.

Cloth pattern recognition using surf:

Manisha Dhongade has developed a system that can detect the cloth pattern and it is verbally used by the blind .SURF is an algorithm is used to detect the local feature of an image, and to extract the feature GLCM is grey level co-occurrence matrix. Local feature gives information about the image patches. Global feature are

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compact and it is sensitive to occlusion and clusters. These both local and global features are combined to give a better result in pattern recognition.

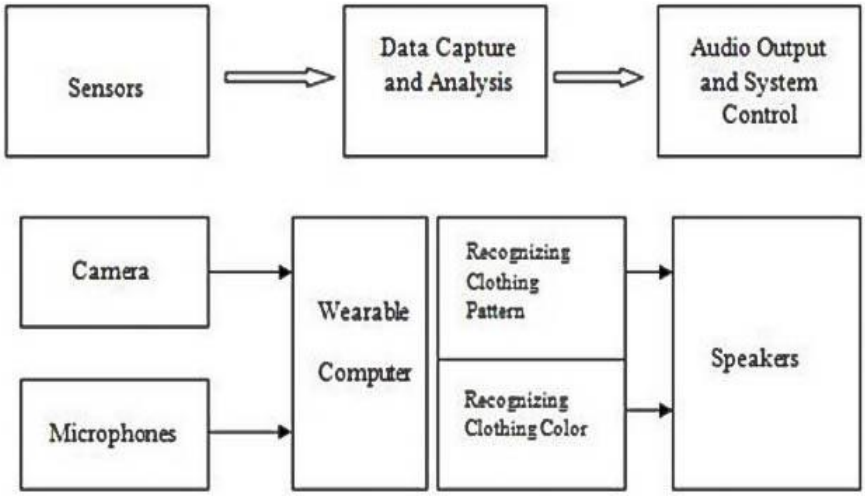

Fig.5.Block Diagram for cloth pattern using SURF

Global Features are captured from discrete wavelet and grey level matrix. The vector which is concatenated is given as input to the support vector machine. Features are clustered using the k-means algorithm. And the colour identification is done through HSV. In this pure colour have saturation value closer to1, whereas the grey colours have their saturation value closer to zero. Each image of clothing is converted from RGB to HSV colour space. If the clothing has multiple colours dominant colour is taken and it is given as an output to the user.

In the HSV system, the hue of a colour is its angle measure on a colour wheel. Pure red hues are 0°, pure green hues are 120°, and pure blues are 240°. V is brightness. Intensity is the overall lightness or of the colour, defined numerically as the average of the equivalent red, green and blue (RGB) values classifies the pixels in the image to the following colours white, black, red, orange, yellow, green, cyan, blue, purple, pink , and grey.

The error rate of this method is about 23.75 this becomes a disadvantage.Table1 is the comparison table and its disadvantages of that method.

Table 1: comparison table

AUTHOR	**TITLE**	**ALGORITHM**	**DISADVANTAGE**
Shuai Yuan,Xiadong Yang and Yingli Tian	Assistive Cloth Pattern Recognition for visually impaired people	Statistical descriptor and scale invariant feature transform.	Difficult to handle large interclass variations
Fiaz M.Hasanuzzaman, Xiadong Yang,Yingli Tian.	Robust and effective component based Bank Note Recognition by using SURF Features.	SURF	Cannot be used in various conditions and environments
Dimitios Dakopouls,and Nikoloas G.Bourbakis	Wearable Obstacle Avoidance Electronic Travel Aids For Blind.	Electronic Travel aid	Only to a short range distance
Sainarayan etal	Navigation Assistance for visually impaired	Sound	Object which is near can be identified
Maniaha Dhongade	Cloth pattern recognition for blind by using SURF and combined GLCM	SURF and GLCM	Error rate is higher

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CONCLUSION

This paper has provided the survey of different classification algorithms for clothing and the colour recognition. After all the methods and analysis, Radon signature is to capture global directionality features and fuzzy clustering helps in recognition of the patterns. Defuzzification is used to get the crisp result. The extracted global and local features are combined to recognize clothing patterns by using a support vector machines (SVMs) classifier. The combination of multiple feature channels provides complementary information to improve recognition accuracy. Based on a survey and a proof-of-concept evaluation with blind users,. This research enriches the study of texture analysis, and leads to improvements over existing methods in handling complex clothing patterns with large interclass variations. The method also provides new functions to improve the life quality for blind and visually impaired people.

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